

A Bernsteinian Analysis of the Recontextualisation of Knowledge in the 5090 Biology Syllabus in Zambia

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ABSTRACT

This study was focused on exploring the recontextualisation of knowledge in the 5090 Biology Syllabus in Zambia. Learners have not performed well in the 5090 Biology Syllabus. The performance poor performance in the 5090 Biology Syllabus has been attributed to a number of reasons. One of the many reasons is that teachers do not know what they are to teach and how they are to teach. The study will help to understanding the instructional and the regulative discourse in the syllabus. This will enable the Biology teachers to effectively teach biology in secondary schools. An analysis of the syllabus will inform the Biology teachers with the content in the syllabus and how the content is to be transmitted. Bernstein's classification and framing concepts have been used as analytical tools. Indicators were developed to guide the analysis. The document was inductively coded using Atlas ti 8 software. The findings indicated a strong framing (F+) in the selection, sequencing, evaluation criteria and in the hierarchical rules. Pacing was not indicated in the document. The classification was weak in the inter-disciplinary, intra-disciplinary and in the inter –discursive relations.

Keywords: Biology syllabus; classification; framing; recontextualisation; recognition and realisation

INTRODUCTION

This study explored the recontextualisation of knowledge in the 5090 Biology Syllabus. The is taught to all the learners in their senior grades that is from grade 10 to grade 12 in secondary schools in Zambia. The syllabus was prepared by the government through its officials. The Curriculum Development Centre (CDC) spear headed the development of the syllabus. The development of the syllabus or curriculum involves recontextualisation processes which take place in the recontextualisation field of the pedagogic device. The pedagogic device has three fields, which are the production, recontextualisation and the reproduction fields (Assump, 2016; Bertram, 2008). Specifically, the syllabus is development in the Official Recontextualisation Field (ORF) of the Pedagogic device.

The official recontextualisation field (ORF) is the field which is dominated by government agencies and its officers. This field include the government departments at national level, provincial level and at district level. The field also include the researchers and the subject inspectors or the standard officers at the different levels of the nation who are the advisors. The ORF also include the people who are not specialists in the pedagogic discourse, such as the stake holders from industries. Stake holders have interest in the education and that they could influence the state and the pedagogic practices (Bibila, 2016; Prayer-koro, 2012) . For this study, agents in this field could include the standard officers at national level, provincial level from the ministry of education, Curriculum Development Centre, researchers from the research centres, stake holders, that is agents from the industries (Bernstein, 1999, 2003).

When the 5090 Biology Syllabus has been prepared in the official recontextualisation field, it is taught to all the learners in secondary schools in Zambia. If all learners are to successfully learn biology in secondary schools, teachers need to have an understanding of the knowledge to be transmitted in the 5090 Biology Syllabus, that is the 'what' and the 'how' knowledge was to be transmitted. Currently Biology is one of the sciences in which the learners have not done well in the final examinations as reported by the examination council of Zambia. The examination council of Zambia is an institution responsible for all the examinations in Zambian schools, from primary to secondary schools and even in colleges of education. The poor result obtained in the 5090 Biology Syllabus is a concern for this study. Scholars have attributed the poor performance in the sciences to teachers not being aware of the 'what' and the 'how' of the pedagogic discourse they are teaching (Nonyameko Zintle, 2012; Petersen, 2015; Reeves, 2006). Where the teachers have had access to the curriculum, they have not understood the 'what' and the 'how' of the pedagogic device. In some cases, teachers have not have access to the curriculum they are teaching and have not ready the curriculum they are teaching (Nonyameko Zintle, 2012; Nsubunga, 2009).

Hence a need that this study is carried out in Zambia with a view to help the teachers understand the instructional and the regulative discourse embedded in Biology Syllabus.

This study will explore the recontextualisation of knowledge in the 5090 Biology Syllabus with a view of helping the teachers to be informed of the knowledge they are to teach the learners, and the biology content to be taught. The study will also inform the educators the gaps in the syllabus to successfully teach all the learners.

The research question which guided the study is: How is knowledge recontextualised in the 5090 Biology Syllabus?

PEDAGOGIC DISCOURSE

The pedagogic discourse is a recontxtualising principle which embeds two discourses which are the Regulative Discourse (RD) and Instructional Discourse. The regulative discourse is a discourse of social order while, the instructional discourse is a discourse of knowledge and skills. Bernstein calls the instructional discourse as the discursive rules and he calls the regulative discourse as the hierarchical rules. The regulative discourse always dominates over the instructional discourse. The instructional discourse is concerned with the selection, sequencing, pacing of knowledge, evaluation criteria and the relations between discourses. It is concerned with the knowledge, skills and values to be transmitted. It is the one which say this is what should be taught, or this is what our learners should learn. The regulative discourses are concerned with the moral issues in the communication. These rules create social order in a pedagogic communication. The rules of the pedagogic discourse are characterised using the classification and the framing concepts. The discursive rules and the hierarchical rules inform the rules of the pedagogic device (Bibila, 2016; Hewlett, 2013; Bourne, 2003).

Bernstein argue that what is relayed is the discourse or, as he sometimes calls it, the "text" though it is still not clear when it comes to the relay itself, that is, the structures that allow it to be conveyed. In other words, pedagogic discourse emphasizes verbal behavior that is what is written and said at the expense of a regulatory pattern of language that is the structures that allow the speech. This was a concern to Bernstein who indicated that, when we study pedagogic communication we study only the surface features, only its message, and not the structure that makes the message possible (Bernstein, 1990). Bernstein was concerned with the production of knowledge and the transmission of the produced knowledge.

According to Bernstein (2000), pedagogic studies were focused on the content of the message that was relayed, the 'what' in the pedagogic transmission and not on the structure of the relay system which makes the transmission and acquisition of the content possible. It is Bernstein's view that the focus should be on

the structure of the relay system, the ‘how’ and not on the ‘what’. According to Bernstein (1990), pedagogic discourse is a relay of the pedagogic communication. The relay of pedagogic communication embeds two discourses which are the Instructional Discourse and Instructional Discourse as earlier indicated. An understanding of the Instructional Discourse and Regulative Discourse enables one to understand the structure of the relay which enables the message to be transmitted. This also informs us that the rules of the pedagogic device are in the Instructional Discourse and regulative Discourse (Bibila, 2016; Mukute & Pesanayi, 2015; Bertram, 2008; Rose, 2014; Jónsdóttir & Macdonald, 2008; Reeves, 2006).

Bernstein (1999) later used the concept of code (classification and framing) to describe and characterise the pedagogic discourse. A number of researchers have used the concepts of classification and framing to characterise the pedagogic discourse (Bibila, 2016; Petersen et al., 2015; Player-koro, 2012).

Following Bernstein’s description of a pedagogic discourse, in this study, I will use the code (classification and framing) to describe the pedagogic discourse/instructional discourse and regulative discourse. The instructional discourse will be described in terms of the strength of the framing in the selection, sequencing, pacing, evaluation criteria and in terms of the strength of the classification in the relationships between the discourses. The RD will be described in terms of the strength of the framing in the control relationship between the teacher and the students. The classification and framing rules, indicate the strength of the recognition and realisation rules (Jónsdóttir & Macdonald, 2008). The strength of the recognition and realization rules determine how one will acquire the text being transmitted.

Bernstein indicates that, the recognition and realisation rules are strong when the framing is strong in the selection, sequencing and in the evaluation criteria with a weak framing in the pacing and in the hierarchical rules. While the classification between the discourses need to be weak

Classification and framing concepts are important in that changes in the classification and framing strength entail a change in the pedagogic discourse. Also the classification and framing strength indicate the strength of the recognition and realisation rules in the acquiring of the text. It is the strength in the classification and framing in the pedagogic discourse that is in the 5090 Biology Syllabus which is the focus in this study. A number of scholars (Bertram, 2012, Reeves, 2005, Player-koro, 2012; Macdonald, 2008) have used the concepts of classification and framing to characterise the pedagogic discourse. Figure 1 show the relations between concepts.

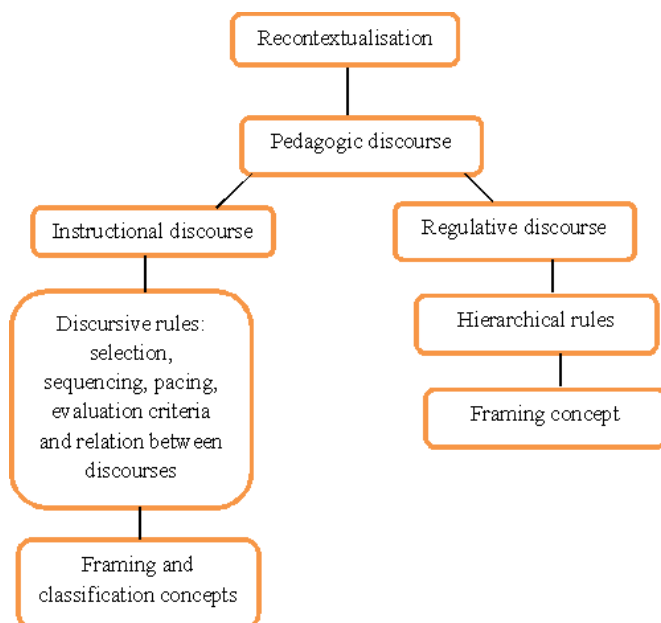


Figure 1: Relations in the concepts

CLASSIFICATION AND FRAMING

Bernstein used the concepts of classification and framing to describe and characterize the pedagogic discourse. Classification is about the organisation of knowledge. Classification shows the relation in the knowledge. Strong classification is indicated when there is no relation in the knowledge and weak classification is indicated when there is a relation in the knowledge (Babila, 2016; Mukute & Pesanayi, 2015; Bertram, 2008; Rose, 2014; Reeves, 2006). Classification helps to inform how much each curriculum subject is distinct or unique in the curriculum. Classification also shows how much the subjects are related to each other in the curriculum. It is the relationship between the subjects in the curriculum which is a concern for educators. Subjects are to be related when the classification is weak. On the other hand, classification is strong when the subjects are not related.

Classification is concerned with the power relations and the strength of the boundaries between categories such as discourses, agents and practices. The relation in the topics in a course also show the classification of knowledge in a course (Bertram, 2012a; Hoadley, 2007, 2012; Hoadley & Galant, 2016). Bernstein (2000) used the concept of classification to examine the strength of the boundaries between the different categories/subjects. For example the relationship (a) between teacher-student and student-student (b) between discourses- intradisciplinary relation, interdisciplinary relation and relation between academic and non-academic knowledge (c) between spaces- teacher's space – students' spaces of different students. Such relationship can be characterised by the form of the boundary. When the boundaries between the categories is blurred between students of different social groups (social class, gender, race, school achievement) then the classification is said to be weak. This means that the students share physical and material space. Strong classification will entail that boundaries between will be very sharp between space and material and that hierarchies between students will exist. However, the teacher-student relationship is always strong. However, at the intra-disciplinary level, there is a weak classification between the several contents of a given discipline and the content in the discipline are interrelated. At the interdisciplinary level, a strong classification exist since the contents of the curriculum are separated from each other, there is no relation in the contents of the discipline in the curriculum. A curriculum is said to be strongly classified if the subjects in the curriculum are highly differentiated and separated into traditional subjects, while a curriculum is said to be weakly classified if the subjects are integrated and the boundaries between the subjects are weak/fragile/blurred. Bernstein also used the concept of framing to describe the control relations in the Pedagogic discourse.

Framing is concerned with the control relations in a Pedagogic discourse. Framing regulate the knowledge to be created and what knowledge is available in the different categories (Diehl, Lindgren, & Leffler, 2015). Framing enables the conversion of knowledge into the pedagogic communication.

Framing is said to be very strong (F++) when the sentence or statement clearly indicates the content to be transmitted and the order in which the content will be transmitted and the time of acquisition is clearly indicated in the document.

METHODOLOGY

Document analysis was used to collect the data. The document was chosen on the basis that it contained the relevant information to the research question (Hancock, 2007). The 5090 Biology Syllabus was analysed in this study. The goal for analysing the was to understand how knowledge has been recontextualised in the . It was important to analyse the curriculum to be informed of what the teachers were expected to know and to do in their teaching practices if they are to successfully teach biology in secondary schools. An inductive approach was used to code the document using Atlas ti 8 software.

The instructional discourse and the regulative discourse formed the basis of the analysis (Bernstein, 1999; Zintle, 2012). Bernstein’s classification and framing concepts have been used as the analytical tools. To be able to read the data, scaling grid was developed to be used to analyse the relations in the pedagogic discourse. A sentence or a complete statement was a unit of the analysis.

The instrument developed to guide the analysis is attached as Appendix 1.

RESULTS

The codes and categories which emerged from the analysis of the 5090 Biology Syllabus have been presented in Table 1.

Table 1: Codes and categories from the

CODES	CATEGORIES
o Grade 10 topic 1	CONTENT
o Grade 10 topic 2	
o Grade 10 units	
o Grade 11 topic, subtopics, specific outcomes, content	
o Grade 11 units	
o Grade 12 topic, subtopics, specific outcomes, content	
o Grade 12 units	
o Knowledge	
o Skills	
o Continuous assessment in schools	
o Grade 10 outcomes	
o Grade 11 outcomes	
o Grade 12 outcomes	
o Outcome based principles	
o Time allocation	PACING OF KNOWLEDGE
o Attitudes	REGULATIVE DISCOURSE
o Interest and appreciation	
o Values	
o Attainment of the 2030 vision	RELATIONS BETWEEN DISCOURSES
o Everyday life	
o Individual and national development	
o Long life education	
o Skills for long life education	
o Stimulate interest	SELECTION OF KNOWLEDGE
o Agents involved	
o Consultative process	
o Appendix 1-scope and sequence	SEQUENCING

As shown in Table 1, the categories which emerged are: selection of knowledge, sequencing of knowledge, pacing of knowledge, evaluation criteria, relations between categories, pacing and the regulative discourse. The codes included in each category are shown in Table 1. The categories were analysed. The findings of the analysis of each category have been presented below.

Selection of Knowledge

The content to be taught is explicitly indicated in the document. The topics, sub-topics, specific-outcomes and the content (knowledge, skills and value) are explicitly shown in the syllabus for the grade 10, 11 and 12. See Table .

Table 2: Topics, Sub-topics, Specific outcomes and content

TOPIC	SUB-TOPIC	SPECIFIC OUTCOMES	CONTENT		
			Knowledge	Skills	Values
10.1 Living Organisms and life processes	10.1.1 Characteristics of living organisms	10.1.1.1 Identify the characteristics of living organisms. 10.1.1.2 Distinguish between living organisms and non-living things. 10.1.1.3 Describe life processes of living organisms.	<ul style="list-style-type: none"> The characteristics of living organisms: Feeding, breathing, reproducing, growing, locomotion, sensitivity and excretion. Living organisms and non-living things. Life processes of living organisms: Metabolism (Catabolism and anabolism). Include the role of enzymes. 	<ul style="list-style-type: none"> Communicating information on the characteristics of living organisms Comparing Living and non-Living organisms Communicating Metabolism and the role of enzymes 	<ul style="list-style-type: none"> Appreciating characteristics of living organisms Asking questions for more understanding Appreciating life processes and role of enzymes

The syllabus has also indicated the general outcomes and the competences learners are expected to acquire as shown in Table .

Table 3: Specific-outcomes and the content (Biology syllabus, 2013:44)

GRADE 12

General outcomes:	Key Competences
<ul style="list-style-type: none"> Demonstrate understanding of asexual reproduction. Demonstrate understanding of vegetative reproduction Develop investigative skills Demonstrate understanding of sexual reproduction in flowering plants. Demonstrate understanding of sexual reproduction in animals. Demonstrate understanding of genetics Demonstrate knowledge, attitudes and values about plants and animals. Acquire knowledge and value of soil. Develop knowledge, positive attitudes and values about ecology. Demonstrate knowledge, attitudes and values about population. 	<ul style="list-style-type: none"> Demonstrate the ability to identify the reproductive parts in flowering plants Show the ability to demonstrate variation of characteristics in plants and animals Demonstrate the ability to identify and classify different species of animals and plants Demonstrate the ability to investigate the composition of soil. Demonstrate the ability to design a food chain in a given ecosystem

The general out-come and the competencies have been specified for all the three grades, that is grades 10, 11 and 12. Therefore, in terms of knowledge selection, the Biology Syllabus is strongly framed (F+). This means that the transmitter have the control in what is taught in schools. Selection of what is to be taught in schools is done by the transmitter (teacher). Strong framing in knowledge selection promotes teacher centered methodology.

Sequencing of knowledge category

The 5090 Biology Syllabus explicitly indicate the order in which all the topics from grade 10 to grade 12 are to be taught. **Error! Reference source not found.** show the sequence in which the topics are to be taught.

Table 4: Scope and sequencing (Biology 5090, 2013:60)

APPENDIX I - SCOPE and SEQUENCE

The following table shows the "Scope and Sequence" of Biology syllabus from G10 to G12.

Grade 10		Grade 11		Grade 12	
UNIT/ TOPIC	SUB-TOPIC	UNIT/ TOPIC	SUB-TOPIC	UNIT/ TOPIC	SUB-TOPIC
1.0: Living Organisms and life processes	10.1.2 Characteristics of living organisms	1.0: Transport and storage in Plants	11.1.1 Transport in plants	1.0: Asexual reproduction	12.1.1 Reproduction in fungi, amoeba and bacteria
2.0: Cells	10.2.1 Microscopes	2.0 Transport in Human	11.2.1 Blood		2.0: Sexual Reproduction in Flowering Plants
	10.2.2 Cell Structure and Function		11.2.2 Blood Groups	12.2.1 Reproduction in plants	
	10.2.3 Cell Organisation		11.2.3 Blood disorders	12.2.2 Pollination	
	10.2.4 Tissues		11.2.4 The heart	3.0: Reproduction in Animals	12.3.1 Sexual reproduction in animals
	10.2.5 Organs		11.2.5 Lymphatic system		12.3.2 Birth Control
	10.2.6 Diffusion, Osmosis and Active transport		11.2.6 Circulatory systems	4.0: Genetics	12.4.1 Variation in plant and animal species
3.0: Enzymes	10.3.1 Characteristics of enzymes	3.0: Excretion	11.3.1 Excretion		12.4.2 Cell division and Chromosomes
4.0: Nutrients	10.4.1 Classes of nutrients		11.3.2 The kidney		12.4.3 Inheritance
	10.4.2 Disorders		11.3.3 The lungs		12.4.4 Mutation
	10.4.3 Dietary needs		11.3.4 The human skin	5.0: Classification of Plants and Animals	12.5.1 Classification

Therefore, the Biology syllabus is very strongly framed (F++) in terms of sequencing. This means that the sequence in which the topics are to be taught is determined by the developers of the syllabus.

Pacing of Knowledge

Pacing is concerned with the time to be taken to teach a topic. There is no indication of how long one should take to teach a topic in the syllabus. However, the syllabus has indicated the time to teach and learn Biology in a week, five 40 minutes time per week indicating that,

“Time allocation for this syllabus is will require at least five-40 minutes periods per week”. (Biology syllabus, 2013:11)

In terms of pacing, framing is strong (F+). The teacher has the control in the pacing of the teaching and learning. The transmitter decide how long should be taken to teach a topic and how many periods per week. The teacher will decide how much work to be done in a given time.

Evaluation Criteria

Evaluation is key in Bernstein’s work. Evaluations condense the entire purpose of the pedagogic discourse. The analysis has revealed that outcomes, assessment and the syllabus aims are explicit in the document. The syllabus has shown that the syllabus puts more emphasis on the performance of the learners in the tests and examinations to be done. The syllabus indicate the way the learners are to be assessed. There is a focus on

the performance of the learners is seen through the testing which has to be done throughout the teaching and learning and through the final examination done at the end of grade 12.

The emphasis in the performance is also seen by the control measures set by the examination council of Zambia. The council clearly indicate the focus of the assessment by providing the assessment guide lines to schools. The syllabus indicate that,

“Continuous assessment will be emphasised by using various methods of testing according to topics and themes at various levels. The examinations council of Zambia will prepare detailed procedures on how continuous assessment will be conducted by the teachers.

The examination council will also develop the scheme of assessment examination syllabus to provide teachers with guidelines on the objectives to be tested. The scheme of assessment will consists of school based assessment and final examination that will be conducted by the examinations of council of Zambia” (Biology syllabus, 2013: xi)

In terms of evaluation criteria, the framing is very strong (F++). The syllabus puts more emphasis on the performance of the learner which is done through testing and through what is called final examination. According to Bernstein, this emphasis on tests and examination indicate a performance type of curriculum.

The syllabus indicates that it was revealed in line with the outcome based principles, hence its emphasis on learner performance indicate that, it has the characteristics of a performance curriculum which has the focus on the performance of the learners. Performance curriculum promotes teacher centred methods. This contradicts the learner centred methods indicated in the Biology syllabus.

Relations between Categories

Analysis of the discourses in the syllabus has shown that the syllabus is weakly classified (C-) in terms of inter-discipline, inter-discursive and intra-disciplinary relations. A weak classification in the intra-disciplinary is seen in the relations between the topics. This is evident in the sequencing of the topics which have been arranged in relation to each other.

In terms of inter-discursive relations, the biology syllabus is weakly classified (C-). This is observed in the vision of the syllabus which state that the syllabus aims to,

“develop abilities and skills that: · are relevant to the study and practice of Biological Sciences, are useful in everyday life, encourage efficient and safe practice, encourage effective communication.”

The syllabus aims to provide,

“quality, life-long education for all which is accessible, inclusive and relevant to individual, national and global needs and value systems.”

Further,

“The syllabus has been reviewed in line with the Outcome Based Education principles which seek to link education to real life experiences that give learners skills to access, criticize analyse and practically apply knowledge that help them gain life skills. Its competences and general outcomes are the expected outcomes to be attained by the learners through the acquisition of knowledge, skills, techniques and values which are very important for the total development of the individual and the nation as a whole. Effective implementation of Outcome Based Education requires that the following principles be observed: clarity of focus, Reflective designing, setting high expectations for all learners and appropriate opportunities.” (Biology, 2013: vi)

The quotations have shown how the discourses of biology are related to everyday knowledge in real life activities. The insulation between the biology discourse and everyday discourse is weak. Meaning there is a relationship between everyday knowledge and the biology knowledge. The knowledge learnt in biology has to be applied in everyday life for the benefit of the individual and the society.

The inter-disciplinary relations are observed in the data extracts that follow.

‘‘promote an awareness that: · the study and practice of Biological Science is subject to social, economic, technological, ethical and cultural influences and limitations,’’

The weak inter-disciplinary relations are seen in the topics of the syllabus which has shown that the topics in the are extracted from the different disciplines. For example the topics are from the plant biology discipline, microbiology discipline, animal biology. Therefore there is a strong inter-disciplinary relation in the topics.

Regulative Discourse

The regulative discourse emerged as one of the categories in the analysis of the syllabus. The analysis found that the syllabus is also concerned with the development of the expected behaviour and attitudes in the learners. For example the learners are to, ‘‘develop attitudes relevant to Biological Sciences such as: concern for accuracy and precision, objectivity, integrity, safety.’’ The syllabus has also shown the ‘‘development of: the skills of enquiry, the attitude of: – initiative, – inventiveness’’ The development of the attitudes and behaviour is also seen in the outcomes. For instance, ‘‘ Assessment outcomes describe the knowledge, skills, values and abilities that learners are expected to demonstrate at the end of the course’’

Therefore in terms of framing, the regulative discourse is strongly framed (F+)

Instructional discourse theme

Analysis of the categories resulted into the Instructional discourse as the main theme. The categories included in this theme are: selection of knowledge, sequencing of knowledge, pacing of knowledge, evaluation criteria and the relations between the discourses. The instructional discourse is concerned with the control relations between the transmitter (lecturer) and the learners and the relations between the discourses being transmitted which characterise the pedagogic discourse being transmitted.

In summary, the analysis of the has shown that in terms of framing the syllabus is strongly framed (F+) in the hierarchical rules, selection, sequencing, pacing, evaluation criteria and in the regulative discourse. The analysis has also shown a weak classification in the inter-disciplinary, intra-discursive and in the inter-discursive relations. A number of knowledge sources such as the text books, websites, were used to develop the syllabus

DISCUSSION

Analysis of the 5090 Biology Syllabus reviewed that, the 5090 Biology Syllabus was strongly framed in the hierarchical rules, selection, sequencing, and in the evaluation criteria. The time to be taken to teach a topic, that is pacing was not indicated in the syllabus, hence the framing was indicated has (F0). The classification was weakly framed in the inter-disciplinary, intra-disciplinary and in the inter-discursive relations.

The content to be delivered in the syllabus was explicitly indicated in the syllabus. The sequence in which the topics were to be taught was explicitly indicated. The periods in which the syllabus was to be taught per week were explicit in the document. The syllabus did not indicate how much time to be taken to teach a topic. This could mean that, the pacing was left to the teachers to decide on the time to be taken to teach a

topic. These characteristics makes the to be a strongly framed (F+) document in terms of hierarchical rules, selection, sequencing, and evaluation criteria. These findings are similar to the findings in the analysis of the Life sciences curriculum (Zintle, 2012). Though the pacing of the knowledge was not explicitly indicated in the analysis of the document, it is most likely that pacing of the knowledge was strongly framed (F+) as the selection of the knowledge was done by the government and the agents. The strong framing in the hierarchical rules, selection of knowledge, sequencing, pacing and evaluation indicate that the government controls what is taught in schools. This observation was evident in the development process of the syllabus. In Zambia, the syllabus was developed by the ministry of education under the Curriculum Development Centre (CDC) as discussed earlier. The government regulated the content to be taught in the syllabus and that more emphasis is put on the content in the teaching of the syllabus. In addition to establishing the CDC department, the government has established the office of the standard officers at all levels of the education, that is the national level, provincial level and at district level. The standard officers are to insure that schools are transmitting the content indicated in the syllabus. Teachers have little autonomy in the pedagogic practices as they are expected to transmit the knowledge, skills and values indicated in the curriculum (Songqwaru, 2012).

In the 5090 Biology Syllabus, assessment weighing are clearly indicated. An indication of how the marks are distributed is one of the ways of explicating the evaluation criteria. Explicating the evaluation criteria is one of the ways which enable the learners to recognise the text and be able to realise the required legitimate text (Morais, 2018). Explicating the evaluation criteria enables the learner to acquire the recognition and the realisation rules which will enable them to produce the legitimate text. If learners are to realise a legitimate text, there is also a need that the framing in terms of pacing is weak (F-). A weak pacing gives an opportunity to explicate the evaluation criteria. A weak pacing entails more learning time given to the learners. A weak pacing has got implications on the cost of the education as this will require more resources. A strong framing in the evaluation criteria observed in the , is a necessary condition for the learners to be able to acquire the recognition and realisation rules required in the production of a legitimate text. However, a strong pacing indicated in the analysis of the syllabus, indicate a differential distribution of the knowledge in the teaching and learning. A strong pacing indicated, advantages the learners from the middle class family who already possess the recognition and the realisation rules needed for the production of a legitimate text. This leads to a differential distribution of the criteria.

Bernstein emphasised a need for a weak pacing and explicit evaluation criteria as necessary conditions for all the learners to acquire the recognition and realisation rules needed for them to produce a legitimate text. Despite this emphasis on weak pacing, politicians have not accepted to increase the learning time because of the high cost which comes with an increase in the learning time (Morais, 2002). This situation is worse in a developing country like Zambia were the government struggle to finance the education. This could be a reason why the framing is strong in the pacing.

When pacing is strong, that is the time required for the learners to learn the content indicated in a curriculum or course, only the learners who already have the recognition and realisation rules, that is the learners from the middle class families have been able to produce a legitimate text. This leads to the unequal distribution of the school knowledge (Hoadley, 2005). In this case there is a differential distribution of the school knowledge. This is not supposed to be the case as the purpose of schools is to enable all the learners to access a vertical discourse or powerful knowledge which could not be accessed at home (Deng, 2021; Young & Muller, 2013).

Bernstein also indicate that in cases were the pacing is strongly framed, educators should try to weaken the classification in the inter-disciplinary, intra-disciplinary and in the inter-discursive. That is, there should be a weak classification between space (teacher-students, students –students), topics, disciplines and between discourses. A weak classification between categories enables more time given to the learning that is a weak framing of pacing and a strong framing of the evaluation criteria (Morais, 2018).

The classification analysis of the Biology syllabus revealed a weak classification in terms of inter-disciplinary, intra-disciplinary and inter-discourse relationship. A weak classification in terms of inter-disciplinary relationship and intra-discursive indicate that the contents are taught repeatedly in the different disciplines and in the different topics. This leads to more time given to learning the concepts. This leads to learning the concepts at high abstract levels and meaningful learning (Morais, 2018: 561).

A weak classification between school knowledge and everyday knowledge indicate that everyday knowledge is present in the schools and yet the school is expected to have elaborated knowledge as opposed to the restricted knowledge. Therefore there is a need to explicitly indicate these knowledge especially to learners from a working class families who were socialised in the strong classification between school and home (Morais, 2002). However, a weak classification between the school knowledge and everyday knowledge also leads to meaningful learning. Morais point out that, “a close relation of communication between academic and non-academic discourses has the potential to make knowledge more meaningful, more understandable and applicable.” (Morais, 2018: 561)

The weak framing of the pacing is important if the teaching and learning are to be successful. Pacing can be weakened not only by increasing the teaching and learning time. But it can be weakened by weakening the classification between the categories. This is a matter which is agent in the teacher training. Teachers should be competent enough to enable them be aware of the desired characteristics in the pedagogic practice being practiced. They need to be knowledgeable of the characteristics in a pedagogic discourse. The findings in the analysis of the 5090 Biology Syllabus, contradict the findings in the analysis of the tourism curriculum in which the knowledge was loosely packed with no sequential progression. This knowledge was seen to be similar to that of everyday knowledge that is the horizontal discourse. The knowledge was more practical, personal and context dependent. Learning required involvement of the learners’ interaction (Petersen, 2015).

In terms of classification analysis, the classification was found to be weak (C-) in the inter-disciplinary relation, intra-disciplinary relation and in the inter-discursive relations. A weak classification indicated that, there is a relationship between the topics in the syllabus, the discipline of biology with other disciplines and between the knowledge of and the everyday knowledge. The weakening of the boundaries between the discourses, indicate that the knowledge taught is powerful, or vertical and can be relevant in different context.

In conclusion, Morais (2018) has indicated that a strong framing in the selection of the knowledge, sequencing of the knowledge and evaluation of the knowledge with a weak pacing of the knowledge and weak framing in the hierarchical rules are necessary for successful teaching and learning. However, weak pacing implies that more time is needed in the teaching and learning. An increase in the teaching and learning entail an increase in the cost of education which has not been easy and has not been accepted by governments. Therefore an alternative is to weaken the classification. In all these pedagogic practices, what matters is the way the teachers are trained. Teachers need to be trained in a way that will equip them with the required competencies to be aware of the necessary pedagogic practices which could enable them provide quality education and relevant education to all the learners. Teachers need to be aware of the characteristics of the pedagogic discourse they are implementing. In all this what matters is the way teachers are trained. Teacher training is crucial in the successful implementation of the curriculum.

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REFERENCES

1. Ana Morais. (2018). Basil Bernstein at the Micro Level of the Classroom Author (s): Ana M . Morais Source : British Journal of Sociology of Education , Vol . 23 , No . 4 , Basil Bernstein ' s Theory of Social Class , Educational Codes and Social Control (Dec ., 2002), pp. British Journal of Sociology, 23(4), 559–569. <https://doi.org/10.1080/0142569022000038413>
2. Bernstein, B. (1999). Vertical and Horizontal Discourse: An essay. *British Journal of Sociology of Education*, 20(2), 157–173. <https://doi.org/10.1080/01425699995380>
3. Bertram, C. (2012). Bernstein ' s theory of the pedagogic device as a frame to study History curriculum reform in South Africa, (7), 1–11.
4. Bertram, C. A. (2008). Curriculum recontextualisation: a case study of the South African high school History curriculum. Faculty of Education, PhD Thesis, 414 pages. Retrieved from sed.ukzn.ac.za/Libraries/Carol_Bertram/CarolBertramPhD.sflb.ashx
5. Bibila, S. (2016). Qualifications, knowledge and curriculum divisions: an analysis of the Welsh Baccalaureate Advanced Diploma. Cardiff University. Retrieved from <http://orca.cf.ac.uk/id/eprint/101016>
6. Dawson R. Hancock, B. A. (2007). Doing Case Study Research: A Practical Guide for Beginning Researchers. *Journal of College Student Development* (Vol. 48). <https://doi.org/10.1353/csd.2007.0003>
7. Deng, Z. (2021). Constructing ' powerful ' curriculum theory. *Journal of Curriculum Studies*, 53(2), 179–196. <https://doi.org/10.1080/00220272.2021.1887361>
8. Diehl, M., Lindgren, J., & Leffler, E. (2015). The Impact of Classification and Framing in Entrepreneurial Education : Field Observations in Two Lower Secondary Schools. *Universal Journal of Education Research*, 3(8), 489–501. <https://doi.org/10.13189/ujer.2015.030803>
9. Hewlett, L. (2013). Recontextualising Knowledge in the Curriculum in Public Management Faculty of Commerce , Law and Management ,PhD thesis, 376 pages, University of the Witwatersrand.
10. Hoadley, U. (2007). The boundaries of care : Education policy interventions for vulnerable children, (DoE 1999), 136–156.
11. Hoadley, U. (2012). What do we know about teaching and learning in South African primary schools ? *Education as Change*, 16(2), 1–18. <https://doi.org/10.1080/16823206.2012.745725>
12. Hoadley, U., & Galant, J. (2016). An analysis of the Grade 3 Department of Basic Education workbooks as curriculum tools. *South African Journal of Childhood Education*, 6(1). <https://doi.org/10.4102/sajce.v6i1.400>
13. Jónsdóttir, A. S. R., & Macdonald, A. (2008). Regulation and innovation : stimulating students ' creativity and thinking through innovation education in Ingunnarskóli (pp. 1–19).
14. Morais, A. M. (2002). Basil Bernstein at the micro level of the classroom. *British Journal of Sociology of Education*, 23(4), 559–569. <https://doi.org/10.1080/0142569022000038413>
15. Mukute, M., & Pesanayi, T. (2015). Contextualising Curriculum Design and Recontextualising Its Implementation The Case of Climate Change Education for Southern African Transfrontier Conservation Area Practitioners *Contextualising Curriculum Design and Reconte*, 30 (December2014).
16. Nonyameko Zintle. (2012). the Grade 10 Life Sciences curriculum and assessment policy context: A case study of the Fundisa for Change teacher education and development programme. Faculty of commerce, law and management, Dessertation, 376 pages, RHODES UNIVERSITY. Retrieved from <https://core.ac.uk/download/pdf/145046205.pdf>
17. Petersen, J. O. Y. (2015). THE DEVELOPMENT OF TOURISM AS A YOUNG SCHOOL SUBJECT. A COMPARATIVE CURRICULUM ANALYSIS JOY. Faculty of Humanities, Minor Dessertation, 96 pages, Cape Town University.

18. Player-koro, C. (2012). Reproducing Traditional Discourses of Teaching and Learning: Studies of Mathematics and ICT in Teaching and Teacher education. Department of applied Information Towards Science Education, PhD thesis, 261 pages. Retrieved from https://gupea.ub.gu.se/bitstream/2077/29043/1/gupea_2077_29043_1.pdf
19. Reeves, C. A. (2006). THE EFFECT OF “OPPORTUNITY-TO-LEARN” AND CLASSROOM PEDAGOGY ON MATHEMATICS ACHIEVEMENT IN SCHOOLS SERVING LOW SOCIO-ECONOMIC STATUS COMMUNITIES IN THE CAPE PENINSULA. Faculty of Humanities, PhD thesis, 448 pages, University of Cape Town.
20. Rose, D. (2014). Analysing pedagogic discourse: an approach from genre and register. *Functional Linguistics*, 1(1), 11. <https://doi.org/10.1186/s40554-014-0011-4>
21. Songqwaru, Z. (2012). Supporting Environment and Sustainability Knowledge in the Grade 10 Life Sciences Curriculum and Assessment Policy Context: A case study of the Fundisa for Change Teacher Education and Development Programme Pilot Project. RHODES UNIVERSITY.
22. Young, M., & Muller, J. (2013). On the powers of powerful knowledge, 1(3), 229–250. <https://doi.org/10.1002/rev3.3017>

APPENDIX 1: INDICATORS FOR ANALYSING THE

Grading scales used to analyse the . The document was analysed for the discursive rules (Selection, sequencing, pacing and criteria) and for the discursive relations (Inter-disciplinary, intra-disciplinary and inter-discursive).

Indicators for the discursive rules and discursive relations were developed to guide the analysis of the document. The indicators developed to guide the analysis are shown in the tables.

Discursive rule SELECTION

To what extent does the teacher and the learner have control in the selection of instructional knowledge? The extent to which the teacher and the learner have the control in the selection of knowledge was determined by the extent to which a sentence or a statement indicated the content or the knowledge to be taught.

F++	F+	F-	F-
Teachers have the control in the selection of the knowledge taught, learners don't decided on what to learn.	Teachers have the control in the selection of the knowledge taught, though in some instances, learners decide on the knowledge to learn.	Learners have control in the selection of the knowledge taught, though in some instances, teachers decide on the knowledge taught and learnt.	Learners have more control in the selection of the knowledge taught. Teachers don't decide on the knowledge to be taught.
The sentence/statement clearly indicate the knowledge to be taught and learnt	The sentence/statement indicate the knowledge to be taught, but leaves room for learners to make additions	The sentence/statement make suggestions of the knowledge to be taught,	The sentence/statement does not indicate the knowledge to be taught

Discursive rule SEQUENCING

To what extent does the teacher and the learner have control in the sequencing of the instructional knowledge? The extent to which the teacher and the learner have the control in the sequencing of the knowledge was determined by the extent to which a sentence or a statement indicated the sequence in which the topics were to be taught.

F++	F+	F-	F-
Teachers have the control in the sequencing of the knowledge.	Teachers have the control in the sequencing of the topics, though learners sometimes also control the sequencing of the knowledge.	Learners have control in the sequencing of the knowledge though the teachers sometimes control the sequencing of the knowledge/topics	Learners have more control in the sequencing of the knowledge/topics.
The sentence/statement clearly indicate the sequence in which the topics are to be taught	The sentence/statement suggests the sequence in which the topics are to be taught, but leaves room for learners to make additions	The sentence/statement does not indicate the sequence in which the topics are to be taught, but gives a suggestion.	The sentence/statement does not indicate the sequence in which the topics are to be taught.

Discursive rule PACING

To what extent does the teacher and the learner have control in the pacing of the learning? The extent to which the teacher and the learner have the control in the pacing of the learning was determined by the extent to which a sentence or a statement indicated the time required to teach and learn the topic.

F++	F+	F-	F-
Teachers have the control in the pacing of the learning.	Teachers have the control in the pacing of the learning, thought learners sometimes also controlled the pace at which the knowledge was taught.	Learners have the control in the pacing of the learning, thought teachers sometimes also controlled the pace at which the knowledge was taught.	Learners have the control in the pacing of the learning.
The sentence/statement clearly indicate the time at which the topics are to be taught	The sentence/statement suggests the time at which the topics are to be taught, but leaves room for learners to decide on the time required for learning	The sentence/statement suggests the time at which a topic has to be taught.	The sentence/statement does not indicate the time required for teaching and learning.

Discursive rule EVALUATION CRITERIA

To what extent does the document explicate the criteria? The extent to which the document explicate the criteria is determined by the extent to which a sentence or a statement explicitly indicate the concepts to be learnt and assessed.

F++	F+	F-	F-
Evaluative criteria very clear and explicit	Evaluative criteria clear and explicit	Evaluative criteria mostly not explicit	Evaluative criteria not explicit
The sentence/statement clearly indicates the evaluative rules by clearly indicating the concepts to be taught and learnt.	The sentence/statement indicates the evaluative rules by clearly indicating the concepts to be taught and learnt.	The sentence/statement mostly does not indicate the evaluative rules. The concepts to be learnt are suggested.	The sentence/statement does not indicate the evaluative rules. The concepts to be learnt are not indicated in the sentence.

Discursive relations

Inter-discipline relations (Between disciplines) The extent to which a sentence/statement indicates an integration of knowledge from other disciplines

C++	C+	C-	C-
No indication of the knowledge from other disciplines	Very little indication of the knowledge from other disciplines	little indication of the knowledge from other disciplines	A very clear indication of the knowledge from other disciplines
There is no indication of the knowledge from other disciplines in the sentence/statement	There is little indication of the knowledge from other disciplines in the sentence/statement	There is clear indication of the knowledge from other disciplines in the sentence/statement	There is a very clear indication of the knowledge from other disciplines in the sentence/statement

Inter-discursive relations (Between school knowledge and everyday knowledge) The extent to which a sentence/statement indicates everyday knowledge

C++	C+	C-	C-
No indication of everyday knowledge in a sentence/statement	Very little indication of everyday knowledge in a sentence/statement	little indication of everyday knowledge in a sentence/statement	Very clear indication of everyday knowledge in a sentence/statement
There is no indication of everyday knowledge in the sentence/statement	There is little indication of everyday knowledge in the sentence/statement	There is clear indication of everyday knowledge in the sentence/statement	There is a very clear indication of everyday knowledge in the sentence/statement

Intra-disciplinary relations (Between the topics) The extent to which a topic/sentence/statement indicate a relation in knowledge between the topics

C++	C+	C-	C-
No relationship indicated	Very weak relationship indicated	Weak relationship indicated	Very strong relationship indicated
There is no indication of a relationship in knowledge in the topics in a sentence/statement	There is a very weak indication of a relationship in knowledge in the topics in a sentence/statement	There is a weak indication of a relationship in knowledge in the topics in a sentence/statement	There is a very strong indication of a relationship in knowledge in the topics in a sentence/statement