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MEDIUM OF INSTRUCTION AND ITS EFFECT ON MATRICULATION EXAMINATION RESULTS FOR 2000, IN WESTERN CAPE SECONDARY SCHOOLS:

A study of examination results in relation to home language and language medium

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DECLARATION

I hereby declare that this dissertation is my own original work and has not been submitted before to any institution for assessment purposes.

Further, I have acknowledged all sources used and have cited these in the bibliography.

ABSTRACT

South Africa must see a measurable improvement in the quality of education in order for all sectors of the population to become relevant. We have a democratic constitution which promises equal opportunities for all. In practice, however, this is not always realised. In the educational domain, for example, language medium is an essential element in all learning, but, as this study shows, we still have the situation where premature learning through an insufficiently developed second or third language impacts negatively on quality of education and on students' performance. The stigma associated with Afrikaans as 'the language of the oppressor' and the perception that African languages are underdeveloped and inferior, further strengthens the position of English as the dominant language in South Africa. Because of the global status of English, it is obvious why the desire to acquire proficiency in English is high among all segments of the population. The importance of English as a language of power is not disputed. However, this study stresses the necessity for the empowerment of African language speakers in their mother-tongues as a prerequisite for empowerment in English, by showing clearly that there is a correlation between first and second language acquisition, as well as between home language, language medium and academic results. Those students who receive education through the medium of their first/home language(s) are advantaged as against the majority, who are taught through a second/foreign language.

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LIST OF ABBREVIATIONS

AEFL - Afrikaans, English First language

AEXFL - Afrikaans, English, Xhosa First language

AFL - Afrikaans First language

ASL - Afrikaans Second language

ave % - Average Percentage

AXFL - Afrikaans, Xhosa First language

BIO - Biology

CED - Cape Education Department

DET - Department of Education and Training

EFL - English First language

ESL - English Second language

EXFL - English, Xhosa First language

GEO - Geography

HG - Higher Grade

HOD - House of Delegates

HOR - House of Representatives

L1 - First language

L2 - Second language

MATH - Mathematics

matric - Matriculation

PHYS/PHYSICS - Physical Science

SG - Standard Grade

WCED - Western Cape Education Department

XFL - Xhosa First language

XSL - Xhosa Second language

XTL - Xhosa Third language

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CHAPTER ONE

General Introduction

1. STATEMENT OF THE PROBLEM

The political history of South Africa has left us with a legacy which perpetuates inequalities created in the past. These inequalities are deeply rooted in the education system, and are manifest in the matriculation examination results for 2000. The new constitution promises equal opportunities for all South Africans as a basic human right and promotes a multilingual society as one of the means to achieve this. In contrast to this, our education system, de facto, benefits an Afrikaans and English speaking elite. African language speakers remain at a disadvantage because they are denied access, in practice, to education in their primary language of communication and conceptual development.

In light of the above I want to investigate the low matric pass rate among African language speakers in comparison with the better results obtained by their Afrikaans and English speaking counterparts. I suggest that the skewed distribution in academic performance can largely be attributed to the fact that while Afrikaans and English speakers are assessed in their home languages in grade twelve, African language speakers, with individual exceptions, are assessed in their second or third language.

2. HYPOTHESIS

The underlying hypothesis driving this research is that African language speaking learners in the Western Cape will tend to do badly in the matriculation examination largely because the medium of instruction and assessment is not the mother tongue, but a second or third language.

3. RATIONALE

Formal learning in schools takes place mainly through the transfer of information from the teacher to the learner and by the negotiation of knowledge between them. The teacher has information that s/he wants to impart to the learner. Whichever the method chosen by the teacher, for the learner to access this information, some form of communication is necessary. Thoughts and ideas must be expressed in a 'concrete' and efficient way. In the classroom, language plays an essential role in realising ideas. It provides us with the mechanism or vehicle to communicate effectively.

The Reader's Digest Universal Dictionary (1987:323) defines 'communicate' as

> ... To share or convey information. To have an interchange of ideas. To express oneself in such a way that one is readily and clearly understood. ...

For most human beings language is the medium through which knowledge is transferred or negotiated. The success of this interaction is determined by the effectiveness of the communication. Thus it would be fair to say that if the means of communication is inappropriate, there will be no knowledge transfer. Further, it seems logical that before any other considerations are made with regards to teaching and learning, the instrument which enables this interaction should first be in place.

Cummins' psycholinguistic theory suggests that

> If academic development of minority students is the goal, then students must be encouraged to acquire a conceptual foundation in their L1 to facilitate the acquisition of English academic skills. Also academic skills in both L1 and L2 should be promoted through providing opportunities for students to use written and oral language actively for meaningful communication.
>
> Cummins, 1991:172-173

In South Africa's multilingual society, educational practice is, by default, becoming an exclusively bilingual (Afrikaans and English) practice.

4. SIGNIFICANCE AND RELEVANCE OF THE STUDY

In a post-apartheid South Africa where we are trying to address the inequalities created in the past, the issue of language medium has, once again, come under the spotlight. The choice of language medium is a debate which is at the heart of educational reform. This study hopes to inform this debate by highlighting the inadequacy of current practice and calling for change. The paramount objective would be to improve matriculation examination results for first language speakers of African languages. At this point I would like to signal that the nature of this project allowed me to focus on only one region in South Africa, namely, the Western Cape, but that a more comprehensive study that explores academic statistical patterns on a national level, will follow.

5. CONTEXTUAL VALIDITY OF THE STUDY

The study is based on the psycholinguistic theory developed by Jim Cummins. The theory serves as a foundation on which the rest of the study is built. I also take account of recent critiques of Cummins' threshold theory by, among others, MacSwan and Rolstad.

6. DELIMITATIONS

In doing a study such as this, I cannot fail to acknowledge that there are a variety of interlinked factors which combine to contribute to the imbalance in academic performance between the three main language groups in the Western Cape, in varying degrees. It would be irresponsible to pinpoint any one factor as the sole cause for the discrepancy in matriculation

results. What complicates this study even further is that these factors, created either directly or indirectly by South Africa's political past, largely exist along the same lines as the division in language communities in the Western Cape, eg. socio-economic differences, inadequate teacher training and motivation, level of learner motivation. We recognise that while we cannot isolate language as the sole cause of the difference in academic performance between Afrikaans, English and Xhosa speaking learners, we can determine to which extent language medium and academic performance are related. There are two significant points of departure:

- the constitutional ideal of equal rights and equal opportunities for all South Africans, and

- psycholinguistic theory developed by Cummins.

7. SYNOPSIS OF THE DISSERTATION

In Chapter Two I take a brief historical look at the role of language in education and how the functions and values assigned to languages by people in power are transferred to existing language practice and language attitudes in South African society today.

In Chapter Three I lay the theoretical foundation for the rest of the study.

Chapter Four gives a layout of the methodology used in the study, including a discussion on the internal validity of the study.

In Chapter Five I compare the average pass rates of three major categories of learners in the Western Cape so as to establish the extent of existing differences in academic performance between these categories in a rough, quantifiable manner.

In Chapter Six I use statistics on the average percentage obtained in various subjects to determine whether possible patterns exist in schools that perform much better or much worse than others in the same category.

Chapter Seven is divided into two sections, A and B. In section A I look at the relationship between the First language and the Second (or additional) language. In section B I examine the relationship between language and academic performance by looking at the performance of learners in the language medium subject in relation to their academic performance in certain subjects using statistics for all the schools in each of the three major categories.

In Chapter Eight I attempt to determine the degree of relationship between language proficiency and academic performance by calculating correlation coefficients in the language medium subject and other key subjects, regardless of category.

In the last Chapter (Chapter Nine) I summarise the main points that emerge from this study, as well as further recommendations for future studies and planning.

CHAPTER TWO

Historical Background: Lessons to be learnt

Education is never neutral but is directed towards achievement of certain purposes, behind which rest fundamental issues such as philosophies of life, religious beliefs, ideas about the state and society, political ideologies and the working of economic forces.
Hartshorne, 1995:306

1. INTRODUCTION

There are three major home language groups in the Western Cape:

- Afrikaans (59.2%)
- English (20.3%)
- Xhosa (19.1%)

Census in Brief, 1996:2.8

These three languages do not enjoy equal status in the various domains of society. Without going into too much detail, it suffices to say that this can largely be attributed to South Africa's political past. The post-apartheid South African government has recognised that, in order to fully empower their speakers, there is a need to elevate the status of languages which were previously deliberately suppressed:

> Recognising the historically diminished use and status of the indigenous languages of our people, the state must take practical and positive measures to elevate the status and advance the use of these languages.
> The Constitution of the Republic of South Africa,1996:Act 108

These 'practical and positive measures to elevate the status' of what will loosely be defined as African languages takes place through the process of status planning. Cooper (1989:99)

defines status planning as the 'deliberate efforts to influence the allocation of functions among a community's languages'.

He goes further to say that

> Determining media of instruction for school systems is perhaps the status-planning decision most frequently made, the one most commonly subject to strong political pressures, and the one most often considered by educationists and by students of language planning.
>
> ibid:109

This brings me to the topic of this thesis: language medium in education, and more specifically, the language medium used by African language speaking learners in the Western Cape. Perhaps, before narrowing our discussion to a provincial level, as a guide, it would be useful to examine language in education policies elsewhere in Africa.

2. LANGUAGE IN EDUCATION POLICY IN AFRICA

Alexander (1989:41) identifies Zimbabwe and Namibia as two countries having a similar colonial history and population make-up to South Africa. I will briefly look at the language in education policies before and after independence in these two countries:

2.1 ZIMBABWE

The pre-independence Zimbabwean education system is described by Colclough et al. (1990:35) as an education system which was

> ... consistent with, complementary to, and underpinned and sustained by the political aims and objectives of the white settler minority - separate development and racial segregation. The result was the establishment of a dual education system - one system for the whites and coloureds and the other for Africans - with completely different aims and purposes.

The Zimbabwean government gained Independence in 1980. The new ZANU(PF) government considered education as a basic right for all citizens (ZANU (PF) Election Manifesto: 1985 p.2 cited in C. Colclough et al., 1990:36). The language in education policy

viewed English as an unbiased, unifying language and therefore adopted a straight for English approach, with Shona and Ndebele taught as subjects (Heugh cited in Alexander 1989:41-42).

The present language in education policy of the Zimbabwean Government follows a subtractive multilingualism[1] format where the home language of the majority of learners is used as the medium of instruction in the first three grades. In grade four there is a gradual change to English as medium of instruction (C. Colclough et. al., 1990:47).

Even though accommodation is made in schools for mother-tongue instruction in the first three years of schooling, success has been limited because the change to English as a medium of instruction comes before the relevant threshold[2] is reached. This shift from a straight for English approach towards the incorporation of indigenous languages in the education system as languages of instruction confirms Heugh's theory about language policy in African countries. Heugh (cited in Alexander, 1989:42) maintains that

> What we have witnessed thus far in the early years after independence (in Zimbabwe) is a familiar pattern where English is selected as a language of wider communication and also one which acts as a unifying bond where intense rivalries exist between major groups within that newly independent state. ...[A]fter the initial language policy has been made, adjustments are gradually made to give greater emphasis to indigenous languages.

2.2 NAMIBIA

Before Independence in 1990, Namibia formed part of South Africa. It therefore shares South Africa's political policies of segregation and exclusion for 'non-whites' (Presidential Commission on Education, Culture and Training, 1999:108-109).

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[1] See chapter three

[2] See chapter three

For much the same reasons as elsewhere in Anglophone Africa, after independence; English was chosen as the official language of the country, despite its multilingual make-up.

> SWAPO has chosen English as its official language because it is a foreign and international language and as such may play a unifying role for Namibians whereas an indigenous language may create divisions within the society.
>
> Heugh cited in Alexander 1989:43

The Namibian language in education policy is almost identical to that of Zimbabwe, except that Namibia also has a 'straight for English' option where 'English is used as the sole medium of instruction from Grade 1 in circumstances where the dual language policy is impracticable' (Presidential Commission on Education, Culture and Training, 1999:109). The Namibian language in education policy is also subtractive.

3. WHICH WAY FOR SOUTH AFRICA?

Alexander describes the development of existing language attitudes by South Africans today:

> Apartheid language policy tried to continue and to intensify British colonial policy but with the substitution of Afrikaans for English as the language of domination and social accommodation. ... it was the possibility of breaking up the black people into a large number of conflicting and competing so-called ethnic groups that really gave rise to this policy.
>
> Alexander, 1989:21

Further on Heugh explains that

> Consequently, the antagonism against English has, to a very large extent, been played down in black politics, and the opposition to the colonial language has been and is currently directed towards Afrikaans in black circles. The irony lies in the emergent attitude toward English as the vehicle for ideologies of freedom and independence.
>
> Heugh cited in Alexander, 1989:57

The problem with this is not so much an over-valuation of English, but an under-valuation and lack of confidence in the potential of African languages. Perhaps the most dangerous aspect in this regard, is that this attitude towards African languages in South Africa is deeply embedded in the hearts and minds of African language speakers themselves. We therefore

have the contradiction that even though the post-apartheid state regards (equal access to) language as a right for all South Africans, the speakers of African languages do not see the need to enforce this right. The onus is thus on the democratic South African government to educate all its people with regards to this issue, as part of the process of overall national transformation and liberation.

In the situation where the state does little to ensure that rights are upheld, those rights are seen as 'passive' rights. In South Africa, inequalities are so great that a rights based language policy only favours those who know they can exercise them, ie. a dominant elite. It is therefore important that an implementation plan be developed alongside the language policy. Heugh (1995:50) relates this to the African context:

> In Africa, most countries have chosen integration as their overarching policy after independence. However, in many instances, there has been a mismatch of policy with implementation plan.

The integration policy is described by the following paradigm derived from Heugh:

Table 1

POLICY	LANGUAGE PARADIGM/ VIEW OF LANGUAGE	IMPLEMENTATION	EDUCATIONAL RESULTS
Integration via a top-down process	Language is a passive right	No implementation plan to effect language as a right, so by default **subtractive/ transitional bilingualism continues**	**Poor results**, and limited proficiency in language(s) of power for the dominated group; access to meaningful education for the dominant group.
Integration via bottom-up and top-down process	Language is a positive right	**Additive bilingual/ multilingual** education for all	**Equal** access to meaningful education

ibid

The current situation in South Africa is described by the scenario where language is viewed as a passive right. South Africa is defaulting into this paradigm as a result of governmental inactivity. Because there is no implementation plan to effect language as a right, and ultimately as a resource among languages with low status (eg. Xhosa), subtractive/transitional bilingualism continues. The language in power dominates, benefiting only a small elite.

As early as 1987 Heugh predicted that in a post-apartheid South Africa (as in other African countries), the role of English will be for national unity at least during a transitional period and immediately after a change in government, and that

> Once a post-apartheid South Africa has been achieved it is possible, as is evident in African countries to the North, that English will gradually be seen to be less apparently neutral. In this event, more attention and status is likely to be conferred upon the black languages.
>
> Heugh, 1987:218/9

In 1995 Young warns against short-term political strategies:

> Short-term political strategies, if successful, tend to become embedded as long-term social practices. The politicians' apparent leaning towards having one major language (English) as an instrument for nation building, reconciliation, communication and education, whether it is achieved or not, will have significant bearing on the development or survival of the other ten national languages.
>
> Young, 1995:65

4. CONCLUSIONS:

The point of this brief general historical political overview is to illustrate how past political ideology has played an important role in so far as determining existing

- language attitudes, and
- language practice.

> In short, while most give lip service to the importance of maximizing the educational attainments of pupils, the decision as to what languages will be used to teach them typically depends on political considerations. Since education is, from the state's point of view, a primary means of social control and, from the individual's or family's point of view, a means for social mobility; it is scarcely surprising that the languages of instruction should be an important political issue.
>
> Cooper, 1989:109

The application of politics for social control through education has been put to good (bad) use in apartheid South Africa. In post-apartheid South Africa, we should use this relationship, not as a means to social control, but as a means to social freedom. Experience in other African countries has shown that success in education is limited if there is disjuncture between reality on the ground and political ideal. It has shown that, while practical and economically viable solutions must be found, if the goal is education, we cannot override or sidestep proper democratic educational practice. In a multilingual country, proper democratic educational practice starts by looking at language in education policy.

In the next chapter I shall look at important theories guiding the development of multilingual language in education policies today.

CHAPTER THREE

Theoretical Considerations

1. INTRODUCTION

Although many factors may play a role in determining a learner's level of academic success, recent theory in the field suggests that language medium could be a deciding factor in whether a learner does well or poorly academically. The point of this study is not to negate the influence of other factors, but to determine whether there is evidence to support these theories, thereby linking poor academic performance to theory on language proficiency development and cognition - specifically those theories proposed and developed by Cummins. This involves comparing actual statistics to the theory and then determining whether it holds for schools in the Western Cape. The motivation for this study is described by Young in his essay, *The role and status of the first language in education in a multilingual society*, where he expresses the same concerns addressed in this thesis about the English Second Language learner:

> English is in high demand as a language for learning in schooling throughout South Africa. Those studying it as a first or second language spend up to 12 years learning it as a medium of instruction for at least eight of these years in the case of second language learners. Why, then, do we have the demonstrably low levels of proficiency displayed by most ESL learners after such lengthy school exposure to English? Poor or under-qualified teaching? Ineffective language teacher training? Low learner motivation? Poor resources? Overcrowded classrooms? All of these are popular suggested explanations for the problem, yet none may tap deeply enough into its roots. One possible explanation might be found in an increasing body of research in the USA and Canada over the past 15 years, particularly that of Skutnabb-Kangas and Cummins. They have theorised and produced some, albeit limited, supporting empirical evidence that there is a direct relationship between first-language acquisition and learning beyond and inside the classroom and parallel, second-language learning in the classroom.
>
> Young, 1995:66

It is towards these theories[3] which we now turn:

2. ADDITIVE/SUBTRACTIVE BILINGUALISM AND THE THRESHOLD THEORY

Colin Baker (1993:108-114) identifies three periods across time in the dominant beliefs on bilingualism[4], and specifically, the link between bilingualism and intelligence since the early 19th century:

- The period of detrimental effects
- The period of neutral effects
- The period of additive effects

(See also Hoffmann, 1991:120-123)

From the mid-1970's studies have consistently shown that the earlier notions of the 'detrimental' and 'neutral' effects of bilingualism on intelligence form part of a much more complex interaction between the two languages known by the bilingual. We have progressed to the point where we are able to identify different types of bilingualism (ie. subtractive, transitional and additive), although this knowledge is more academic than common.

Lambert, cited in Baker (1993:57) views additive bilingualism as a situation 'where the addition of a second language and culture are unlikely to replace or displace the first language and culture', and subtractive bilingualism as a situation where 'the learning of a majority second language may undermine a person's minority first language and culture'. Following Lambert's distinction between additive and subtractive bilingualism, in the late 1970's, Toukomaa and Skutnabb-Kangas, and Cummins developed the threshold theory (see Baker, 1993:135-136). Cummins suggests that

[3]The theories discussed in this chapter are well known and have been widely debated in academic circles. For the sake of clarity and completion they will be summarized here.
[4]Throughout this study, unless otherwise indicated, we will assume that theory regarding bilingualism and bilinguals can be extended to include multilingualism and multilinguals.

> ... the level of proficiency attained by bilingual students in their two languages may be an important influence on their academic and intellectual development (Cummins, 1984). Specifically, there may be a threshold level of proficiency in both languages which students must attain in order to avoid any negative academic consequences and a second, higher, threshold necessary to reap the linguistic and intellectual benefits of bilingualism and biliteracy.
>
> Cummins, 1991:166

The threshold theory has been supported by various studies (see Cummins, 1991:163-166), perhaps the most relevant of which is the South African initiative, the Threshold Project:

> Recent South African research on the Threshold Project (1990), has shown that many black pupils suffer the ill effects of subtractive bilingualism owing to the sudden changeover from a first to a second-language medium of instruction in Standard 3 (grade 5). The project found that pupils could not explain in English what they already knew in their first languages; nor could they transfer into their first languages the new knowledge that they had learnt through English.
>
> Luckett, 1995:75-76

3. SUP, CUP AND THE INTERDEPENDENCE PRINCIPLE

In this section I discuss the relationship between L1 and L2 in the bilingual learner.

There are two well-known models on bilingualism and cognition. Cummins cited in Baker (1993:132-133) describes these two models as the **S**eparate **U**nderlying **P**roficiency (**SUP**) model and the **C**ommon **U**nderlying **P**roficiency (**CUP**) model. The SUP model says that a bilingual's proficiency in L1 and L2 develop separately, having as a consequence that a bilingual can only think in one language at a time, ie. L1 or L2. The CUP model is described by Cummins (1991:166-167) as follows:

> ... although the surface aspects (e.g. pronunciation, fluency, etc.) of different languages are clearly separate, there is an underlying cognitive/academic proficiency which is common across languages. This 'common underlying proficiency' makes possible the transfer of cognitive/academic or literacy-related skills across languages.

In other words, in order for a learner to use a second language as a language medium in the classroom successfully, the learner must have developed the first language, *as well as the second language* to a level where cognitive and linguistic skills can be transferred across

languages effortlessly. This level of development in both languages can only be reached once the learner has progressed past 'surface fluency' to 'cognitive fluency' (ie. an appropriate level of literacy for schooling) in those languages.

The subtractive multilingual program followed in South Africa for African language speaking learners means that the second language is not developed to a level where the transfer of literacy and academic-related skill can take place from the mother-tongue[5].

The CUP model has been developed further and is stated in recent literature as the Interdependence principle:

> The interdependence principle has been stated formally as follows (Cummins, 1981: 29): 'To the extent that instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur provided there is adequate exposure to Ly (either in schools or environment) and adequate motivation to learn Ly.'
>
> Cummins, 1991:166

Previously the interdependence principle was concerned mainly with the transfer of metalinguistic skills from L1 to L2. Studies done in the mid-1980's have shown that bilingualism may also lead to an increase in general cognitive ability (see Cummins 1991:165).

For the situation in the Western Cape, the interdependence principle can be stated as follows:

To the extent that instruction in Xhosa First Language (XFL) is effective in promoting proficiency in Xhosa, transfer of this proficiency to English Second Language (ESL) will occur provided there is adequate exposure to English (either in schools or environment) and adequate motivation to learn English.

5 See p16

To clarify our understanding of academic and linguistic transfer, we will quote, at length, a summary by Baker (1993:135) in which he explains how this model operates, and describes the possible consequences for the bilingual learner if this facility remains un(der)developed:

1. Irrespective of the language in which a person is operating, the thoughts that accompany talking, reading, writing and listening come from the same central engine. When a person owns two or more languages, there is one integrated source of thought.
2. Bilingualism and multilingualism are possible because people have the capacity to store easily two or more languages. People can also function in two or more languages with relative ease.
3. Information processing skills and educational attainment may be developed through two languages as well as through one language. Cognitive functioning and school achievement may be fed through one monolingual channel, or **equally successfully through two well developed language channels.** Both channels feed the same central processor.
4. **The language the child is using in the classroom needs to be sufficiently well developed to be able to process the cognitive challenges of the classroom.**
5. Speaking, listening, reading or writing in the first or the second language helps the whole cognitive system to develop. However, **if children are made to operate in an insufficiently developed second language (e.g. in a 'submersion' classroom), the system will not function at its best. If children are made to operate in the classroom in a poorly developed second language, the quality and quantity of what they learn from complex curriculum materials and produce in oral and written form may be relatively weak and impoverished.** This has been the experience of some Finns in Swedish schools who were forced to operate in Swedish (Skutnabb-Kangas and Toukomaa, 1976). **Such children tended to perform poorly in the curriculum in both Finnish and Swedish because both languages were insufficiently developed to cope with given curriculum material.**
6. **When one or both languages are not functioning fully** (e.g. because of unfavorable attitude to learning through the second language, pressure to replace the home language with the majority language) **cognitive functioning and academic performance may be negatively affected.**

The sections that are particularly relevant to African language speaking learners have been highlighted.

4. BICS AND CALP

It is advisable to briefly stand still at this point to discuss the issue of 'proficiency'. Until now, we have been using the term language proficiency without questioning what it means. When is one proficient enough to use a language for academic purposes? How proficient must one be in a language before (linguistic and cognitive) transfer to another language can

take place? In an earlier quotation (p13) Cummins draws a distinction between two levels of language proficiency,

- surface aspects (eg. pronunciation, fluency, etc), and
- underlying cognitive/academic proficiency.

These two interrelated levels are formally known as **B**asic **I**nterpersonal **C**ommunicative **S**kills (**BICS**) and **C**ognitive/**A**cademic **L**anguage **P**roficiency (**CALP**) (see Cummins, 1991:169-170)[6]. The distinction was made in order to

> ... conceptualise 'language proficiency' in such a way that the developmental interrelationships between academic performance and language proficiency in both L1 and L2 can be considered.
>
> Cummins and Swain, 1986:152

For Cummins, in order for a bilingual to achieve CALP status in L2, s/he must first achieve CALP status in L1. The consensus is that CALP level can be reached in L2 after ± 5-7 years of adequate exposure to L2 (ie. once an adequate level of proficiency for schooling has been reached in L2), and only once CALP level in L1 has been reached (see Cummins cited in Cummins, 1991:169).

An alternative view is presented by MacSwan and Rolstad in their article, *Linguistic Diversity, Schooling, and Social Class: Rethinking our Conception of Language Proficiency in Language Minority Education* (2001).

They maintain that literacy (roughly reading, interpreting and writing) is an academic construct rather than a component of language ability. Literacy is taught and learnt at school, and thus, levels of literacy do not reflect a learner's language ability, but the ability of that learner to write a test. Therefore, in second language proficiency development, '... ability differences in an L2 will very likely be perceived as a component of success in the academic environment quite generally' (MacSwan and Rolstad, 2001:13) and as a result '...L2 learning is subject to considerable variation in rate and ultimate attainment, and appears to be dependent upon extra-linguistic factors.' (ibid).

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6 Cummins described BICS and CALP as two extremes in a language proficiency continuum called 'context embedded' and 'context-reduced' communication in his earlier work (see Cummins and Swain, 1986:151-155).

Essentially, where Cummins defines CALP (Cognitive/Academic Language Proficiency) as part of a speaker's language proficiency, MacSwan and Rolstad see CALP/literacy as an academic construct which does not improve the speaker's language, but equips him/her with technical tools for academic use.

MacSwan and Rolstad (ibid:6) describe proficiency development in the MT as follows:

> Native language growth is inwardly driven and all normal children achieve linguistically.
>
> Furthermore,
>
> Considerable research has shown that there is simply no human language or language variety which does not have complex grammatical structures, or the mechanisms to create new words as new situations arise, or to make complex meanings explicit by means of language itself.

This reasoning, however, does not extend to written tests where, according to MacSwan and Rolstad (ibid:8-9), and Edelsky (1991:60-63) literacy skills are tested rather than language proficiency.

The 'inwardly driven' ability of native language speakers enables Xhosa speakers to develop 'surface fluency' in their mother-tongue without much effort. Xhosa first language speakers receive mother-tongue instruction until grade 3, and they do Xhosa as a first language subject on HG level throughout schooling. This enables them to develop 'cognitive fluency' in Xhosa. However, this cognitive proficiency is not subject specific because Xhosa speaking learners do not receive mother-tongue instruction in specific learning areas[7]. Also, the level of second language proficiency is so low that they cannot transfer linguistic and academic skills across these languages.

In my view it is logical that language proficiency (as defined by MacSwan and Rolstad) must precede language literacy (what Cummins calls CALP). This is so in all languages -

7 See discussion on Gee, p10 – 11, in this volume.

regardless of whether it is a mother-tongue or not. What is important, however, is that in normal children, the level of proficiency needed to begin learning adequate literacy skills for schooling in the mother-tongue is acquired without much effort, and by the time s/he starts primary school. In L2 learners, this level of proficiency must also first be reached before the same level of literacy skills can develop in that language. Table 2 below describes the relationship between language proficiency (oral) and literacy skills (reading, interpreting and writing) as I see it:

Table 2

LANGUAGE X		**LANGUAGE X**
no proficiency	→	no literacy skills
poor proficiency	→	poor literacy skills
average proficiency	→	average literacy skills
good proficiency	→	good literacy skills
excellent proficiency	→	excellent literacy skills

The level of proficiency in a language *can* lead to the same level of literacy skill in that language, though this is not automatic. In other words, excellent proficiency can exist without excellent literacy skills, but excellent literacy skills cannot exist without excellent proficiency. Thus, a mother-tongue speaker who naturally develops (oral) proficiency - what Cummins calls BICS - does not automatically develop literacy (reading, interpreting and writing) - what Cummins calls CALP - because literacy is 'taught' in schools. It is therefore possible to distinguish between proficiency and literacy in the mother-tongue without attacking the ability of its native speakers.

[8]Children of different ages show different levels of proficiency in the mother-tongue. This levels out as they get older.

In his essay, *Learning in Semiotic Domains: A Social and situated account* (2001:1-10), Gee identifies different 'semiotic domains' (ibid:1) in society, each with its own 'social language' or register.

> Each different domain – thanks to the workings of situated meaning and the interests and discoveries of different affinity groups through history – recruits a different style of English or whatever other natural language may be at work in the domain.
>
> ibid:2

In the same way that eg. a gangster or a florist uses a specific (complex) register to communicate with other members of his/her affinity group, the academic domain (school) also needs an academic register. This general academic register is further sub-divided into different learning areas (subjects) which must be mastered by a learner if s/he wants to succeed in that learning area (subject).

My conclusion is that the level of proficiency (oral) in a language plays (at least) an underlying role in the development of literacy skills, and therefore in determining good or bad results on literacy tests. CALP is redefined as a level of development in a particular register.

7. CONCLUSION

The focus of this study is the academic performance of grade twelve learners VS the medium of instruction in schools and home language. In the case of African language speakers, there is a mismatch between the medium of instruction and the home language.

The threshold theory and the interdependence principle have demonstrated that there is always a relationship between a bilingual's L1 and L2. According to Cummins, depending on the proficiency obtained in L1, this relationship can have negative, neutral or positive effects on linguistic ability and academic development.

The implications of the interdependence principle for bilingual education are that if cognitive academic language proficiency (CALP) is not achieved in Lx (XFL), and if an adequate level of proficiency is not reached in Ly (ESL), then there can be no successful transfer of linguistic proficiency and academic skills from Lx (Xhosa) to Ly (ESL).

While it remains essential that CALP is reached in the mother-tongue, it is equally important that an adequate level of proficiency is reached in the second language before the transfer of literacy-and-academic-related skills (needed for the academic domain) can occur from one language to the other.

At present, the South African school system follows a subtractive bilingualism programme for the above-mentioned learners. The threshold theory indicates that a subtractive programme places these learners at a major academic disadvantage.

We recognize that these theories do not operate in isolation and that other factors may manipulate the outcomes of the academic performance of a learner. This study will, however, use the theoretical considerations discussed in this chapter as a point of departure.
In the chapters that follow we will examine, in detail, the relationships between L1, L2 and academic development in light of the above insights by looking at the matriculation examination results in the Western Cape, 2000.

CHAPTER FOUR

Methodology

1. INTRODUCTION

Throughout this study I have stated that the question I want to address is as follows: 'Is a learner's level of language proficiency in the language medium related to his/her level of academic performance?' This is because I want to investigate the low level of academic performance achieved, in particular, by African language speaking learners. In order to do this I need to compare the academic performance of learners with different levels of language medium proficiency to their academic performance. There are a variety of research methods which one can employ to attempt to answer this question, eg. one could by means of an experimental study, monitor the academic progress of mother-tongue learners VS the academic progress of non-mother-tongue learners within a school, or do a case study in which the academic progress of individual learners, with varying language proficiencies, is monitored. I found that the appropriate research tool to use in this particular study, is the causal-comparative method because of factors such as scale, availability of data, generalizability, costs, time constraints, and so on. The research methodology used is based on the research principles discussed in the book, *How to design and evaluate research in education*, by Fraenkel and Wallen (2000), which I will refer to throughout this chapter.

2. NATURE OF CAUSAL-COMPARATIVE RESEARCH

> In causal-comparative research, investigators attempt to determine the cause or consequences of differences that *already exist* between or among groups of individuals.
>
> Fraenkel and Wallen, 2000:393

Because of various considerations, it is difficult to manipulate the language medium of learners in the school system. A causal-comparative approach allows me to 'investigate the

possibility of a causal relationship among variables that cannot, as in experimental research, be manipulated.' (ibid:339). If the relationships identified in this study have been determined to be noteworthy, they can be investigated further in an experimental study, on a smaller scale.

3. METHODOLOGY

3.1 FORMULATING THE PROBLEM

> The first step in formulating a problem in causal-comparative research is usually to identify and define the particular phenomena of interest and then to consider possible causes for, or consequences of, these phenomena.
>
> ibid:395

The 'particular phenomenon of interest' is the disparity in matriculation examination results between the three major categories (ex-CED, ex-HOR and ex-DET) identified in this study. The main aim of this study is to investigate the relationship that exists between variable 1, a learner's level of language proficiency (in the language medium of the school), and variable 2, his/her academic performance (in key subjects) in five different groups of schools in the Western Cape. I hope that identifying a relationship between variable 1 and 2 will bring us a step closer to levelling out these differences.

3.2 SELECTION OF VARIABLES

> ... differences in a number of variables can be investigated in a causal-comparative study in order to determine which variable (or combination of variables) seems most likely to cause the phenomena being studied.
>
> ibid:396

Many possible causes have been put forward for the differences in results between the three categories of learners in the Western Cape, eg.

- teacher attitudes and prejudice
- level of learner motivation

- level of teacher training

- socio-economic status of the learners (parents)

- unequal distribution of resources in schools

It is beyond the scope of this text to examine all the variables that affect academic performance in detail, though it is important for future studies to do so in order to develop a comprehensive approach to educational development in this country. Practical constraints allow me to examine only one piece of the puzzle in the hope that research in the other areas will follow. The choice of variables in this study is grounded in the psycholinguistic theory developed by Cummins, Skutnabb-Kangas and others[9]. My approach is tempered, however, by subsequent critiques of their hypotheses.

Based on existing theory I have reason to believe that the level of language proficiency is an important variable that may affect the academic performance of a learner. I need to determine the extent of the relationship between a learner's proficiency in the school's medium of instruction, and his/her level of academic performance. For me to do this I need to determine the level of proficiency in the language medium and academic performance in concrete, quantifiable terms. I will use the relevant subjects offered at school to access these variables. With regards to this, a few important points should be made:

- If a school offers Afrikaans or English as a First Language (HG) subject, this is also likely to be the language medium offered at the school. I will use performance in the First Language (HG) subject as an indication of a learner's proficiency in the medium of instruction.

- Cummins' psycholinguistic theory suggests that academic development is optimal when the home language is carried through to the language of instruction at school[10]. Disparities exist in schools where Xhosa is offered as a First Language (HG) subject.

9 I have relied heavily on the summary by Baker, p15, this volume.
10 See summary by Baker, p15, this volume.

These schools usually have English as the medium of instruction and examination.

3.3 SAMPLE

In causal-comparative research, the important thing is to 'define carefully the characteristic to be studied, and then to select groups that differ in this characteristic.' (ibid:396).

I have already stated the focus of this study as 'a learner's level of proficiency in the language medium VS his/her level of academic performance.' The population with which I am concerned consists of twelfth grade learners who enrolled for the 2000 matriculation examination at single medium schools in the Western Cape. These learners are grouped according to the centres where they enrolled for the exam. Because data was available for all but 6 schools[11], I decided to use the entire population rather than a sample.

A list of **367** centres was obtained from the Western Cape Education Department. The centres differ with respect to language medium. For me to determine the language medium of a centre, I look at the First Language (HG) subject/s offered[12].

11 The information for 6 schools did not appear on the lists obtained from the Western Cape Education Department.
12 See selection of variables, p22.

Table 3 illustrates the breakdown of these examination centres according to the First Language (HG) subject/s offered:

Table 3

L1 (HG) SUBJECT/S	# SCHOOLS	% SCHOOLS
AEFL	147	40.05
AEXFL	6	1.64
AXFL	5	1.36
AFL	**105**	**28.61**
EXFL	9	2.45
EFL	**43**	**12.53**
XFL	**49**	**13.35**
TOTAL	367	99.998[13]

From this table I will only select the relevant single medium language groups, ie. AFL, EFL and XFL. Special schools such as finishing schools, private schools and schools with fewer than 20 matriculants have been excluded from this study. The final composition of schools according to First Language (HG) subject for this study is therefore as follows:

[13]Rounded off to the nearest ten.

Table 4

L1 (HG)	# SCHOOLS
AFL	92
EFL	28
XFL	45

In Chapter Five I explain that the situation in the school system is complicated by South Africa's past political ideologies, resulting in variation within the three major language groups. In an attempt to keep the groups more uniform, I have created three major uniform categories, with five smaller sub-groups, according to ex-education departments.

Table 5

	ex-DEPT	L1 (HG)	# SCHOOLS
CATEGORY 1	Cape Education Department (CED)	AFL	17
		EFL	17
CATEGORY 2	House of Representatives (HOR)	AFL	75
		EFL	11
CATEGORY 3	Department of Education and Training (DET)	XFL	45

I need to determine whether schools where the language medium is different from the learner's mother-tongue perform worse than schools where the language medium and mother-tongue is the same. The population used in this study is composed of three different categories of mother-tongue speakers, of which two[14] receive mother-tongue education, and one does not.

14 In some ex-HOR schools the language medium issue is complicated by learners who chose to be in an EFL stream even though they are AFL speakers.

2.4 INSTRUMENTATION

The data used in this study was collected from existing records at the Western Cape Education Department. I obtained statistics for

- the average percentage obtained per subject, per school
- the overall average percentage pass per school, and
- the number of candidates who entered, passed and failed per subject, per school.

for the 2000 matriculation examination. These statistics come from examination transcripts administered by teachers in secondary schools across the Western Cape, evaluated by independent authorities appointed by the education department. I assume that these examinations give (at least) a rough estimate of the two variables concerned, ie. language proficiency and academic performance.

3.5 DESIGN AND PROCEDURES

> The basic causal-comparative design involves selecting two or more groups that differ on a particular variable of interest and comparing them on another variable or variables. No manipulation is involved. The groups differ in one of two ways: one group either possesses a characteristic (often called a criterion) that the other does not, or the groups differ on known characteristics.
>
> ibid:397

The table below represents the basic format for a causal-comparative design as suggested by Fraenkel and Wallen:

Table 6

GROUP	INDEPENDENT VARIABLE	DEPENDENT VARIABLE
I	C (Group possesses characteristic)	O (Measurement)
II	-C (Group does not possess characteristic)	O (Measurement)

ibid:397

I have selected three major categories of learners that differ on the variable language proficiency (in the language medium), comparing them to the academic performance of these learners in key subjects.

3.5.1 CHAPTER FIVE

Chapter Five serves as an introductory chapter to the statistics where I set out to roughly establish the extent of the difference in academic performance between the three categories of learners. The format allows me to compare the overall average percentage passes obtained across the three categories:

Table 7

CATEGORY	ACADEMIC PERFORMANCE
I	ave % pass
II	ave % pass
III	ave % pass

Once I have established that a difference exists, I can suggest possible causes for this difference.

3.5.2 CHAPTER SIX

Chapter Six takes on the form of case studies, where I look at the statistics of specific schools in each category – these schools are identified in Chapter Five.

I speculate that the reason for the differences in academic performance is due to the different levels of language proficiency in the language medium. The purpose of chapter six is to investigate whether a pattern exists in the statistics that indicates that the level of proficiency in the language medium is related to academic performance in schools where the average percentage passes fall outside the norm for that group, at both ends of the scale. In other words, I want to establish what is different about these schools that the academic performance is either higher or lower than the norm for that group by using the statistics. I use the following format:

Table 8

CATEGORY	INDEPENDENT VARIABLE (language proficiency)	DEPENDENT VARIABLE (academic performance)
I	+MT instruction (high level of proficiency in LM)	ave % passes
II	-/+MT instruction (moderate-high level of proficiency in LM)	ave % passes
III	-MT instruction (low level of proficiency in LM)	ave % passes

3.5.3 CHAPTER SEVEN

In Chapter Seven I use statistics for the average percentages obtained in key subjects rather than the statistics for the average percentage passes for each group. This gives a more accurate and detailed indication of academic performance in specific subjects in relation to the level of proficiency in the language medium. The design is similar to that in chapter six, but I use statistics for the entire group rather than statistics for specific schools only.

3.5.3.1 SECTION A

In Section A I look at the relationship between the first and second language for each group of learners. This is especially important for learners in category three who must be fully bilingual to be able to learn through a second (or third) language. Section A uses the following format:

Table 9

CATEGORY	LANGUAGE PROFICIENCY	
	1st lang	2nd lang
I	ave %	ave %
II	ave %	ave %
III	ave %	ave %

3.5.3.2 SECTION B

In Section B I look at the relationship between the level of proficiency in the language medium and academic performance in key subjects for each group of learners:

Table 10

CATEGORY	INDEPENDENT VARIABLE (language proficiency)	DEPENDENT VARIABLE (academic performance)
I	+MT instruction (high level of proficiency in LM)	ave % passes
II	-/+MT instruction (moderate-high level of proficiency in LM)	ave % passes
III	-MT instruction (low level of proficiency in LM)	ave % passes

3.5.4 CHAPTER EIGHT

Chapter Eight takes on the form of a correlational study, where two quantitative variables are correlated to produce a correlation-coefficient which describes the degree of relationship between those variables. In this chapter I correlate the level of proficiency in the language medium VS academic performance across all five groups of learners.

Table 11

CATEGORY	LANGUAGE PROFICIENCY (LM subject)	ACADEMIC PERFORMANCE (key subjects)
I	ave %	ave %
II	ave %	ave %
III	ave %	ave %

4. THREATS TO INTERNAL VALIDITY

> ... internal validity means that observed differences on the dependent variable are directly related to the independent variable, and not due to some other unintended variable.
>
> ibid:190

4.1 SUBJECT CHARACTERISTICS THREAT

> The major threat to the internal validity of a causal-comparative study is the possibility of a subject characteristics threat. Because the researcher has had no say in either the selection or formation of the comparison groups, there is always the likelihood that the groups are not equivalent on one or more important variables other than the identified group membership variable.
>
> ibid:397-8

There is no doubt that this is the case in this study. Determining a possible cause of the low academic performance of African language speakers as compared to the other language groups in the Western Cape is difficult precisely because there is no one specific cause. A

complex set of interrelated factors combines to cause this phenomenon, in varying degrees. I will attempt to determine the extent of the language proficiency factor, which I believe to be a major contributing cause to weak academic performance.

Although there are many possible subject characteristics that might be considered, I deal with what I regard as the three most important here - socio-economic status of the learners (parents), level of teacher training, and unequal distribution of resources in schools.

4.1.1 SOCIO-ECONOMIC STATUS OF THE LEARNERS

The socio-economic status of a learner may be related to the 'hypothesised causal variable' (ibid:400) ie. the level of proficiency in the language medium (specifically if the language medium is the second language[15]).

The socio-economic status of a learner can be expected to be related to whether a learner performs well or poorly academically.

Likelihood of having an effect unless controlled: HIGH

4.1.2 LEVEL OF TEACHER TRAINING/TEACHING METHODS

The level of teacher training/teaching method used may be related to the 'hypothesised causal variable' (ibid) ie. the level of proficiency in the language medium (specifically in the second language[16]).

The level of teacher training/teaching method used can be expected to be related to whether a learner performs well or poorly academically.

Likelihood of having an effect unless controlled: HIGH

15 See discussion on MacSwan and Rolstad, chapter three, this volume.
16 See discussion on MacSwan and Rolstad, chapter three, this volume.

4.1.3 DISTRIBUTION OF RESOURCES IN SCHOOLS

The type and amount of resources available to a learner may be related to the 'hypothesised causal variable' (ibid:400) ie. the level of proficiency in the language medium (specifically in the second language[17]).

The type and amount of resources available to a learner can be expected to be related to whether s/he performs well or poorly academically.

Likelihood of having an effect unless controlled: HIGH

In a study such as this a subject characteristics threat is unavoidable and must be dealt with as best we can. Fraenkel and Wallen (2000:399) suggest finding or creating homogenous sub-groups as a means to control this type of threat. I have attempted to do this by dividing the three language groups into three major categories according to ex-education department, and five more uniform sub-groups. I compare the statistics for the language medium subject to the statistics for the key subjects within each group, thus minimizing external influences.

4.2 LOCATION THREAT

> A location threat is possible if the data are collected under different conditions for different groups.
>
> ibid:399

It could be that the causal variable/s differ/s for different schools, ie. the cause/s for the different levels of academic performance by a learner differ/s for different venues.

The location of a school may be related to the level of academic performance achieved, though it is unlikely that significant differences in performance for such a big number of learners can be attributed to the venue in which an examination takes place.

17 See discussion on MacSwan and Rolstad, chapter three, this volume.

Likelihood of having a significant effect if not controlled: MODERATE

Fraenkel and Wallen (ibid:193) suggest that the 'best method of control for a location threat is to hold location constant - that is, keep it the same for all participants.' Clearly this is not possible in the context of this study. By dividing up the learners into three major categories and five smaller sub-groups I have managed to keep the conditions under which examinations take place fairly uniform and constant within each group.

4.3 INSTRUMENTATION THREAT

4.3.1 INSTRUMENT DECAY

'Instrumentation can create problems if the nature of the instrument (including the scoring procedure) is *changed* in some way or another.' (ibid:193) eg. fatigue of the scorer may result in him/her scoring differently for the first ten learners than for the last ten learners.

The data collection and scoring procedure is standardized and consistent for all learners in all the identified groups.

4.3.2 DATA COLLECTOR CHARACTERISTICS

'Gender, age, ethnicity, language patterns, or other characteristics of the individuals who collect the data in a study may have an effect on the nature of the data they obtain.'(ibid:194) eg. an older person may get more serious, mature responses to a question than would a young person.

The examination is independent of the invigilator who should not play a significant role in the responses of the learners.

4.3.3 DATA COLLECTORS

> There is also the possibility that the data collector(s) and/or scorer(s) may unconsciously distort the data in such a way as to make certain outcomes (such as support for the hypothesis more likely).
>
> ibid

The examination procedure is standardized, ie. all schools across the Western Cape follow the same procedure for examinations. The data collectors were ignorant of the hypothesis at the time of data collection because this study is done after the examination and scoring procedure took place.

4.4 TESTING THREAT

'In intervention studies, where data are collected over a period of time, it is common to test subjects at the beginning of the intervention(s).' (ibid:195). Fraenkel and Wallen go on to say that 'practice' on the pretest may be responsible for an improvement, regardless of what the intervention might be.

This type of threat is irrelevant to this study.

4.5 HISTORY THREAT

> On occasion, one or more unanticipated, and unplanned for, events may occur during the course of a study that can affect the responses of subjects.
>
> ibid:196

We have not come across this type of threat in this study.

4.6 MATURATION THREAT

> Often change during an intervention may be due to factors associated with the passing of time rather than to the intervention itself.
>
> ibid

This type of threat is irrelevant to this study.

4.7 ATTITUDE OF SUBJECTS

> The way in which subjects view a study and their participation in it can create a threat to internal validity.
>
> ibid:197

The subjects were ignorant of this study at the time of data collection because the study was done after the examination procedure took place. Note that this type of threat is different from the learner attitude/motivation threat that would fall under subject characteristics. The information obtained from the subjects is objective (factual) rather than subjective.

4.8 REGRESSION THREAT

> A regression threat may be present whenever change is studied in a group that is extremely low or high in its pre-intervention performance.
>
> ibid:198

This type of threat is irrelevant to this study.

4.9 IMPLEMENTATION THREAT

> The treatment or method in any experimental study must be administered by someone - the researcher, the teachers involved in the study, a counselor, or some other person. This fact raises the possibility that the experimental group may be treated in ways that are unintended and not a necessary part of the method, yet which give them an advantage of one sort or another.
>
> ibid:198

This type of threat is irrelevant to this study.

4.10 LOSS OF SUBJECTS (MORTALITY)

> No matter how carefully the subjects of a study are selected, it is common to 'lose' some as the study progresses.
>
> ibid:198

This did not pose a threat to the internal validity of this study.

CHAPTER FIVE

General Analysis of the Average % Passes obtained by 'monolingual' schools in the Western Cape

1. INTRODUCTION

In this study I compare three main groups of learners in the Western Cape, namely:

- those who do Afrikaans First Language Higher Grade [AFL(HG)]
- those who do English First Language Higher Grade [EFL(HG)], and
- those who do Xhosa First Language Higher Grade [XFL(HG)]

These represent the three largest language groups in the Western Cape. The situation in the school system is complicated by South Africa's past political ideologies, resulting in variation within the three groups. Three major uniform categories can be identified, with five smaller sub-groups, according to ex-education department:

Category 1: ex-Cape Education Department (CED) - AFL
- EFL

Category 2: ex-House of Representatives (HOR) - AFL
- EFL

Category 3: ex-Department of Education and Training (DET) - XFL

Because there are population groups in South Africa which were previously disadvantaged, dividing the population along these lines allows us to keep external factors, which also influence academic performance[18], fairly constant within each category. Schools within these categories can be compared with minimal influence from external factors.

The following table illustrates the

- **mode** - 'most frequent score in a distribution'. In this study I use modal intervals which indicate the number of scores that fall in a percentage interval.

- **arithmetic mean** - 'average of all scores in a distribution'

- **standard deviation (SD)**[19] - 'single number that represents the spread of a distribution', and

- **number of schools**

for each group (see Fraenkel and Wallen, 2000: 217). The results are derived from a list of matriculation pass rates per school obtained from the Western Cape Education Department (WCED). The mean, for example, illustrates the average % pass obtained by the number of schools in the group concerned.

18 eg. Socio-economic background, inadequate teacher training, lack of learner motivation, access to resources.

19 In this study I have chosen to use the SD rather than the range as an indicator of the variability in scores in a distribution because "The Standard Deviation is a more accurate and detailed estimate of dispersion because an outlier can greatly exaggerate the range ... The Standard Deviation shows the relation that (a) set of scores has to the mean of the sample." William, MK http://trochim.human.cornell.edu/kb/statdesc.htm.

Table 12

	CATEGORY 1		CATEGORY 2		CATEGORY 3
	A.ex-CED (AFL)	B.ex-CED (EFL)	A.ex-HOR (AFL)	B.ex-HOR (EFL)	ex-DET (XFL)
MODE	100	90-99.99	70-79.99	90-99.99	50-59.99
MEAN	98.93	96.85	77.53	83.44	50.63
SD	1.57	3.91	12.46	12.74	17.26
n	17	17	75	11	45

2. DISCUSSION

2.1 Category 1

The learners in category 1 all belong to the former education department, CED. In general, they come from similar socio-economic backgrounds (across the spectrum), have similar resource allocation, teacher training and learner motivation.

The statistics show that, with regards to the average % pass per school, there is no noteable difference between sub-group A and B:

Figure 1

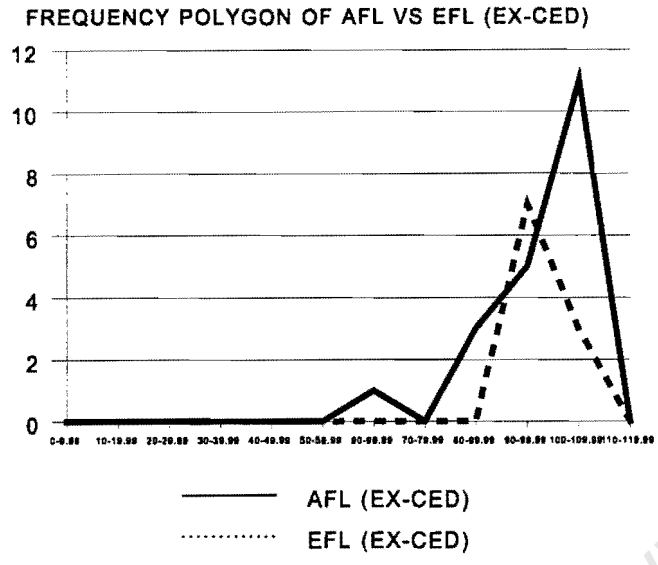

Table 13

CATEGORY 1

	A.ex-CED (AFL)	B.ex-CED (EFL)
MODE	100	90-99.99
MEAN	98.93	96.85
SD	1.57	3.91
n	17	17

2.1.1 Analysis of frequency polygons and descriptive statistics for category 1

The lowest average % pass obtained by a school in both categories, AFL (ex-CED) and EFL (ex-CED) falls in the interval **90-99.99%**. In both categories the highest ave % pass obtained by a school is **100%**. The standard deviation[20] is 'an index of variability' (Fraenkel and Wallen, 2000:CD). The SD for the AFL (ex-CED) is **1.57** and for EFL (ex-CED) the SD is equal to **3.91**. The higher total for EFL (ex-CED) indicates that there is more variability for

20 "You can think of the standard deviation as a 'typical' deviation of a score from the mean of the scores. It is a kind of average deviation from the mean." Fraenkel and Wallen, 2000:CD

the scores in this distribution. The lower total for AFL (ex-CED) indicates that the scores in the distribution are grouped closely around the mean (**98.93%**). The SD for both distributions is low, indicating that there is not much variation in the ave % pass from school to school.

The mode of a distribution tells us what the ave % pass is for the greatest number of schools in that group. The mode for AFL (ex-CED) is **100%**, i.e. the majority of schools in this distribution obtained an average % pass of **100%**. This is slightly higher than the mean (**98.93%**), but not noticeably so.

The mode for EFL (ex-CED) falls in the interval **90-99.99%** and the (arithmetic) mean is equal to **96.85%**. The mean is an average of all the scores obtained by schools in the distribution.

There is no significant difference between the ave % passes obtained in sub-group 1 A and sub-group 1 B. There is also little variation in the ave % passes obtained by individual schools within the respective groups, showing that there is no significant difference between schools when it comes to the ave % pass of learners per school.

2.2 Category 2

The learners in category 2 belong to the former department of education, HOR . Two groups of learners can be identified, AFL (ex-HOR) and EFL (ex-HOR). The types of schools in these two groups are similar with regards to the socio-economic background of learners (of which the majority is working class), access to resources, teacher training and learner motivation.

The statistics show that there is a difference in the average % passes between sub-groups 2A and B:

Figure 2

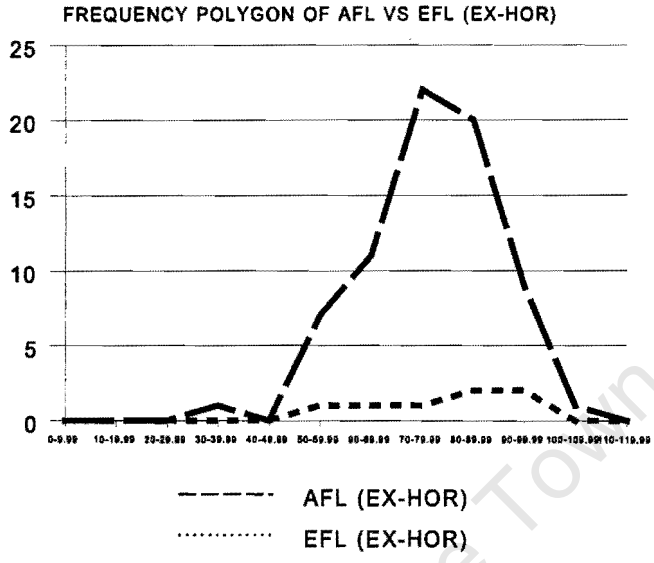

Table 14

CATEGORY 2

	A.ex-HOR (AFL)	B.ex-HOR (EFL)
MODE	70-79.99	90-99.99
MEAN	77.53	83.44
SD	12.46	12.74
n	75	11

2.2.1 Analysis of frequency polygons and descriptive statistics for category 2

The lowest ave % pass obtained by a school in the category AFL (ex-HOR) falls in the interval **30-39.99%**, and the highest ave % pass is **100%**. The lowest ave % pass obtained by a school in the category EFL (ex-HOR) falls in the interval **50-59.99%**, and the highest ave % pass falls in the interval **90-99.99%**.

The SD (indicating the variability of scores in the distribution) for AFL (ex-HOR) and EFL (ex-HOR) is almost identical - **12.46** and **12.74** respectively. This indicates that the scores in the two distributions are grouped in similar ways around the mean in the distribution.

The mode for the category AFL (ex-HOR) falls in the interval **70-79.99%**. This is the most frequent average % pass obtained per school. The mean (**77.53%**) falls within this interval. From the polygon we can see that a high number of schools also obtained an average % pass of between **80** and **89.99%** (24 schools fall in the interval **70-79.99%**, and 21 schools fall in the interval **80-89.99%**)[21]. The highest concentration of scores can be found in the middle of the highest and the lowest score.

The mode for schools in the category EFL (ex-HOR) falls in the interval **90-99.99%**. The mean **83.44%** falls outside this interval. From the frequency polygon we can see that a high number of schools also obtained an average % pass of between **80** and **89.99%** (6 schools fall in the interval **90-99.99%**, and 4 schools fall in the interval **80-89.99%**)[22]. This, and the two scores in the lower intervals reduce the mean.

There is a big difference in population size between sub-group 2A and B. In this regard an important point should be made:

Each school represents a group of learners. The numbers 75 and 14 refer to the numbers of schools per group and not the number of learners per group. A total of 5 schools, for example,

21 See grouped frequency distribution graphs in Addendum
22 See grouped frequency distribution graphs in Addendum

can refer to a total of over 600 learners[23]. So, even though this number is considerably less than eg. 60 schools, the number of learners is large enough for as little as 5 schools to derive reliable statistics which are representative of the full range of academic abilities for each group. It would therefore not be justified if we were to say, for example, out of a group of 600 learners, all are gifted students resulting in a high % pass rate.

Furthermore, even though there is a big difference between the number of schools for each category, the mean and the SD use the raw scores and the number of schools in the calculation:

mean $$X = \frac{\sum x}{n}$$

Standard Deviation $$SD = \sqrt{\frac{\sum (x - X)^2}{n}}$$

where $\sum$ represents the "sum of", 'x' represents any raw score value[24], '*n*' represents the total number of scores, 'X' represents the mean, and 'SD' is the symbol for standard deviation. (see Fraenkel and Wallen, 2000:217 and 220). This means that each score is calculated according to the number of schools in the distribution.

To sum up, from the frequency polygon and table above we can see that for the category AFL (ex-HOR), the highest concentration of schools falls in the middle intervals (**70-79.99%** and **80-89.99%**), whereas for the category EFL (ex-HOR), the highest concentration of schools falls in the upper intervals (**80-89.99%** and **90-99.99%**). Even though conditions in the schools are similar for both groups, there is a difference in mean between them (**77.53%** and **83.44%**).

23 eg. 5 Schools with 4 classes of 30 learners each will amount to 120 matriculants per school, and 600 learners for 5 schools.

24 The 'raw score value' referred to here indicates the aggregate scores per school within each group. The aggregate scores per school are calculated on the raw scores obtained by the individual learners in that school, per subject, for the matric exam, 2000. The mean therefore refers to the average of the aggregate scores for each group of schools, and the SD indicates the degree of variability in the different school averages.

2.3 Category 3

The learners in category 3 all belong to the former department of education, DET. In general, they come from similar socio-economic backgrounds (across the spectrum), have similar resource allocation, teacher training and learner motivation.

The statistics show that there is a noteable difference in the ave % pass between groups 1 and 2, and group 3:

Figure 3

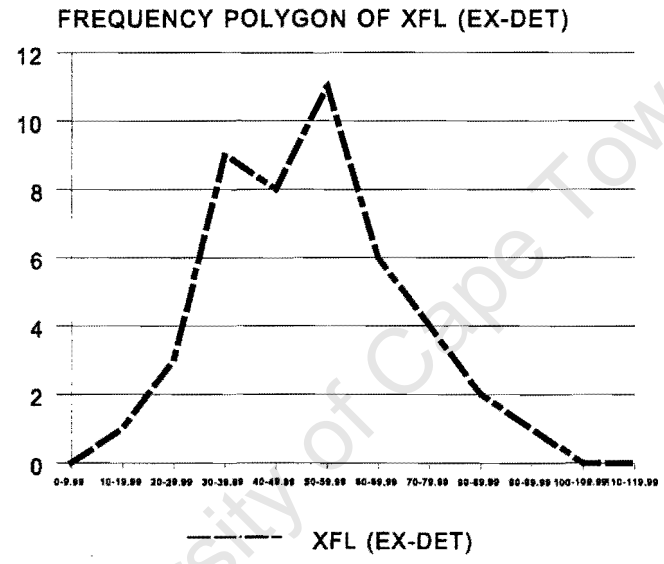

Table 15

	CATEGORY1		CATEGORY2		CATEGORY3
	A.ex-CED (AFL)	**B.ex-CED (EFL)**	**A.ex-HOR (AFL)**	**B.ex-HOR (EFL)**	**ex-DET (XFL)**
MODE	100	90-99.99	70-79.99	90-99.99	50-59.99
MEAN	98.93	96.85	77.53	83.44	50.63
SD	1.57	3.91	12.46	12.74	17.26
N	17	17	75	11	45

2.3.1 Analysis of frequency polygons and descriptive statistics for category 3.

The lowest ave % pass obtained by a school in the category XFL (ex-DET) falls in the interval **10-19.99%**. The highest ave % pass falls in the interval **90-99.99%**.

The modal interval is **50-59.99%**. The mean (**50.63%**) falls just within this interval. The high number of schools in the lower intervals (**30-39.99%** and **40-49.99%**)[25] reduces the mean.

Category 3 shows the greatest variability in scores for the distribution. This is reflected in the SD (**17.26**).

3. CONCLUSION

There are many factors that differ between categories 1 and 3, and to a lesser extent, categories 2 and 3. Dividing schools according to ex-department keeps them in fairly uniform categories, thereby controlling external factors to some degree. Even so, there is great variation in scores in categories two and three. Why do two schools with the same general background obtain such different scores? Why are the results in category 1 more consistent than in the other two categories? Are the results determined by external factors alone, or should we look under the surface at factors that are more intrinsic to the learner and the actual process of learning?

In the chapters that follow I will focus on psycholinguistic theory developed by Cummins more closely as one of the possible reasons for the variation in scores in categories two and three, and the uniformity of scores in category one.

25 See grouped frequency distribution graphs in the Addendum.

CHAPTER SIX

A more detailed analysis of the extreme case studies in each category

1. INTRODUCTION

In Chapter Five I distinguished between three major categories of learners on the basis of socio-economic background, access to resources, quality of teacher training, and so forth. I highlighted similarities and/or differences within and across these groups using statistics received from the WCED on the ave % passes obtained by 'monolingual' schools in the Western Cape for the 2000 matriculation examination. Although sorting the schools according to ave % pass is a quick and easy way of assessing academic performance, it only serves as a rough estimate of the academic ability of the learners in a school. For this reason, in this chapter, I will examine the ave % passes in relation to the average percentages obtained in individual key subjects by schools in each group. The key subjects (Biology, Geography, Mathematics and Physics) are chosen on the basis that they are accessible to learners in all three categories throughout the Western Cape, and because they form the core of base subjects for various fields of study at tertiary level.

In short, this chapter attempts to examine trends within and between the identified groups in more detail using Baker's summary of Cummins' psycholinguistic theory[26] as our point of departure. I will compare the schools who obtained extreme ave % passes in each group (across the percentage scale) so as to establish whether a pattern exists which distinguishes between schools who achieve well from those who do not. I recognise that conclusions should be tentative because of the risk of an ecological fallacy, ie. making conclusions about individuals based solely on the observation of groups.

26 See chapter three, p15, this volume.

2. CATEGORY 1 - AFL AND EFL (ex-CED)

2.1 General Conditions in ex-CED Schools

Conditions in category 1 schools are fairly uniform across language medium. In general, schools are well resourced, teachers are trained efficiently, learners come from stable and even privileged socio-economic backgrounds and they have a traditional 'culture of learning'. Schools that fall in the sub-group AFL (ex-CED) are concentrated mainly in the rural areas, whereas schools in the sub-group EFL (ex-CED) are mostly found in urban areas.

Thus far I have not discussed the issue of learner migration across categories. Schools in category 1 have remained relatively unaffected by learner migration. This is because 'migrants' have come mainly from middle-class families, where English and/or Afrikaans have been developed to first language levels of proficiency at home (where English or Afrikaans is not the mother-tongue of the 'migrant' learner). High school fees have prevented many learners from working class homes in ex-HOR and ex-DET schools from migrating to ex-CED schools. The numbers of 'migrant' learners in ex-CED schools remains low, and these learners form a minority group in the school. In some schools where the 'migrant's' mother-tongue is other than the medium of instruction at the school, provision is made by

- introducing the mother-tongue as a second or third language subject (HG or SG) at the school

- reducing the standard of the first and/or second language subject taught at the school from HG to SG. The school will then have a group of mother-tongue learners doing eg. AFL(HG) and ESL(HG), and a group of non-mother-tongue learners doing eg. AFL(SG) and ESL(HG) or AFL(SG) and ESL(SG). The medium of instruction will, however, remain the same.

2.2 Extreme Case Studies in Category 1

The ave % passes obtained by schools in category 1, AFL and EFL (ex-CED) are consistently high. No extremes can be identified as academic performance is fairly uniform throughout both distributions. As a result we will not compare individual schools for this category in this chapter.

3. CATEGORY 2 - AFL (ex-HOR) and EFL (ex-HOR)

3.1 Conditions in ex-HOR schools

Conditions in category 2 schools are not as uniform across language medium and the rural-urban divide as the ex-CED group (with regards to the socio-economic background of the learners). As with category 1, schools in the sub-group AFL (ex-HOR) are concentrated in the rural areas, whereas EFL (ex-HOR) schools are situated in the urban areas. In both regions (rural and urban) communities are burdened with high unemployment rates, and learners come from homes where the income is low. A few urban schools are plagued by the problem of gangsterism, though the effect of this on academic results has not been taken into account here because of the scale of this study. Generally speaking conditions in the schools themselves (with regards to resource allocation, teacher training, and so on) are fairly uniform.

Some schools in category 2 experience emigration and immigration of learners . Learners who come from middle-class homes emigrate to the ex-CED schools in the hope of getting a better quality of education. This is not so problematic because the mother tongues of the learners are the same in both categories. For the same reason, learners who come from working-class homes in ex-DET schools migrate to ex-HOR schools, where school fees are low. This causes problems in the classroom because teachers are generally not fluent in the learners' mother-tongue, and they are not trained to cope with the mismatch between mother-tongue and language medium at the school. It is possible to roughly identify whether such a problem exists in a school by the (SG) language subjects and the second and third language subjects offered at the school. One can identify a learners' level of proficiency in a language

by looking at whether s/he does it on HG or SG level. Also, if a school has a number of Xhosa mother-tongue speaking learners, it usually offers support to these learners by offering Xhosa as a second or third language on HG level[27].

3.2 Extreme Case Studies in Group 2

3.2.1 GROUP 2 - AFL (ex-HOR)

In the group AFL (ex-HOR), the lowest ave % pass obtained by a school is **39.09%**, and the highest ave % pass obtained is **100%**. I will compare the performance of these two schools in key subjects:

27 See discussion on p48.

Table 16

SCHOOL A		SCHOOL B
39.09%	**AVE % PASS**	100%
42.41%	**AFL (HG)**	54.27%
44.82%	**ESL (HG)**	44.22%
37.3%	**BIO (HG)**	53.63%
30.05%	**BIO (SG)**	46.56%
40.48%	**GEO (HG)**	49.25%
28.38%	**GEO (SG)**	50.08%
-	**MATH (HG)**	-
22.93%	**MATH (SG)**	31.74%
-	**PHYS (HG)**	-
46.86%	**PHYS (SG)**	50.06%
110	**# CANDIDATES**	44

School A offers AFL(SG)[28] and ESL(SG)[29] as subjects. This indicates that some learners at this school are not mother-tongue speakers of Afrikaans, and some cannot do the ESL subject at (HG) level. The medium of instruction at school A is Afrikaans. If some learners are doing AFL(SG) it means that they are learning through a language which they have not yet mastered at AFL(HG) level[30]. School B also offers ESL (SG)[31] as a subject, indicating that some learners cannot do the ESL subject at (HG) level.

28 AFL (SG) - 51.04% for 15 candidates
29 ESL (SG) – 37.11% for 9 candidates
30 See discussion on pp48 and 50.
31 ESL (SG) – 35.42% for 12 candidates

As stated earlier Cummins' psycholinguistic theory suggests that the level of development (fluency and literacy) in the mother-tongue is related to second (additional) language and overall academic performance[32].

I will use the (HG) language subjects as an indication of a learner's proficiency in that language, and the key subjects as an indication of a learner's academic performance.

The ave % for AFL(HG) in school A is **42.41%**. The ave %'s in the key subjects fall below the average for AFL (HG), except for PHYS (SG) - **46.86%**[33]. The ave % for AFL (HG) in school B is **54.27%**. The ave % in the key subjects also fall below this average.

School B, which obtained a higher ave % in AFL (HG) than school A, outscores school A in the key subjects, with the exception of the ESL (HG) subject, where the ave % is roughly the same. The ave % pass is also higher for school B.

In order to determine whether a pattern exists, I will look at the two schools which obtained the 2nd lowest and the 2nd highest ave % pass as well.

School C obtained an ave % pass of **50.00%** and school D obtained an ave % pass of **98.63%**. I will compare the performance of these two schools in key subjects:

32 See chapter three.
33 See discussion on p54-55.

Table 17

SCHOOL C		SCHOOL D
50.00%	**AVE % PASS**	98.63%
48.01%	**AFL (HG)**	53.68%
42.85%	**ESL (HG)**	51.47%
-	**BIO (HG)**	60.75%
36.6%	**BIO (SG)**	40.43%
32.05%	**GEO (HG)**	58.83%
28.75%	**GEO (SG)**	50.12%
-	**MATH (HG)**	45.75%
15.82%	**MATH (SG)**	25.23%
-	**PHYS (HG)**	54.75%
-	**PHYS (SG)**	36.47%
78	**# CANDIDATES**	73

School C offers AFL (SG)[34] and ESL (SG)[35] as subjects. This indicates that some learners at this school are not mother-tongue speakers of Afrikaans[36], and some cannot do the ESL subject at (HG) level. The medium of instruction at school C is Afrikaans. If some learners are doing AFL (SG) it means that they are learning through a language which they have not yet mastered at AFL (HG) level. School D also offers ESL (SG)[37], indicating that some learners cannot do ESL at (HG) level.

34 AFL (SG) - 54.28% for 25 candidates
35 ESL (SG) - 36.83% for 2 candidates
36 See pp48 and 50.
37 ESL (SG) – 46.91% for 38 learners

As stated earlier, Cummins' psycholinguistic theory suggests that the level of development (fluency and literacy) in the mother-tongue is related to second (additional) language acquisition and overall academic performance.

The ave % for AFL (HG) in school C is **48.01%**. The ave % in the key subjects all fall below this average.

The subjects BIO (HG), MATH (HG), PHYS (HG) and PHYS (SG) are not offered at school C. Because BIO and MATH are offered at (SG) level, lack of facilities to accommodate these subjects seems an unlikely explanation (they are already taught at (SG) level, indicating that there should be teachers and books available to teach these subjects). A more likely explanation for the lack of learners at (HG) level in these subjects is that it is deemed that the learners do not have the ability to do well in it. For the PHYS subject, either of the two reasons offered can serve as a possible explanation because the subject is not offered at the school at any level.

The ave % for AFL (HG) in school D is **53.68%**. The average percentages for BIO (HG) - **60.75%** - GEO (HG) - **58.83%** - and PHYS (HG) - **54.75%** - fall above the ave % for AFL (HG). All other key subjects fall below this average.

When we examine BIO (HG), GEO (HG) and PHYS (HG) more closely, we see that the ave % for these subjects might be misleading. The ave % obtained in BIO (HG), for example, could be misleading because only 2 candidates were entered for the subject. The ave % for the subject therefore depends only on the performance of 2 candidates. If both perform well, the ave % for the subject will be high, and if both perform badly, the ave % for the subject for that school is low. The ave % for MATH (HG) could also be influenced by the number of candidates who entered for the subject (1). It is for this reason that schools with less than 20 matriculants have been excluded from this study. By excluding the number of schools with 20 or less learners, I can decrease the number of instances where there are only 1 or 2 candidates per subject, making comparisons between schools more reliable. Throughout this chapter I will highlight instances where 1 or 2 candidates represent the ave % for a subject.

Another possible reason why the ave %'s for the (HG) subjects are sometimes higher than the ave % for the language medium subject could be that the learners who are allowed to do subjects on the higher grade are regarded as the more intelligent learners. While this is so for the (HG) subjects, all learners do the language medium subject. This possibly inflates the ave % for the (HG) subjects, while the language medium subject incorporates the 'good' and 'bad' learners. The same argument may pertain to Physical Science (SG)[38].

School D, which obtained a higher ave % in AFL (HG) than school C, outscores school C in the key subjects. The ave % pass for school D is also higher than school C.

3.2.2 GROUP 3 - EFL (ex-HOR)

In the group EFL (ex-HOR), the lowest ave % pass obtained by a school is **59.83%** (school F), and the highest ave % pass obtained by a school is **99.56%** (school G). We will compare the performance of these two schools in key subjects:

38 Traditionally, Physical Science and Mathematics are also regarded as subjects done by 'intelligent' learners only. However, this is controlled for Mathematics, because of the perceived value of the subject for tertiary studies and in the job market. In most cases, all learners do Mathematics at least on (SG) level. This is reflected in the low ave %'s for specifically Mathematics (SG).

Table 18

SCHOOL F		SCHOOL G
59.83%	**AVE % PASS**	99.56%
44.01%	**EFL (HG)**	56.13%
53.62%	**ASL (HG)**	69.66%
34.02%	**BIO (HG)**	55.52%
32.5%	**BIO (SG)**	47.73%
39.89%	**GEO (HG)**	61.42%
32.52%	**GEO (SG)**	53.73%
58.5%	**MATH (HG)**	59.94%
26.01%	**MATH (SG)**	48.62%
42.98%	**PHYS (HG)**	53.79%
40.12%	**PHYS (SG)**	52.9%
117	**# CANDIDATES**	225

In school F, the ave % for EFL (HG) is equal to **44.01%**. The ave % in the key subjects all fall below the ave % for EFL (HG), except for MATH (HG) - **58.5%**[39]. The ave % for ASL (HG) is high, suggesting that the learners may live in bilingual (Afrikaans/English) communities. Only 3 candidates entered for MATH (HG) in school F.

The ave % for EFL (HG) in school G is equal to **56.13%**. The ave % in the key subjects falls below this ave, except for GEO (HG) - **61.42%** - and MATH (HG) - **59.94%**[40]. The ave % for ASL (HG) is high, suggesting that the learners may live in bilingual (Afrikaans/English) communities.

39 See discussion on p54-55.
40 See discussion on p54-55.

When we compare school F to school G, we see that the school with the higher ave % for EFL (HG) outperforms the other.

The second example from this category of schools is the 2nd lowest and 2nd highest ave % pass obtained by a school. School H obtained an ave % pass of **66.45%** and school I obtained an ave % pass of **97.40%**.

Table 19

SCHOOL H		SCHOOL I
66.45%	**AVE % PASS**	97.40%
45.35%	**EFL (HG)**	54.02%
56.81%	**ASL (HG)**	66.47%
38.72%	**BIO (HG)**	58.42%
32.2%	**BIO (SG)**	49.18%
40.59%	**GEO (HG)**	56.19%
41.1%	**GEO (SG)**	53.55%
41.81%	**MATH (HG)**	54.09%
22.42%	**MATH (SG)**	39.4%
35.19%	**PHYS (HG)**	54.51%
37.34%	**PHYS (SG)**	51.25%
152	**# CANDIDATES**	154

School H offers EFL (SG)[41] as a subject. It also offers Xhosa third language (HG)[42] and (SG)[43]. This suggests that there are XFL speaking learners at the school[44].

When we look at school H, we see that the ave % for EFL (HG) is **45.35%**. The ave % for the key subjects all fall below the ave % for EFL (HG). The ave % for ASL (HG) is high, suggesting that the learners live in bilingual (Afrikaans/English) communities.

School I obtained an ave % of **54.02%** for EFL (HG). The ave % for BIO (HG) - **58.42%** - and GEO (HG) - **56.19%** - fall above this average[45], while the ave % for MATH (HG) - **54.09** - and PHYS (HG) - **54.51** - is roughly the same. The ave % for ASL (HG) is high, suggesting that the learners live in bilingual (Afrikaans/English) communities.

When we compare school H to school I, we see that the school with the higher ave % in EFL (HG) outperforms the other.

4. CATEGORY 3 - XFL (ex-DET)

4.1 Conditions in ex-DET schools

Group 3 schools are fairly uniform across urban and rural areas. Schools are poorly resourced, teachers receive inadequate training, and learners come from low (and no) income homes.

Schools in this category are affected mostly by emigration rather than immigration. Some learners from middle-class homes emigrate to ex-CED schools, and some learners from lower-class homes emigrate to ex-HOR schools, though the majority of ex-DET schools remain largely overpopulated.

41 EFL (SG) – 53.87% for 18 candidates
42 XTL (HG) – 66.81% for 18 candidates
43 XTL (SG) – 86.33% for 1 candidate
44 See pp48 and 50
45 See discussion on p54-55.

4.2 Extreme Case Studies in Group 5

We will compare extreme scores for this group in the key subjects. The school obtaining the lowest ave % pass in this group is school J with **15.79%** and the highest is school K, with **90.64%**.

Table 20

SCHOOL J		SCHOOL K
15.79%	**AVE % PASS**	90.64%
55.69%	**XFL (HG)**	62.74%
30.15%	**ESL (HG)**	44.34%
-	**ASL (HG)**	37.24%
-	**BIO (HG)**	40.86%
32.08%	**BIO (SG)**	37.05%
-	**GEO (HG)**	39.32%
20.87%	**GEO (SG)**	38.52%
-	**MATH (HG)**	39.2%
12.98%	**MATH (SG)**	39.68%
-	**PHYS (HG)**	59.08%
24.12%	**PHYS (SG)**	45.8%
114	**# CANDIDATES**	171

According to Cummins, the level of proficiency (fluency and literacy) in the language medium subject (usually the mother-tongue) is related to further linguistic development as

well as overall academic performance[46]. English is the medium of instruction in school J and K. Therefore the level of proficiency (fluency and literacy) in this subject determines how the learners will perform in the rest of their subjects.

School J offers ESL (SG)[47] as well as ASL (SG)[48]. School K offers ASL (SG)[49] but not ESL (SG). For learners in the ex-DET schools the level of second language proficiency is important because it is the medium of instruction. If the learner does ESL on SG level, the level of proficiency obtained is further removed from the level of proficiency needed for academic purposes.

The ave % for XFL (HG) is **55.69%** for school J. The ave % for ESL (HG) is **30.15%**. All the key subjects except BIO (SG) fall below the ave % for ESL (HG).

The ave % for XFL (HG) is **62.74%** for school K. The ave % for ESL (HG) is **44.34%**. The ave % for all the key subjects except PHYS (HG)[50] - **59.08%** - and PHYS (SG) - **45.8%** - falls below the ave % for ESL (HG). The PHYS (HG) result for school K is for 3 candidates only.

From the ave %'s for the language (HG) subjects we can see that the school that obtained a better ave % for XFL (HG), (the mother-tongue), also obtained a better ave % for ESL (HG), (the second language). The school with the higher ave % for ESL (HG) also outscored the other in the key subjects, as well as in the overall % pass.

The XFL (HG) subject stands out as an exceptional score when compared to the rest of the results. The result for the home language is obtained by the same learners, in the same school setup, with the same economic background, same teachers and resources. Why is there such a huge improvement in the XFL (HG) subject if all external factors are constant? The determining factor can only be that this is the only subject which is written in the learners'

46 Refer to the discussion in chapter three, p13-15 regarding the interdependence principle.
47 ESL (SG) – 26.78% for three candidates
48 ASL (SG) – 36.11% for 32 candidates
49 ASL (SG) – 42.96% for 117 candidates
50 See discussion on p54-55.

mother-tongue. The other subjects are all written in a language other than the mother-tongue (ie. Afrikaans or English).

Our second example in this group involves the 2nd lowest and 2nd highest scores in the distribution. School L obtained an ave % pass of **20.00%** and school M obtained an ave % pass of **88.29%**. We compare these two schools in key subjects:

Table 21

SCHOOL L		SCHOOL M
20.00%	**AVE % PASS**	88.29%
52.58%	**XFL (HG)**	62.02%
33.03%	**ESL (HG)**	40.54%
-	**ASL (HG)**	40.75%
31.05%	**BIO (HG)**	43.06%
24.09%	**BIO (SG)**	37.71%
21.21%	**GEO (HG)**	33.4%
26.18%	**GEO (SG)**	34.34%
22.00%	**MATH (HG)**	-
11.82%	**MATH (SG)**	24.19%
41.50%	**PHYS (HG)**	36.94%
21.46%	**PHYS (SG)**	32.99%
125	**# CANDIDATES**	111

School L offers ESL (SG)[51] as well as ASL (SG)[52]. School M only offers ASL (SG)[53] as a subject[54].

The ave % for XFL (HG) in school L is **52.58%**. The ave % for ESL (HG) is **33.03%**. The ave %'s for all the key subjects fall below the ave % for ESL (HG), except PHYS (HG)[55]. The ave % for MATH (HG) and PHYS (HG) is for 1 candidate only.

The ave % for XFL (HG) in school M is **62.02%.** The ave % for ESL (HG) is **40.54%.** The ave %'s for all the key subjects except BIO (HG) **-43.06%**- fall below the ave % for ESL (HG).

For these two schools we see the same pattern where the ave % obtained for XFL stands far above the averages obtained for the other subjects, for the same learners, in the same school, with the same resources and teachers. As with the previous example we can see that from the ave %'s for the language (HG) subjects, the school that obtained a better ave % for XFL (HG), (the mother-tongue), also obtained a better ave % for ESL (HG), (the second language). The school with the higher ave % for ESL (HG) outscored the other in the key subjects, as well as in the overall % pass.

5. CONCLUSION

When we look at the ave % obtained in the key subjects for each school, we see that there is a correlation between the language medium subject [AFL (HG) where learners are Afrikaans mother-tongue speakers, EFL (HG) where learners are English mother-tongue speakers, and ESL (HG) where learners are Xhosa mother-tongue speakers], and good or bad academic performance. A pattern emerges which shows that where the ave % for the language medium subject is low, the ave %'s for the key subjects are low, and the overall ave % pass for the school is low. Where the ave % for the language medium subject is high, the ave %'s for the key subjects are high, and the overall ave % pass for the school is also high.

These findings are consistent with Cummins' psycholinguistic theory[56].

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51 ESL (SG) – 30.96% for 18 candidates
52 ASL (SG) – 35.47% for 56 candidates
53 ASL (SG) – 48.21% for 14 candidates
54 See discussion on p60.
55 See discussion on p54-55.
56 See chapter three

CHAPTER SEVEN

Analysis of the dynamics between L1, L2 and academic performance for the greater grade 12 population in the Western Cape

1. INTRODUCTION

In Chapter Three we saw that the relationship between a bilingual's first and second language can have a negative, neutral or positive effect on the linguistic proficiency and the overall cognitive development of the learner. In order to determine whether this could be a reason for the weaker performance in the matriculation examination results for African language speakers, I need to examine the dynamics between the first and second languages of these learners, as well as the relationship between these languages and overall cognitive development. To do this I will use the average percentages obtained in the first and second language (HG) subjects as a guide to the levels of proficiency in the first and second languages of the learners, and the average percentages obtained in the key subjects as a guide to the academic achievement of the learners.

In her book, *With Literacy and Justice for all - Rethinking the Social in Language and Education*, Carole Edelsky criticises Cummins for accepting 'prevailing instructional and evaluational practice as a given...' (1991:61) and limiting himself '...to relating students language proficiency to such practice.' (ibid).

She goes on to say that

> This THEORY changes nothing but the language of instruction. It does nothing to change the prevailing model of education which effectively disenfranchises minority students in the first place. It not only leaves intact beliefs in a skills 'theory' of reading and writing; it actually strengthens those beliefs and, along with them, promotes a congruent goal for education the attainment of higher scores on artificial tests.
>
> ibid

She concludes by saying that 'I believe that what Cummins calls skill with academic language is really skill in instructional nonsense (SIN, if another acronym is needed).' (ibid:69).

This leaves me in the position where, if I use the statistics for the average percentages obtained in the first and second language subjects as an indication of language proficiency, and the average percentages obtained in key subjects as a guide to the academic performance of the learners, I am criticised for perpetuating unsound educational practices.

It is so that social success or failure depends on one's performance in the education system, and as it stands, certain groups of learners are benefiting more from the education system than others. "Performance" in school is used as a guide to a learner's level of preparedness for further education. So, the question arises, 'Do we develop learners in all groups to the point where they have the opportunity to develop academic performance, instructional nonsense, literacy skills, test-wiseness (or whatever the chosen label) to a level where they have an equal chance to "succeed", or not?'. If we don't make an attempt, then the inequalities continue and the gap widens. So, while I acknowledge that the education system is not ideal, we need to start somewhere to begin orchestrating change. Because tests are standardized and because they are the same for all learners, I will use the above-mentioned statistics - though I am aware of their limitations.

This chapter is divided into two sections, according to two important theories developed by Cummins, namely the interdependence theory and the threshold theory[57]. Section A deals with

57 See chapter three

the interrelationship between the first and the second language, and Section B deals with the effects of language development on academic performance.

SECTION A

First Language VS Second Language

A.1 FIRST LANGUAGE (HG)

The first language (HG) subject gives us an indication of learners' home languages. A learner who does Afrikaans First Language (HG) as a subject at school, for example, would probably have Afrikaans as his/her home language. Likewise for a learner who does Xhosa First Language (HG) or English First Language (HG). In the same breath it must be said that although this is so for the majority of learners in the Western Cape, there are a few exceptions where, eg. learners who do English First Language (HG) as a subject at school may do so because of external pressures[58], and may really have Afrikaans or Xhosa as their home language.

Table 22 shows the statistics for the mode, (arithmetic) mean, standard deviation (SD) and number of schools (*n*) for the first language (HG) subject for each group of schools:

Table 22: **FIRST LANGUAGE (HG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	60-69.99	50-59.99	50-59.99	40-49.99	50-59.99
MEAN	62.60	57.59	50.88	48.70	55.34
SD	3.68	6.11	3.35	4.96	4.17
n	17	17	75	11	45

The importance of the first language subject for the purpose of this study is that it is the only subject which all learners in the Western Cape can write in their home language. We see that the mean for the First Language (HG) subject for the XFL (ex-DET) group is **55.34%**. This is on par with the results obtained by the EFL (ex-CED) group. I will refer to this statistic later again.

58 Such as the perception that one can only be successful if one learns through the medium of English or that a pass in EFL (HG) offers better job prospects and/or enhances social status.

A.2 SECOND LANGUAGE (HG)

In the AFL groups, the Second Language (HG) subject taken by most learners is English. Similarly, in the EFL groups, the Second Language (HG) subject taken by most learners is Afrikaans. In the XFL group, however, most learners do two Second Language (HG) subjects, namely English and Afrikaans. The ex-DET group is therefore divided into two sub-groups:

- XFL (I) - Afrikaans Second Language (HG), and
- XFL (II) - English Second Language (HG).

Table 23 shows the statistics for the mode, median, mean, standard deviation and number of schools for the Second Language (HG) subject for each group of schools:

Table 23: **SECOND LANGUAGE (HG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL(ex-DET) I	XFL(ex-DET) II
MODE	50-59.99	60-69.99	40-49.99	60-69.99	30-39.99	30-39.99
MEAN	58.18	63.58	46.43	63.59	35.70	37.81
SD	4.88	4.72	3.88	5.13	6.91	4.02
n	17	17	75	11	32	45

The crucial deduction to be made with regards to table 23 is that in group 5, the mean (average score obtained by learners) for the second language is below 40%. This is important because it indicates that, on average, the majority of learners in this group are not passing the Second Language (HG) subject. *As stated previously, learners in group 5 are compelled to write the rest of the matriculation examination syllabus in one of the two second languages, as if it were their home language.* What is problematic is that if these learners cannot pass a language subject on second language level, how can they be expected to treat it as their first

language for the rest of the curriculum? This is a recipe for failure. It is also apparent that learners in group 5 do not have access to the same quality of education as the learners in the other groups.

A.3 POSITIONING THE RESULTS WITHIN THE THEORETICAL FRAMEWORK

I will begin the discussion with group 4, EFL (ex-HOR) and group 5, XFL (ex-DET).

A.3.1 GROUP 4: EFL (ex-HOR)

The means for the First and Second Language (HG) subjects for the group **EFL (ex-HOR)** are **48.70%** and **63.59%** respectively. We see that the mean for the Second Language (HG) subject (Afrikaans) is much higher than the mean for the First Language (HG) subject (English). I already mentioned that in some cases external pressures could cause learners (and/or their parents) to choose an English medium classroom above an Afrikaans medium classroom, despite the actual home language of the learner. This tendency is more prevalent among 'coloured' Afrikaans speaking learners than among 'white' Afrikaans speaking learners because of the stigma attached to Afrikaans as the language of the oppressor, and because of the strong sense of identity associated with the 'moeder-taal' for 'white' Afrikaans speakers. In many EFL (ex-HOR) schools the learners seem to be bilingual Afrikaans and English speakers. Some argue that many of these learners are semi-lingual[59] in both languages because of the language medium switch at the expense of the home language. Because the examinations for English and Afrikaans are on different levels (first and second language), learners then do better in the second language subject than in the first language subject.

59 The term semi-lingual has caused some controversy in linguistic circles. It is difficult to label a language as incomplete. Some maintain that proficiency in a native language cannot be incomplete. However, the level of literacy in a mother-tongue can vary from speaker to speaker. I will therefore suggest that the term limited bilingualism refers to the ability of a learner to read, interpret and write in the relevant academic environment; ie. school in the context of this study.

A.3.2 GROUP 5 - XFL (ex-DET)

When we look at the results for the XFL (ex-DET) group, we see that the reverse is true. The mean for the first language (HG) subject (XFL) is **55.34%**. The means for the second language (HG) subjects are **35.70%** for ASL (HG) and **37.81%** for ESL (HG), much lower than the mean for XFL (HG)[60].

A.3.3 GROUPS 1, 2 AND 3

There is a small difference between the means for the First and Second Language (HG) subjects for the first three groups in the table. The mean for the First Language (HG) subject in the group, AFL (ex-CED) is **62.60%.** The corresponding mean for the Second Language (HG) subject is **58.18%**. This group of learners receives instruction in their mother-tongue (Afrikaans) for their entire schooling career. We can see that the level of proficiency is high in both languages. Likewise, the means for the First Language (HG) subject for the groups EFL (ex-CED) and AFL (ex-HOR) are **57.59%** and **50.88%** respectively. The corresponding means for the Second Language (HG) subject are **63.58%** and **46.43%** respectively. For all three groups of learners a high level of proficiency in the First Language (HG) subject goes together with a high level of proficiency in the Second Language (HG) subject. The major difference between these groups and the XFL (ex-DET) group is that the former has mother-tongue instruction throughout schooling whereas the latter group does not. This means that academic development is continuous, and no transfer of literacy-and-academic-related skills to the second language is needed[61]. The 'accelerated' development of proficiency in the mother-tongue allows for quicker transfer/development in the second language, once the second language is developed to a level which enables transfer.

60 See discussion in chapter three, p17-18 on native language development, as well as p88 in this chapter.
61 See summary by Baker in chapter three, p15, this volume.

A.4 CONCLUSIONS

From the statistics for the first and second language (HG) subjects we can see that there are no significant disparities between the means obtained in groups 1, 2 and 3 between the two subjects. It seems as if the percentages obtained in the first language (HG) subject are related to the percentages obtained in the second language (HG) subject.

We can also see that Xhosa speaking learners achieve much better on 'literacy tests' in their mother-tongues than on 'literacy tests' in the second language. From the first language results one can see that they have already mastered the ability to take a test[62]. Following Cummins, I suggest that the reason why they are less successful in the second language test is because the appropriate level of proficiency has not been reached in the second language for transfer to take place from the first language, due to the subtractive bilingualism program followed[63] in South African schools.

62 See discussion in chapter three, p17-18 on native language development.
63 See summary by Baker in chapter three, p15, this volume.

SECTION B

Language Proficiency VS Academic Performance

The second part of Cummins' interdependence theory deals with the level of proficiency in the mother-tongue and overall cognitive development. More specifically, the level of proficiency in the mother-tongue influences overall academic performance[64]. I will first examine the academic performance of each group by looking at the average percentages obtained in the key subjects.

B.1 BIOLOGY (HG)

Table 24 shows the statistics for the mode, mean, standard deviation (SD) and the number of schools (*n*) for BIO (HG) for each group of schools:

Table 24: **BIO (HG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	50-59.99 60-69.99	50-59.99	40-49.99	30-39.99	30-39.99
MEAN	58.55	55.14	44.96	43.44	35.49
SD	7.97	8.08	7.24	8.87	10.14
n	17	17	70	10	41

The pass mark for all HG subjects is 40%. The statistics show that, on average, most learners in the group XFL (ex-DET) are not reaching this mark for BIO (HG). The SD for all the groups is fairly high, indicating that there is variation in the average percentages obtained[65]. We see that the means for the ex-CED groups are the highest, while the ex-HOR groups fall in the middle.

64 See summary by Baker on p15, this volume.
65 The variability in the ave %'s in the groups could simply be a result of the different abilities of the learners in the subject. It is difficult to speculate as to why this variability in scores exists within each group without looking at the statistics for the individual learners within each group for that subject. This in itself would be a big undertaking and it is therefore beyond the scope of this text to do so.

B.2 BIOLOGY (SG)

Table 25 shows the statistics for the mode, mean, SD and *n* for Biology (SG) for each group of schools:

Table 25: **BIO (SG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	40-49.99	40-49.99	30-39.99	30-39.99	30-39.99
MEAN	48.44	46.51	38.47	40.28	33.35
SD	6.72	7.55	4.84	6.97	5.10
N	17	16	75	10	45

The pass mark for all SG subjects is 33.33%. The statistics show that, on average, most learners in the group XFL (ex-DET) obtain a mark which is approximately equal to this mark. The SD for all the groups is fairly high, indicating that there is some variation in the scores for this subject[66]. We see that the means for the ex-CED groups are the highest, while the ex-HOR groups fall in the middle. In general, performance in this subject is not very good in all the groups.

66 See footnote, p73.

B.3 GEOGRAPHY (HG)

Table 26 shows the statistics for the mode, mean, SD and *n* for Geography (HG) for each group of schools:

Table 26: **GEO (HG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	50-59.99	50-59.99	40-49.99	50-59.99	30-39.99
MEAN	57.23	55.65	49.24	51.01	36.69
SD	9.22	6.60	7.14	8.72	8.30
N	8	15	68	8	39

The statistics show that, on average, most learners in the group XFL (ex-DET) obtain a mark which is below the pass mark for this subject (40%). The SD for all the groups is fairly high, indicating that there is some variation in the scores for this subject[67]. The means for the ex-CED groups are the highest, and the means for the ex-HOR groups fall in the middle.

67 See footnote, p73.

B.4 GEOGRAPHY (SG)

Table 27 shows the statistics for the mode, mean, SD and *n* for Geography (SG) for each group of schools:

Table 27: **GEO (SG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	60-69.99	40-49.99	40-49.99	40-49.99	30-39.99
MEAN	57.49	45.99	43.88	44.55	32.45
SD	8.45	6.73	5.35	7.14	4.50
N	8	12	75	8	45

The statistics show that, on average, most learners in the group XFL (ex-DET) obtain a mark which is below the pass mark for this subject (33.33%). The SD's for all the groups are fairly high indicating that there is some variation in the scores[68]. The mean for the AFL (ex-CED) group is much higher than the means for the rest of the groups in this subject.

68 See footnote, p73.

B.5 MATHEMATICS (HG)

Table 28 shows the statistics for the mode, mean, SD and *n* for Mathematics (HG) for each group of schools:

Table 28: **MATH (HG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	50-59.99	40-49.99	30-39.99	40-49.99 50-59.99	20-29.99
MEAN	59.17	49.77	40.58	45.12	30.72
SD	6.61	11.85	10.06	10.59	13.09
n	15	17	30	9	17

The statistics show that, on average, most learners in the group XFL (ex-DET) obtain a mark which is far below the pass mark for this subject (40%). The SD for all the groups is high, indicating that there is variation in the scores[69]. There is a difference of approximately 10% between the means for group 1 and group 2, and approximately another 10% difference between the means for group 2 and group 3. On average, most learners in the group AFL (ex-HOR) obtain a mark which is approximately equal to the pass mark.

69 See footnote, p73.

B.6 MATHEMATICS (SG)

Table 29 shows the statistics for the mode, mean, SD and *n* for Mathematics (SG) for each group of schools:

Table 29: **MATH (SG)**

	AFL (ex-CED)	**EFL (ex-CED)**	**AFL (ex-HOR)**	**EFL (ex-HOR)**	**XFL (ex-DET)**
MODE	50-59.99	30-39.99 40-49.99	30-39.99	20-29.99	20-29.99
MEAN	53.95	46.37	29.70	32.21	21.72
SD	9.03	11.03	7.26	9.29	6.78
n	17	17	75	11	44

The statistics show that, on average, most learners in the groups AFL (ex-HOR), EFL (ex-HOR) and XFL (ex-HOR) obtain a mark which is below the pass mark (33.33%). The schools in these two categories are poorly resourced. Moreover, it is argued that there are not enough qualified teachers to teach Mathematics at this level in these schools. Why is there an improvement of approximately 10% in each of these groups between the MATH (HG) and MATH (SG) subjects? When we look at the number of schools that offer MATH (HG) in each of the three groups, we see that fewer schools offer MATH (HG) than MATH (SG). Only 'bright' learners are allowed to do MATH (HG), while the other learners are forced to do it at SG level because of the value of the subject. This could be why the results for MATH (HG) are generally better than the results for MATH (SG). African language speaking learners are faced with the additional challenge of learning in a second (or additional) language. Their performance is weaker than the other groups.

The SD for all the groups is high, indicating that there is variation in the scores within each group for this subject[70]. There is a difference of approximately 20% between group 1 and group 4, and a difference of approximately 30% between group 1 and group 5.

B.7 PHYSICAL SCIENCE (HG)

Table 30 shows the statistics for the mode, mean, SD and *n* for Physical Science (HG) for each group of schools:

Table 30: **PHYS (HG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	60-69.99	50-59.99	30-39.99	40-49.99	40-49.99
MEAN	59.00	50.77	43.92	45.68	38.75
SD	9.70	9.03	10.63	7.63	12.88
n	15	17	30	8	25

The statistics show that, on average, most learners in group 5 obtain a mark which is below the pass mark (40%). The SD for all the groups is high, indicating that there is variation in the scores for this subject[71]. There is a difference of approximately 10% between group 1 and group 2, and a difference of approximately 20% between group 1 and group 5. Learners in all five groups appear to do better in this subject. The situation for Physical Science is the same as for Mathematics, though it is more exclusive. Only the 'brightest' learners are allowed to do Physics as a subject. This contributes to the higher marks obtained in all the groups. Another factor is that of teacher training. Physics is seen as a specialist subject. This requires specialist training.

70 See footnote, p73.
71 See footnote, p73.

B.8 PHYSICAL SCIENCE (SG)

Table 31 shows the statistics for the mode, mean, SD and *n* for Physical Science (SG) for each group of schools:

Table 31: **PHYS (SG)**

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
MODE	60-69.99	40-49.99	40-49.99	50-59.99	30-39.99
MEAN	58.76	47.96	42.69	46.44	34.02
SD	9.48	6.13	5.98	6.86	6.04
N	15	14	66	9	45

The statistics show that, on average, most learners in group 5 obtain a mark which is approximately equal to the pass mark (33.33%). The SD for all the groups is fairly high, indicating that there is some variation in the scores for this subject[72]. There is a difference of approximately 10% between group 1 and group 2, and a difference of approximately 25% between group 1 and group 5. Learners in all five groups appear to do better in this subject[73].

B.9 CHAPTER FIVE REVISITED

In Chapter Five I compared the ave % passes per school between five important groups in the Western Cape. When we refer back to these statistics, some results for the ave % passes seem to be inconsistent with the results for the First Language (HG) subject discussed in Section A regarding Cummins' psycholinguistic theory.

72 See footnote, p73.
73 See discussion on p79.

Table 32 shows the results from Chapter Four in relation to the First Language (HG) subject results discussed in Section A:

Table 32

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
AVE % PASS	98.93	96.85	77.53	83.44	50.63
AVE % L1 (HG)	62.60	57.59	50.88	48.70	55.34

In keeping with Cummins, there are two important results which must be explained:

- the low mean for the First Language (HG) subject for the EFL (ex-HOR) group, and
- the high mean for the First Language (HG) subject for the XFL (ex-DET) group.

Why are the ave % passes for the ex-DET schools so low when the ave % for the First Language (HG) subject is so high? And, why are the ave % passes for the EFL (ex-HOR) schools so high when the ave % for the First Language (HG) subject is so low?

I will examine the latter question first. In Chapter Six (p47) I explained why it is not sufficient to look at the statistics for the ave % pass alone. In order to get a better, more informed picture we should compare the performance in the First Language (HG) subject to the average percentages obtained in the key subjects as well.

Table 33 shows the average percentage obtained in the First Language (HG) subject in relation to the average percentage obtained in the key subjects for all the schools in the group EFL (ex-HOR):

Table 33

EFL (ex-HOR)

SUBJECT	AVERAGE PERCENTAGE
EFL (HG)	48.70
BIO (HG)	43.44
BIO (SG)	40.28
GEO (HG)	51.01
GEO (SG)	44.55
MATH (HG)	45.12
MATH (SG)	32.21
PHYS (HG)	45.68
PHYS (SG)	46.44

From the table we can see that although the ave % pass for this group is high, the ave % per subject is not. Cummins suggests that the academic performance of a learner is affected by their level of proficiency in the first language[74]. In other words, performance in the key subjects is relative to the level of proficiency in the first language. I will refer back to these statistics later.

To answer the question, 'Why are the ave % passes for the ex-DET schools so low when the ave % for the first language subject is so high?', we need to look at the medium of instruction for this group of learners[75]. As noted in Section A (p69), the language through which

74 See chapter three, p13.
75 See summary by Baker on p15, this volume, on the importance of the language medium.

cognitive processing takes place in school is the second (and sometimes third) language for Xhosa first language speakers in the Western Cape. Therefore, if we want to determine whether there is a relationship between the language through which academic processing takes place and academic performance, we need to look at the relationship between the second language subject (language medium subject) and the key subjects for this group of learners.

Table 34 shows the average percentage obtained in the Second Language (HG) subject[76] in relation to the average percentages obtained in the key subjects for all the schools in the group XFL (ex-DET):

Table 34

XFL (ex-DET)

SUBJECT	AVERAGE PERCENTAGE
ESL (HG)	37.81
BIO (HG)	35.49
BIO (SG)	33.35
GEO (HG)	36.69
GEO (SG)	32.45
MATH (HG)	30.72
MATH (SG)	21.73
PHYS (HG)	38.75
PHYS (SG)	34.02

I have shown that the First Language (HG) subject is not related to the academic performance of learners in the XFL (ex-DET) group because the transition to English medium takes place before an adequate level of proficiency (for schooling) is reached in English. From the table

76 We will only look at the statistic for the ESL (HG) subject because this is likely to be the language medium in the ex-DET schools.

we can see that there is not a big disparity between performance in the key subjects and performance in the second language subject. I will refer to these statistics later in the chapter again.

B.10 SUMMARY OF RESULTS

Table 35 summarizes the results obtained in the key subjects for the 5 groups:

Table 35

	AFL (ex-CED)	EFL (ex-CED)	AFL (ex-HOR)	EFL (ex-HOR)	XFL (ex-DET)
BIO (HG)	58.55	55.14	44.96	43.44	35.49
BIO (SG)	48.44	46.51	38.47	40.28	33.35
GEO (HG)	57.23	55.65	49.24	51.01	36.69
GEO (SG)	57.49	45.99	43.88	44.56	32.45
MATH (HG)	59.17	49.77	40.58	45.12	30.72
MATH (SG)	53.95	46.37	29.70	32.21	21.73
PHYS (HG)	59.00	50.77	43.92	45.68	38.75
PHYS (SG)	58.76	47.96	42.69	46.44	34.02

Learners in all 5 groups tend to do better in the (HG) subjects than in the (SG) subjects. From the table it is clear that learners in the ex-CED groups perform the best, while learners in the ex-DET group perform the worst. Learners in the ex-HOR groups fall somewhere in the middle. This result is not surprising. The questions that arise out of this are, 'Why do we expect learners from ex-HOR and ex-DET schools to do worse than learners in ex-CED schools?', and 'What are the possible reasons why this is so?'. The aim of this study is to investigate whether deep-rooted psycholinguistic theory could offer a possible explanation for the major differences in results, as opposed to the more obvious reasons which have been offered previously (e.g. lack of resources, inadequate teacher training, and so on).

B.11 POSITIONING THE RESULTS WITHIN THE THEORETICAL FRAMEWORK

Groups 1 and 2 fall in the category, ex-CED, groups 3 and 4 fall in the category, ex-HOR, and group 5 falls in the category ex-DET.

B.11.1 CATEGORY 1: AFL AND EFL (ex-CED)

Table 36 shows the average percentages obtained in the key subjects, as well as the average percentages obtained in the language subjects for groups 1 and 2 respectively:

Table 36

	AFL (ex-CED)	EFL (ex-CED)
FIRST LANGUAGE (HG)	62.60	57.59
SECOND LANGUAGE (HG)	58.18	63.58
BIO (HG)	58.55	55.14
BIO (SG)	48.44	46.51
GEO (HG)	57.23	55.65
GEO (SG)	57.49	45.99
MATH (HG)	59.17	49.77
MATH (SG)	53.95	46.37
PHYS (HG)	59.00	50.77
PHYS (SG)	58.76	47.96

Learners in this category obtained the highest average percentages in all the key subjects. They also obtained the highest average percentages in the First and Second Language subjects.

We see that learners in the EFL (ex-CED) group perform weaker than learners in the AFL (ex-CED) group in the mother-tongue subject, which is also the medium of instruction and the primary language in which cognitive processing takes place. They also perform weaker in all the key subjects than learners in the AFL (ex-CED) group. This is interesting because learners in these two groups are the most similar with regards to socio-economic background of the learners, access to resources in schools, level of teacher training, and so on. In order for us to determine the precise reasons for this difference we would need to do a qualitative study.

B.11.2 CATEGORY 2: AFL AND EFL (ex-HOR)

Table 37 shows the average percentages obtained in the key subjects, as well as the average percentages obtained in the language subjects for groups 3 and 4 respectively:

Table 37

	AFL (ex-HOR)	EFL (ex-HOR)
FIRST LANGUAGE (HG)	50.88	48.70
SECOND LANGUAGE (HG)	46.43	63.59
BIO (HG)	44.96	43.44
BIO (SG)	38.47	40.28
GEO (HG)	49.24	51.01
GEO (SG)	43.88	44.55
MATH (HG)	40.58	45.12
MATH (SG)	29.70	32.21
PHYS (HG)	43.92	45.68
PHYS (SG)	42.69	46.44

From the table we can see that the average percentages for all the subjects are fairly low. There is also a drop in the average percentage for the mother-tongue subject from the previous category. The percentages for the key subjects and the first language subject are similar for both groups. We see that there is a big difference in the average percentage for the second language subjects between the groups. In Section A (p69) I gave possible reasons as to why the average percentage for the second language subject in group 4 is so high. What is of foremost importance in all the categories, however, is the level of academic performance in the primary language of conceptual development, ie. usually the first language subject.

B.11.3 CATEGORY 3: XFL (ex-DET)

Table 38 shows the average percentages obtained in the key subjects, as well as the average percentages obtained in the language subjects for group 5:

Table 38

	XFL (ex-DET)
FIRST LANGUAGE (HG)	55.34
SECOND LANGUAGE (HG)	37.81
BIO (HG)	35.49
BIO (SG)	33.35
GEO (HG)	36.69
GEO (SG)	32.45
MATH (HG)	30.72
MATH (SG)	21.73
PHYS (HG)	38.75
PHYS (SG)	33.02

For the most part, the language medium for ex-DET schools is English. I will therefore regard the ESL (HG) subject as the language in which academic processing takes place (in school) beyond grade 3 for these learners[77]. We see that the average percentages for the key subjects and the second language subject are very low, while the average percentage for the first language subject is fairly high. This means that learners perform badly in all subjects taught through the second (or sometimes third) language, and perform well in the one subject that is taught in the mother-tongue. The statistics in table 38 show that a connection has not been established between the first and the second languages of Xhosa first language speaking learners in the Western Cape. If South African schools continue to follow a subtractive multilingualism program[78] for African language speaking learners, these statistics will not change.

77 See chapter six, p60.
78 See discussion in chapter three, p12-20.

CHAPTER EIGHT

A quantifiable look at the relationship between language proficiency and academic performance

1. INTRODUCTION

Throughout this study we have seen that, in general, in all five groups, a high average percentage in the language medium subject goes together with a high average percentage in the key subjects, while a low average percentage in the language medium subject goes together with a low average percentage in the key subjects. For me to describe this relationship in more concrete terms I will construct scatterplots and calculate correlation coefficients so as to determine the degree of relationship between the two variables for all five groups.

> The scatterplot illustrates all the data visually, while the correlation coefficient provides a numerical summary of the data.
>
> Fraenkel and Wallen,2000:272

> ... a correlation coefficient, designated by the symbol *r*, expresses the degree of relationship that exists between two sets of scores. ... A positive relationship is indicated when high scores on one variable are accompanied by high scores on the other, low scores on one are accompanied by low scores on the other, and so forth. ... A negative relationship is indicated when high scores on one variable are accompanied by low scores on the other, and vice versa.
>
> ibid:229

The scatterplots and correlation coefficients in this chapter illustrate the relationships between the variables academic performance in the language medium subject, and academic performance in the key subjects.

2. A CLOSER LOOK AT THE SCATTERPLOTS AND CORRELATION COEFFICIENTS

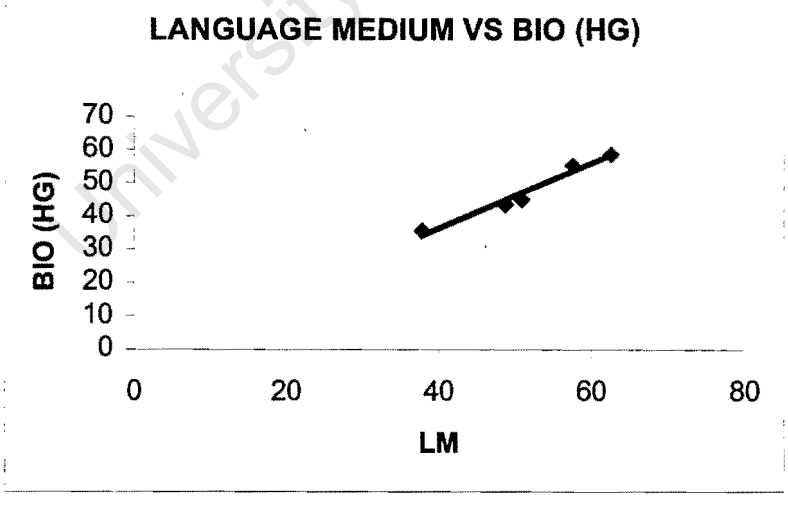
> ... correlation coefficients are never more than +1.00, indicating a perfect positive relationship, or -1.00, indicating a perfect negative relationship. Perfect positive or negative correlations, however, are rarely, if ever achieved. If the two variables are highly related, a coefficient somewhat close to +1.00 or -1.00 will be obtained (such as 0.85 or 0.93). The closer the coefficient is to either of these extremes, the greater the degree of relationship. If there is no or hardly any relationship, a coefficient of .00 or close to it will be obtained.
>
> ibid

> Correlations between .40 and .60 are often found in educational research and may have theoretical or practical value, depending on the context.
>
> ibid:370

Below follows a brief discussion of each scatterplot and its corresponding correlation coefficient:

2.1 LANGUAGE MEDIUM VS BIO(HG)

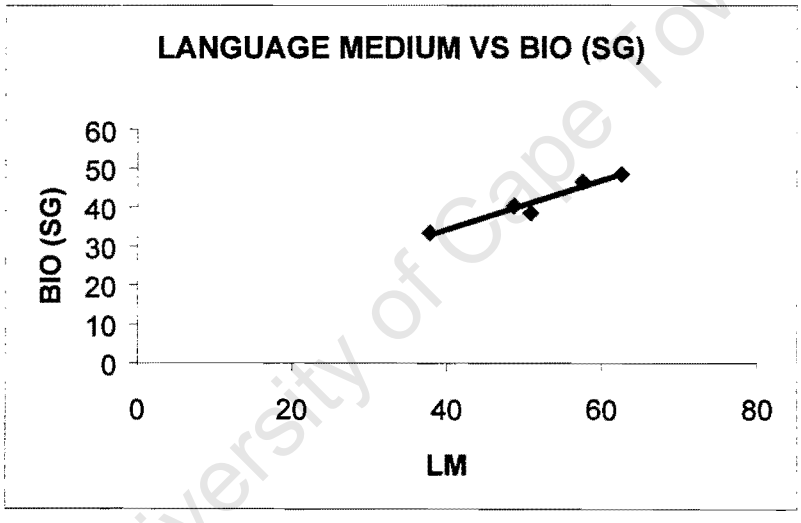
Figure 4



The scatterplot shows the relationship between academic performance in the language medium subject and Biology (HG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient[79] is approximately equal to 0.98 (r=0.98). The relationship is positive which means that, in general, high scores in the language medium subject correspond to high scores in Biology (HG), and vice versa. The correlation coefficient is high showing that there is a strong relationship between the two variables. This, however, does not mean that a strong relationship does not exist between academic performance in the key subjects and any other variable as well.

2.2 LANGUAGE MEDIUM VS BIO (SG)

Figure 5

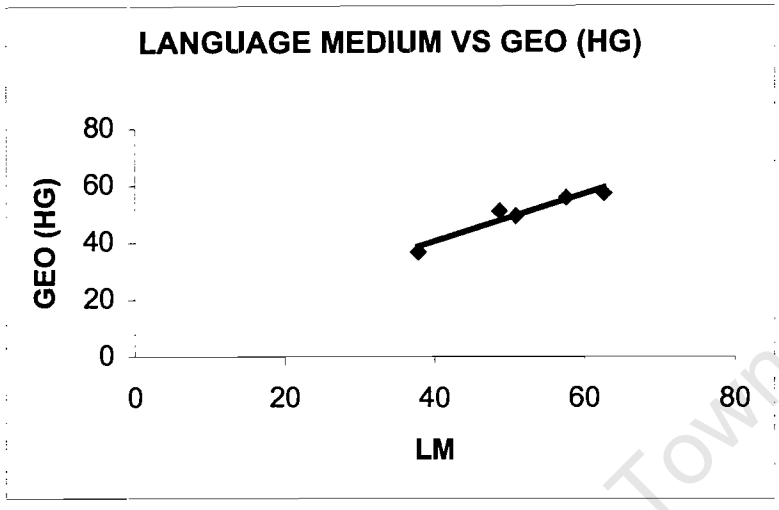


The scatterplot shows the relationship between academic performance in the language medium subject and Biology (SG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.97 (r=0.97). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

[79] 'When the data for both variables are expressed in terms of quantitative scores, the Pearson r is the appropriate correlation coefficient to use ...' (ibid:232).

2.3 LANGUAGE MEDIUM VS GEO (HG)

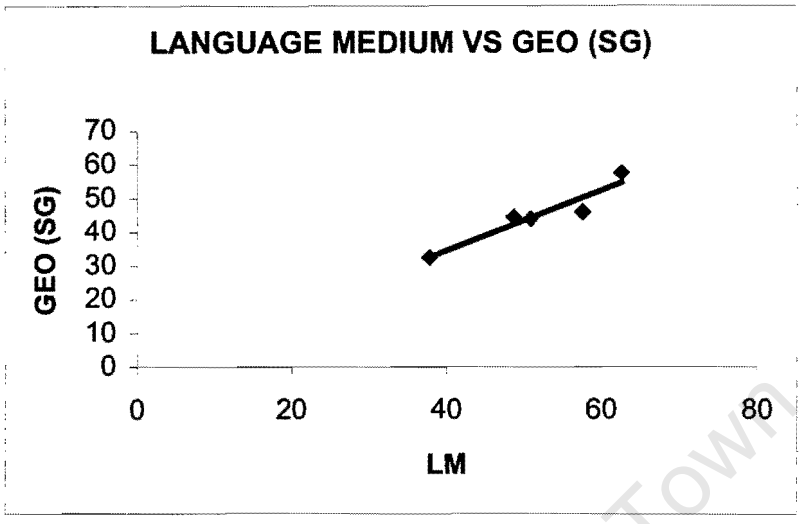
Figure 6



The scatterplot shows the relationship between academic performance in the language medium subject and Geography (HG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.96 (r=0.96). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

2.4 LANGUAGE MEDIUM VS GEO (SG)

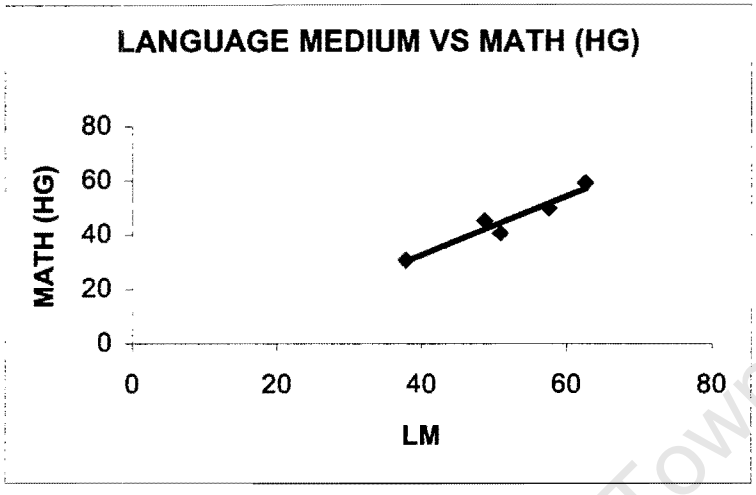
Figure 7



The scatterplot shows the relationship between academic performance in the language medium subject and Geography (SG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.95 (r=0.95). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

2.5 LANGUAGE MEDIUM VS MATH (HG)

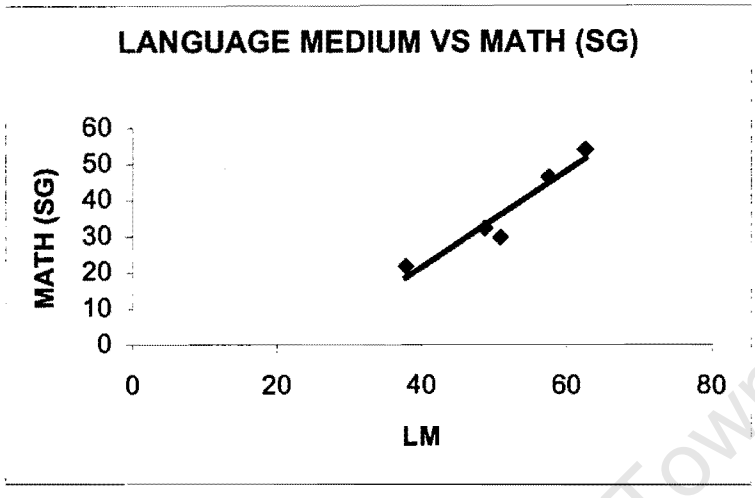
Figure 8



The scatterplot shows the relationship between academic performance in the language medium subject and Mathematics (HG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.96 (r=0.96). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

2.6 LANGUAGE MEDIUM VS MATH (SG)

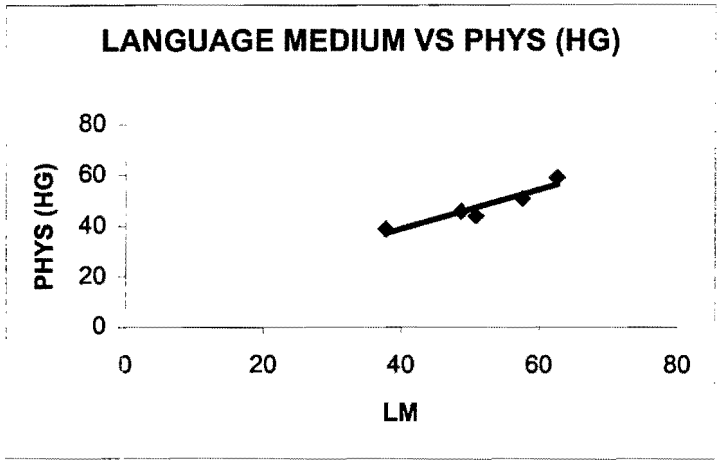
Figure 9



The scatterplot shows the relationship between academic performance in the language medium subject and Mathematics (SG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.96 (r=0.96). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

2.7 LANGUAGE MEDIUM VS PHYS (HG)

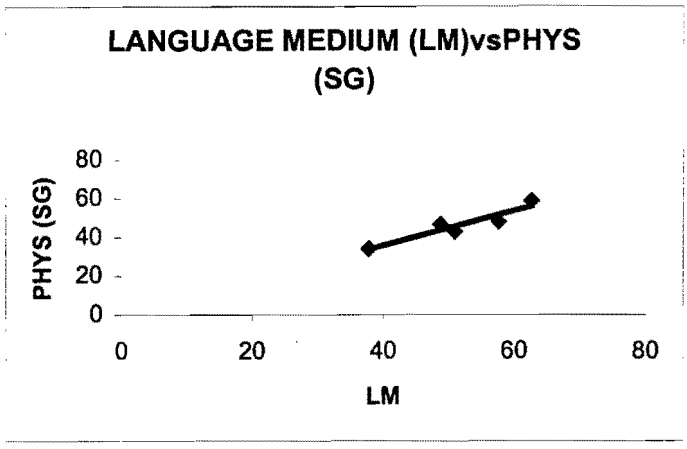
Figure 10



The scatterplot shows the relationship between academic performance in the language medium subject and Physical Science (HG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.95 (r=0.95). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

2.8 LANGUAGE MEDIUM VS PHYS (SG)

Figure 11



The scatterplot shows the relationship between academic performance in the language medium subject and Physical Science (SG) for schools in all five groups in the Western Cape. The Pearson product-moment coefficient is approximately equal to 0.94 (r=0.94). The relationship is positive. The high correlation coefficient shows that there is a strong relationship between the two variables.

3. CONCLUSION

The scatterplots and correlation coefficients in this chapter indicate that there is a strong linear relationship between the average percentage obtained in the language medium subject and the average percentages obtained in the key subjects. This strong positive relationship supports the theory that a higher level of proficiency (including literacy) in the language medium results in better academic results[80].

80 The strong relationship between the average percentage obtained in the language medium subject and the average percentages obtained in the key subjects does not indicate that a strong linear relationship does *not* exist between academic performance and any other possible causal variable.

CHAPTER NINE

Conclusions and Further Recommendations

There are two important points that this study wants to bring to the readers attention:

1. DIFFICULTIES FACING AFRICAN-LANGUAGE-SPEAKING LEARNERS

MacSwan and Rolstad describe the difficulties facing the second language learner:

> While majority language children have the single objective of mastering academic content (math, social studies, science, reading and writing) in school, language minority children have **two** objectives which they must meet in order to be academically successful: Like majority language children, they must master academic content; but unlike children in the majority, they must also learn the language of instruction at school.
>
> MacSwan and Rolstad, 2001:13-14

Learners in category three are compelled to write all non-language subjects in Afrikaans or English. At the moment, Afrikaans and/or English is taught as a second language subject, on second language level to these learners. The results show that the level of proficiency (fluency and literacy) in this subject is not high, ie. *not even at second language level.* We can therefore say that the instrument (language medium) used for communication (and therefore learning) is not appropriate for these learners. Needless to say, this will impact negatively on any learning that takes place.

2. LEARNING THROUGH XHOSA MEDIUM

> It is difficult to learn skill with instructional nonsense in any language but it is probably easier to learn it in the first language.
>
> Edelsky, 1991:70

From the frequency polygons and the tables we can see that there is a difference in performance between learners who write in their first language (ie. Afrikaans and English

home language speakers), and those who write examinations in a second (or additional) language (ie. African language speakers).

There is one subject in this study that shows a notably similar performance in all three categories, namely, the first language subject, even though external variables are kept constant in each category. In other words, the learners still have:

- unequal access to resources
- same socio-economic background
- same quality of teacher training.

The question of interest is. 'Why is the performance in this subject then significantly better than in all the others with regards to Xhosa speaking learners?' Let us consider the fact that when we look at the first language subject (as with any language subject), the medium of instruction and examination changes. This means that as in categories one and two, learners in category three are also taught and assessed in their home language. This differs from the other subjects where the language medium is different from the home language.

I realise that while this gives an indication that non-mother-tongue education may have an effect on pass rates, it may still not be conclusive as variation in internal factors, such as the nature of the subject, quality of teaching, and so forth, may still play a role. It may not, however, be possible to quantify any of the other relevant causal factors. It suffices that I demonstrate a positive correlation between the language medium subject and academic achievement in key subjects.

The results for the ABET level 4 (Education portfolio committee, 2001:7-8) examinations show a similar pattern to the one found in this study:

> Languages were the most encouraging, except for English (37%) and Afrikaans (22%), but the African languages showed consistently high results (70% for IsiZulu and IsiXhosa, and 98% for Tshivenda). African language classes are generally taught by mother-tongue speakers, and students excelled in these areas.

3. FURTHER RECOMMENDATIONS

In conclusion,

> The education department has recently admitted that despite its best intentions and programmes (and it has some very good ones), it has not achieved the success that hoped. In a parliamentary briefing, Education Minister Kadar Asmal reported that out of a total of 477 955 matric candidates, only 25 384 passed higher grade mathematics and 35 454 passed higher grade science.
>
> Underqualified teachers, poor infrastructure and impoverished social conditions, all of which are inherited, are some important reasons for the poor performance of especially African students. But a far bigger problem for African students is the medium of instruction in maths and science. For all pupils the manner in which scientific subjects are presented to them is another major problem.
>
> C. Qunta, 2002

It is important to mention that the Western Cape Education Department regards it necessary to increase the examination results of all African language mother-tongue speakers in the non-language subjects by five percent every year. This suggests a pre-conceived lack of faith in the academic abilities of African language speakers. All the results used in this study include this five percent increase.

What I want to bring across in the last paragraph of this study is this:

- I agree that an effort should be made to improve conditions and resources in previously disadvantaged schools.

- I agree that the curriculum should be integrated and learner centred.

- I agree that teacher training forms an essential part of transforming the educational system.

I also believe, however, that we should develop these issues in conjunction with a more important, overriding issue, ie. that of language medium. The results in this study indicate that perhaps we should consider the issue of language medium more seriously and more urgently. Once we can shift our focus to making mother-tongue instruction in schools a reality we can develop comprehensive educational planning and implementation models for South Africa. If it does nothing else, this study underlines what is generally known but seldom articulated, namely, that in a bilingual educational system, mother-tongue education is essential if we want to provide all learners with similar choices and opportunities.

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ADDENDUM

CHAPTER 5

FREQUENCY DISTRIBUTION GRAPHS FOR THE AVERAGE PERCENTAGE PASS RATES PER GROUP - CHAPTER 5

GROUPED FREQUENCY DISTRIBUTION FOR AFL (EX-CED)

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	7
100	0

GROUPED FREQUENCY DISTRIBUTION FOR EFL (EX-CED)

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	9
100	8

GROUPED FREQUENCY DISTRIBUTION FOR EFL (EX-HOR)

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	1
60-69.99	1
70-79.99	2
80-89.99	3
90-99.99	4
100	0

GROUPED FREQUENCY DISTRIBUTION FOR AFL (EX-HOR)

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	0
50-59.99	7
60-69.99	11
70-79.99	24
80-89.99	21
90-99.99	10
100	1

GROUPED FREQUENCY DISTRIBUTION FOR XFL (EX-DET)

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	1
20-29.99	3
30-39.99	10
40-49.99	8
50-59.99	11
60-69.99	5
70-79.99	4
80-89.99	2
90-99.99	1
100	0

LIST OF AVERAGE % PASS PER CENTRE

EX-CED (AFL)	EX-CED (EFL)	EX-HOR (AFL)	EX-HOR (EFL)	EX-DET (XFL)
95.45	90.43	39.09	59.83	15.79
95.65	91.67	50	66.45	20
96.97	91.78	54.88	71.43	24.02
98.08	92	56.18	77.91	27.34
98.28	92.04	57.45	82.24	30.91
98.48	92.9	57.75	85.71	31.48
98.85	97.83	57.75	86.49	32.2
100	98.77	59.32	93.48	32.45
100	99.01	61.34	97.37	33.33
100	100	63.37	97.4	33.33
100	100	64.29	99.56	35.48
100	100	64.44	**mean:**83.4427272727273	37.62
100	100	65.33	**SD:**12.7435938208606	37.76
100	100	67.8	***n***:11	39.07
100	100	68.75		45.75
100	100	68.89		45.97
100	100	68.99		46
mean:98.9270588235294	**mean:**96.8488235294118	69.12		46.72
SD:1.57148721242702	**SD:**3.91077978533824	69.81		47.68
n:17	***n***:17	70.83		47.83
		71.21		49.45
		72.41		49.53
		72.66		50
		72.68		50.7
		73.39		51.52
		73.42		52.83
		73.53		53.77
		73.91		54.24
		74.67		54.76

75.18
76.05
76.09
76.47
76.5
76.61
77.35
77.73
77.94
78.05
78.16
78.43
78.95
79.59
80.17
80.34
80.67
81.38
82.45
82.73
83.02
83.78
84.04
84.38
85.05
85.25
85.64
86.96
87.11
87.39
88.78
88.82
89.44
89.77

55
55.15
57.58
59.6
60.19
61.81
62.82
65.81
69.47
71.15
71.43
75
76.36
80.49
88.29
90.64

mean:50.6293333333333
SD:17.2635252483379
n:45

89.86
90.05
91.3
91.33
95.88
96.3
96.55
96.57
97.39
97.5
98.63
100

mean:77.5318666666667
SD:12.4554202564893
n:75

CHAPTER 7

GROUPED FREQUENCY DISTRIBUTION OF EX-CED (AFL)

Table 1: **AFL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	3
60-69.99	14
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 2: **ESL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	1
50-59.99	11
60-69.99	3
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 3: **BIO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	2
50-59.99	7
60-69.99	7
70-79.99	1
80-89.99	0
90-99.99	0
100	0

Table 4: **BIO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	2
40-49.99	9
50-59.99	6
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 5: **GEO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	0
50-59.99	4
60-69.99	3
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 6: **GEO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	2
50-59.99	2
60-69.99	4
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 7: **MATH (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	2
50-59.99	8
60-69.99	4
70-79.99	1
80-89.99	0
90-99.99	0
100	0

Table 8: **MATH (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	5
50-59.99	7
60-69.99	4
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 9: **PHYS (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	2
50-59.99	4
60-69.99	5
70-79.99	3
80-89.99	0
90-99.99	0
100	0

Table 10: **PHYS (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	3
50-59.99	4
60-69.99	6
70-79.99	2
80-89.99	0
90-99.99	0
100	0

GROUPED FREQUENCY DISTRIBUTION FOR EX-CED (EFL)

Table 1: **ASL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	4
60-69.99	12
70-79.99	1
80-89.99	0
90-99.99	0
100	0

Table 2: **EFL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	12
60-69.99	4
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 3: **BIO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	5
50-59.99	7
60-69.99	4
70-79.99	1
80-89.99	0
90-99.99	0
100	0

Table 4: **BIO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	11
50-59.99	4
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 5: **GEO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	4
50-59.99	7
60-69.99	3
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 6: **GEO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	4
40-49.99	5
50-59.99	3
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 7: **MATH (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	1
30-39.99	2
40-49.99	6
50-59.99	5
60-69.99	3
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 8: **MATH (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	5
40-49.99	5
50-59.99	4
60-69.99	2
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 9: **PHYS (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	2
40-49.99	5
50-59.99	8
60-69.99	1
70-79.99	1
80-89.99	0
90-99.99	0
100	0

Table 10: **PHYS (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	7
50-59.99	5
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

GROUPED FREQUENCY DISTRIBUTIONS FOR EX-HOR (AFL)

Table 1: **AFL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	33
50-59.99	42
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 2: **ESL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	3
40-49.99	60
50-59.99	12
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 3: **BIO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	1
30-39.99	14
40-49.99	36
50-59.99	17
60-69.99	2
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 4: **BIO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	3
30-39.99	45
40-49.99	27
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 5: **GEO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	8
40-49.99	26
50-59.99	32
60-69.99	2
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 6: **GEO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	3
30-39.99	10
40-49.99	53
50-59.99	9
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 7: **MATH (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	5
30-39.99	11
40-49.99	7
50-59.99	7
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 8: **MATH (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	8
20-29.99	31
30-39.99	32
40-49.99	4
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 9: **PHYS (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	12
40-49.99	9
50-59.99	7
60-69.99	1
70-79.99	1
80-89.99	0
90-99.99	0
100	0

Table 10: **PHYS (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	1
30-39.99	22
40-49.99	34
50-59.99	9
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

GROUPED FREQUENCY DISTRIBUTIONS FOR EX-HOR (EFL)

Table 1: **ASL (HG)**

0-9.99	0
PERCENTAGE	**FREQUENCY**
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	0
50-59.99	3
60-69.99	8
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 2: **EFL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	6
50-59.99	5
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 3: **BIO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	5
40-49.99	2
50-59.99	3
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 4: **BIO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	6
40-49.99	3
50-59.99	1
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	

Table 5: **GEO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	2
50-59.99	4
60-69.99	1
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 6: **GEO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	5
50-59.99	2
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 7: **MATH (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	1
30-39.99	2
40-49.99	3
50-59.99	3
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 8: **MATH (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	6
30-39.99	2
40-49.99	3
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 9: **PHYS (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	1
40-49.99	4
50-59.99	3
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 10: **PHYS (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	2
40-49.99	2
50-59.99	5
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

GROUPED FREQUENCY DISTRIBUTION FOR EX-DET

Table 1: **ASL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	8
30-39.99	16
40-49.99	6
50-59.99	1
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 2: **ESL (HG)**

PERCENTAGE	*FREQUENCY*
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	33
40-49.99	11
50-59.99	1
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 3: **XFL (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	0
30-39.99	0
40-49.99	5
50-59.99	33
60-69.99	7
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 4: **BIO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	2
20-29.99	11
30-39.99	17
40-49.99	7
50-59.99	3
60-69.99	1
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 5: **BIO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	11
30-39.99	29
40-49.99	4
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 6: **GEO (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	1
20-29.99	7
30-39.99	20
40-49.99	8
50-59.99	3
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 7: **GEO (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	12
30-39.99	30
40-49.99	1
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 8: **MATH (HG)**

PERCENTAGE	FREQUENCY
0-9.99	1
10-19.99	1
20-29.99	5
30-39.99	3
40-49.99	4
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 9: **MATH (SG)**

PERCENTAGE	FREQUENCY
0-9.99	1
10-19.99	16
20-29.99	18
30-39.99	5
40-49.99	0
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 10: **PHYS (HG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	9
30-39.99	3
40-49.99	7
50-59.99	4
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

Table 11: **PHYS (SG)**

PERCENTAGE	FREQUENCY
0-9.99	0
10-19.99	0
20-29.99	9
30-39.99	25
40-49.99	7
50-59.99	0
60-69.99	0
70-79.99	0
80-89.99	0
90-99.99	0
100	0

LIST OF AVE % PER SUBJECT, PER CENTRE FOR AFL (ex-CED)

AFL(HG)	ESL(HG)	BIO(HG)	BIO(SG)	GEO(HG)	GEO(SG)	MATH(HG)	MATH(SG)	PHYS(HG	PHYS(SG)
60.61	57.11	60.75	46.56			71.08	56.25	73	
62.12	56.09	66.8	49.25	57.56	43.71	53.94	62.3	63.29	73.42
61.52	55.63	55.02	44.74	37.25	54.83	59.23	59.46	54.26	41.33
56.65	44.83	54.83	40.79				49.76	38.75	
68.03	61.78	63.28	57.38	67.1	60.08	57.82	62.43	64.82	64.69
57.97	54.15	44.88	50.46				51.79		58.07
60.27	58.51	64.19	45.85	56.06	55.67	58.84	44.76	48.2	49.58
68.46	68.64	54.25	47.11	60.83	65.33	68.46	56.33	71.25	70.67
64.67	59.05	58.7	43.53			63.16	45.17	62.57	56
61.73	60.51	43.08	37.52	54.46	49.33	49	34.73		68.5
64.39	56.87	56.67	53.32			52.05	55.38	54.18	60.52
63.92	58.19	74.07	57.41	58.75	69.78	58.04	42.17	60.42	62.33
68.26	64.2	64.15	58.3			49.88	57.33	53.56	40.67
61.47	59.22	65.14	56.89			67.17	68.27	72.92	61.71
56.53	58.1	54.35	36.79			56.63	59.81	49.3	54.28
64.76	59.83	51.34	49.6	65.83	61.19	64.21	64.86	56.5	60
62.94	56.31	63.93	48.07			58	46.33	62	59.6
62.60588	**58.17765**	**58.55471**	**48.44529**	**57.23**	**57.49**	**59.167333**	**53.948824**	**59.00133**	**58.758**
3.677431	**4.87602**	**7.968091**	**6.719098**	**9.219532**	**8.449597**	**6.6132253**	**9.0306913**	**9.703471**	**9.475811**

LIST OF AVE % PER SUBJECT, PER CENTRE FOR EFL (ex-CED)

ASL(HG)	EFL(HG)	BIO(HG)	BIO(SG)	GEO(HG)	GEO(SG)	MATH(HG	MATH(SG	PHYS(HG	PHYS(SG)
60.76	59.81	60.56	53.67	62.5	57.24	65.12	58.38	54.89	53.42
71.13	69.41	64.34	46	65.87		58.24	59	58.79	
63.14	55.3	53.6	47.15	47.78	39.89	46.63	54.44	57	57.38
66.71	69.41	70.7	47.5	61		69.28	62.45	71.29	
63	54.29	40.76	45.22			30.88	40.8	39.54	
69.23	58.88	47.27	48.76	52.48	43.62	50.12	47.01	43.77	45.27
67.13	56.64	53.92	45.61	57.31	53.87	46.33	39.74	46.63	40.76
59.86	53.42	53.54	43.02	47.41	48.52	42.68	36.01	51	47.45
60.57	51.66	49.89	42	50.49	39.39	48	49.29	42.85	42.5
61.19	53.24	53.13	47.61	46.73	44.82	23.72	26.28	34	48.95
58.03	52.83	52.85	40.16	45.86	37.78	61.36	40.88	51.94	51.15
69.98	61.19	65.48	55.17	59.87	54.39	53.31	51.5	42.4	51.67
56.4	54.4	52.69	51.48	57.63	44.13	45.47	39.42	55.39	52.63
65.34	67.34	67.68	58.41	62.08		58.67	64.67	60.3	57.11
69.71	58.29	46.27	24.67	58.15	38.33	48.05	36	46.14	39.52
61.39	49.65	49.99	47.75			39.1	33.39	51.64	43.04
57.3	53.34	54.64		59.56	49.89	59.14	49.09	55.48	40.53
63.58059	**57.59412**	**55.13588**	**46.51125**	**55.648**	**45.98917**	**49.77059**	**46.37353**	**50.76765**	**47.95571**
4.721237	**6.108305**	**8.076729**	**7.546895**	**6.59697**	**6.729331**	**11.85279**	**11.02658**	**9.03262**	**6.131835**

LIST OF AVE % PER SUBJECT, PER CENTRE FOR AFL (ex-HOR)

AFL(HG)	ESL(HG)	BIO(HG)	BIO(SG)	GEO(HG)	GEO(SG)	MATH(HG	MATH(SG	PHYS(HG	PHYS(SG)
45.88	40.44	54.4	41.65	52.6	37.58		17.37		36.09
49.5	40.72		34.32	36.75	41.65		14.73		
52.84	45.93	44.56	38.93	50.75	42.45		37.69	34.92	32.79
49.7	42.25	51.43	37.36	57.35	46		36.28	68.25	45.72
52.2	42.79	44.68	32.19	54.13	46.59		29.49		42.95
53.94	43.86	54.18	39.06	51.14	43.98	40.75	28.3	51.5	41.71
47.48	46.47	50.12	44.06	46.44	40.49		39.42		39.99
46.08	46.23	41.96	34.21	44.95	47.31	56	32.96		35.28
48.1	44.56	51.8	37.87	57.2	47.15	54.5	36.82	71.5	45.22
54.29	45.49	40.38	35.25	35.57	36.57		25.63		34.02
50.5	47.09	38.5	36.71	55.75	49.48		46.1		50.91
48.24	49	41.92	34.81	47.04	41.85		22.77		49.08
48.33	48.96	46.52	36.29	46.67	48.37	43.25	31.06	50.25	47.53
56.04	43.21	37.5	35.69	43.76	42.67		42.11		
53.67	46.67	43.94	43.38	51.5	39.57	33.13	32.56	38.63	38.08
51.98	38.23	28.85	36.76	41.05	48.72		34.83		50.19
48.49	47.51	50.71	34.43	45.03	43.97	56.5	27.07		40.33
55.74	49.59	43.91	44.02	58.97	50.52		39.17		47.95
49.65	45.76	47.25	37.56	49.31	43.67	52.83	34.35	39.15	34.81
46.54	47.51	43.75	38.03	58.17	47.79	54.75	31.61	35.25	42.48
48.75	46.87	31.31	36.52	38.43	34.88		19.18		38.23
53.4	45.33	34.82	28.76	52.79	44.44	58.75	34.65		44.12
52.87	38.96	42.48	40.01	50.96	47.72		29.9		38.47
45.19	44.62	46.27	40.75	39.23	41.3	28.56	25.14	31.48	29.5

54.9	49.11	42.27	36.05	54.5	48.43	38.75	33.89	41.25	41.85
50.15	38.19	41	37.66		43.59		24.33		35.47
43.76	46.7	65	37.68		47.67	26.63	24.97		48.89
53.27	48.67	44.29	37.51	58.75	52.51		30.67		46.52
49.12	46.56	39.72	29.24	50.68	47.87		36.23		37.42
47.83	45.4	42.21	35.97	55	43.2		21.5		33.95
53.68	51.47	60.75	40.43	58.83	50.12	45.75	25.23	54.75	36.47
57.01	54.46	52.9	47.16	57.82	48.91	33.77	35.65	46.19	50.36
50.27	48.72	53.17	40.48	42.06	40.91		28.42		36.73
48.42	43.82	37.3	29.74	45.79	40.14		37.65		42.57
53.39	51.42	46.38	48.76	45.88	41.3	38.25	23.46	52.25	42.15
52.71	43.47	48.81	48.77	49.79	54.52		28.47		
48.5	43.06	41.39	34.66	53.03	45.51		30.91	32.1	39.06
42.41	44.82	37.3	30.05	40.48	28.38		22.93		46.86
53.93	53.22	51.6	44.16	46.25	52.25	39.75	27.7	37.5	48.48
51.95	46.66	51.31	46.38	58.75	53.37		29.8	41.83	46.11
46.61	42.13	40.45	30.77		37.99		31.15		50.04
48.55	46.49	35.75	32.55	40.03	38.55		22.48		31.45
54.6	51.46	54.68	39.2	43.89	38.97	40.19	35.27	57.13	50.31
57.41	48.65	57.53	44	59.59	46.05	42.81	27.67	51.08	45.3
48.38	42.47	32.19	30.67	41.85	41.66		34.64		52.15
49.12	46.19	45.96	39.59	54.68	44.82	38.33	22.58	30	35.44
51.74	49.64	42.81	39.32	54.75	49.29		30.18		
51.49	46.54	41.25	42.58		48.51		17.33		
49.41	48.06	54.75	47.86	52.14	46.64	38.19	35.19	45	44.68
46.56	43.1		36.21	50	42.14		19.98		38.07
51.16	54.27	43.22	42.25	49.7	50.77	41.5	36.92	45.17	44.31
52.08	44.51	36.25	41.76	37.45	43.23		31.77		39

48.18	52.66	52.92	35.26	56.75	37.7		27.05		49.25
56	55.35	45.08	42.22	44.81	46.43	46.25	29.63		49.56
51.46	45.07		47.66		48.4		21.18		40.92
57.79	50.95	48.04	44.37	61.84	52.69	54.22	47.18	53.75	52.36
46.59	44.42	42.15	40.39	44.33	43.24		24.53		40.13
52.66	50.37	50.19	45.27	54.88	40.44		38.09		48.98
47.89	42.26		34.05		40.08		27.1		
48.01	42.85		36.6	32.05	28.75		15.82		
50.82	40.46	47.29	40.3	49.29	43.28	27.25	17.8	44.21	39.47
47.3	43.83	36.03	37.14	39.94	42.45	23.5	20.24	33.54	37.81
54.17	47.53	52.64	36.79	61.13	46.08		25.98	45.5	40.17
53.55	55.2	49.22	40.58	50.5	40.01		35.55		46.83
49.2	47.04	33.77	35.11	44.1	44.53		23.42	31.58	42.62
46.51	47.03	46.81	43.53	57	45.19		37.99	30.88	31.52
54.3	44.56	34.25	35.31	42	38.53		17.6		
53.85	48.05	32.67	37.13	43.86	41.74	35.25	39.67		54.35
51.35	42.73	49.92	31.72		39.67		43.69		
54.19	48	46.13	33.9	54.75	44.67	27.08	24.36	42.75	40.81
52.97	43.93	48.44	38.15	48.54	42.57	30.97	29.67	47.21	47.5
49.81	46.77	42.74	38.64	55.48	28.14	32.58	33.2		46.65
54.27	44.22	53.63	46.56	49.25	50.08		31.74		50.06
52.67	54.42	43.6	35.24	53.59	41.28	37.25	32.33	33.14	43.03
54.95	47.09	40.27	38.98	36.85	43.18		27.7		46.38
50.884	**46.428**	**44.961**	**38.4664**	**49.23779**	**43.882**	**40.57633**	**29.7024**	**43.92467**	**42.68924**
3.35435	**3.881618**	**7.243085**	**4.840524**	**7.138109**	**5.35184**	**10.05633**	**7.259269**	**10.6285**	**5.97924**

LIST OF AVE % PER SUBJECT, PER CENTRE FOR EFL (ex-HOR)

ASL(HG)	EFL(HG)	BIO(HG)	BIO(SG)	GEO(HG)	GEO(SG)	MATH(HG	MATH(SG	PHYS(HG	PHYS(SG)
56.81	45.35	38.72	32.2	40.59	41.1	41.81	22.42	35.19	37.34
58.69	45.97	41.24	42.58	42.23	45.57	36.83	31.77		51.63
63.18	45.63	32.37	36.61	54.41	41.82	41.03	25.27	40.27	39.76
66.8	51.49	39.63		54.22		29.22	26.66	42.85	
63.04	50.08	37.97	34.58			37.15	43.42	40.9	50.56
66.52	55.72	50.36	39.89	59.13	47.67	47.5	40.71	54.95	54.25
69.66	56.13	55.52	47.73	61.42	53.73	59.94	48.62	53.79	52.9
66.81	44.81	46.13	50.89				28.73		
66.47	54.02	58.42	49.18	56.19	53.55	54.09	39.4	54.51	51.25
53.62	44.01	34.02	32.5	39.89	32.52	58.5	26.01	42.98	40.12
67.91	42.48		36.69		40.44		21.3		40.14
63.59182	**48.69909**	**43.438**	**40.285**	**51.01**	**44.55**	**45.11889**	**32.21**	**45.68**	**46.43889**
5.127465	**4.9638**	**8.871214**	**6.971276**	**8.720405**	**7.141584**	**10.59199**	**9.292366**	**7.626358**	**6.8633**

LIST OF AVE % PER SUBJECT, PER CENTRE FOR XFL (ex-DET)

ASL(HG)	ESL(HG)	XFL(HG)	BIO(HG)	BIO(SG)	GEO(HG)	GEO(SG)	MATH(HG	MATH(SG	PHYS(HG	PHYS(SG)
33.94	36.59	48.98	25.58	21.78		34.23		20.6		31.67
29.6	40.07	54	32.68	35.7	35.5	38.75		24.47	28.71	43.18
26.71	35.28	57.63	31.95	35.33	32.75	32.16	24.67	18.52		37.88
37.24	44.34	62.74	40.86	37.05	39.32	38.52	39.2	39.68	59.08	45.8
	36.16	54.02	36.75	36.41	46.42	36.7		17.07	46.25	33.84
	30.15	55.69		32.08		20.87		12.98		24.12
24.52	35.46	54.73	33.25	36.52	33.75	31.97		29.58	72	42.35
29.5	35.47	53.59	30.92	34.21	30.75	28.03	20.7	17.07	20.75	27.86
29.39	40.43	58.13	31.38	32.55	34.83	29.57		31.68	39.16	35.35
41.99	41.11	46.12	64.75	33.98		39.38		21.19		36.07
34.4	38.55	56.15	51.44	37.67	52.38	37.47	32.63	24.4		35.77
36.33	33.29	49.49		34.01	34.94	28.94		7.17	23.92	22.22
	39.92	57.22	32.44	37.32	44.6	37.45		21.6		32.6
34.38	33.85	54.25		33.57	27	27.25		13.78		29.48
43	36.14	51.74	54.75	31.02	32.33	32.06		25.75	40.5	33.87
32.97	32.91	51.99	39	30.57	23.97	25.67		25.93		32.26
47.56	36.67	48.08	36.47	26.94	33.19	24.49		11.51		36.39
34.75	33.55	53.44	34.64	30.73	38.23	31.68		19.21		36.53
40.74	50.85	55.46	41.37	31.65	43.77	35.38	43.75	23.87	44.5	38.6
	33.52	52.56	21.57	28.93	28.95	30	7.5	11.35		21.78
28.45	45.65	53.08	48.9	44.21		29.1	14.25	20.21	32	32.81
	39.96	57.27	24	33.45	39.42	28.81	31.44	26.53	44.58	44.98
38.33	36.51	62.88	43.61	43.41	52.84	33.33	54	32.62	57.6	41.06
	44.88	60.33		42	46.21	34.2		22.59		35.95

	33.53	52.7	19.29	27.37	42.2	35.82				
29.46	41.14	56	28.52	26.61	39.67	30.14		20.08		31.84
29.67	37.41	56.26	29.67	35.86	27.67	28.86		18.31		30.26
33.62	37.85	57.19	39.78	32.49	28.5	32.33		23.57		36.56
	42.88	63.17	24.46	37.8	33.05	41.76		30.96		46.42
	32.64	57.52	38.78	32.68	47.25	31.88	44.75	18.16	41.5	32.51
42	34.29	51.37	25.55	30.14	44.63	31.85		28.03		27.31
48.79	40.23	53.8	46.96	40.69	47.75	37.21	45.5	31	29.13	33.63
35.47	33.03	52.58	31.05	24.09	21.21	26.18	22	11.82	41.5	21.46
32.56	39.25	61.52	36.06	39.5		30.54	25	21.58	26.5	33.35
	35.38	52.19	25.88	30.03	35.78	31.65	20.13	16.16	42.14	35.97
31.42	35.91	53.12	16.5	27.2		28.16		13.8	25.25	28.42
35.39	37.6	56.9	33.17	29.35	37.5	33.96	47.75	33.22		30.85
34.44	38.51	53.43	29.01	29.66	31.73	31.58	26	18.04		31.44
	36.97	58.9	43.88	33.67	50.42	38.7		23.02	51.25	40
	41.79	60.84	52.42	42.06	36.78	39.97	23.04	16.6	51.25	33.96
56.68	39.53	46.9	26.42	27.22	28.77	30.67		17.25	22.58	31.88
30.29	38.62	59.44	38.82	30.82	18.17	30.55		27.21	27.36	41.42
38.22	34.77	56.75	29.63	28.09	35.6	37.69		23.93	27.36	27.09
	38.32	58.08	39.84	36.73	39.83	30.33		19.67	36.94	37.24
40.75	40.54	62.02	43.06	37.71	33.4	34.34		24.19	36.94	32.99
35.705	**37.81111**	**55.33889**	**35.48927**	**33.35244**	**36.69385**	**32.44844**	**30.72412**	**21.72636**	**38.75**	**34.02318**
6.907652	**4.021789**	**4.173687**	**10.13688**	**5.101146**	**8.296513**	**4.50539**	**13.09276**	**6.783199**	**12.88164**	**6.044917**

CHAPTER 8

LIST OF AVE % FOR LANGUAGE MEDIUM VS KEY SUBJECTS

	AFL(EX-CED)	EFL(EX-CED)	AFL(EX-HOR)	EFL(EX-HOR)	XFL(EX-DET)
LANG. MEDIUM	62.6	57.59	50.88	48.7	37.81
BIO(HG)	58.55	55.14	44.96	43.44	35.49
BIO(SG)	48.44	46.51	38.47	40.28	33.35
GEO(HG)	57.23	55.65	49.24	51.01	36.69
GEO(SG)	57.49	45.99	43.88	44.55	32.45
MATH(HG)	59.17	49.77	40.58	45.12	30.72
MATH(SG)	53.95	46.37	29.7	32.21	21.73
PHYS(HG)	59	50.77	43.92	45.68	38.75
PHYS(SG)	58.76	47.96	42.69	46.44	34.02

LIST OF CORRELATION COEFFICIENTS

LM VS BIO (HG)	0.985142812
LM VS BIO (SG)	0.970228486
LM VS GEO (HG)	0.962719205
LM VS GEO (SG)	0.949725692
LM VS MATH (HG)	0.963287427
LM VS MATH (SG)	0.956814164
LM VS PHYS (HG)	0.948541564
LM VS PHYS (SG)	0.941487626