

Development of verbal thinking and problem-solving among TshiVenda-speaking primary school children

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The paper presents findings of primary school children's performance on classification and generalisation tasks to demonstrate the fundamental connection between their verbal thinking processes and problem-solving, on the one hand, and the practical activities of their society and culture, on the other. The results reveal that, although children generally classify (or group) objects in ways that suggest abstract categorical relations, they in fact employ heterogeneous thought processes rather than simply employing either concrete-functional or abstract-theoretical modes of thinking. In addition to the concrete and abstract modes, a third cognitive mode termed abstract-functional mode is posited as revealing the fundamental connection between verbal thinking processes and the modalities of the specific sociocultural context of these children's learning and development. The findings have crucial implications for children's schooling and curriculum development, as they call for classroom pedagogy that accounts for, and interrogates the heterogeneous nature of children's thinking and conceptual development.

Keywords: Vygotsky, verbal thinking, classification, cognitive development

Introduction

A recent study by Cubero, de la Mata and Cubero (2008) elaborated on the question of what and why changes occur during participation in formal learning processes. The study compared the classification performance between advanced and novice adult education learners on classification tasks involving lists of domestic menus. Participants had to classify the lists of local, Mediterranean menu in two different ways: formal and local-spontaneous and everyday modes related to familiar domestic meal-preparation activities. The study found that both the novice and the advanced learners employed everyday modes of classification when using familiar objects in familiar task situations such as preparing domestic meals using local menus, whereas the advanced learners were more adept to employing an alternative, formal mode of classification with abstract justifications when requested to employ an alternative mode of classification. Their novice counterparts, on the contrary, resorted to the everyday mode of classification that resembled familiar, domestic food-preparation activities and were thus unable to employ an alternative, abstract-categorical mode of classification.

These findings extended Luria's (1976) original results in that they elaborate on the differentiated ways in which people engaged in similar activities may apply their cognitive processes to problem situations depending on the nature and extent of their engagement. Cubero, de la Mata and Cubero (2008) argue, on the basis of these findings, that what accounts for the different forms of thinking is the use of different mediational means in different activity settings. That is, the use of formal, abstract forms of knowledge in school accounts for a change in the conceptual tools people use for thinking, and this change is accounted for by the activity setting (that is, the formal learning context) in which the cognitive processes are applied. However, this change does not necessarily supplant existing modes of thinking and problem-solving, but rather contribute to differentiation of thought processes that are applied to a problem situation according to its specific demands.

While beginning to elaborate on the nature and extent of the developmental changes that occur during the course of formal schooling, Cubero, de la Mata and Cubero's (2008) analysis was questioned for not mentioning anything new that was not known, in that it essentially confirms Vygotsky-Luria's original hypothesis, showing us how deeply schooling can modify and develop people's modes of expressing themselves and of understanding their environment (Zittoun, 2008). Zittoun argues that such studies

should rather consider the ambiguous meanings and the possible interpretations that could be derived, not from the results, but from the experimental processes.

Zittoun's (2008) critique, while perhaps emphasising individuals' meanings and interpretations at the expense of the role played by activity setting and the associated cultural-psychological tools, may, at the same time, be crucial for understanding potential manifestations of differentiated, plural forms of thinking and problem-solving in a specific activity setting such as formal schooling. That is, learners may manifest forms of thinking and problem-solving that derive both from their formal learning experience and from their spontaneous, everyday learning and developmental settings simultaneously within their formal learning, classroom context.

This proposition demands that the notion of 'activity setting' and 'cultural tools' be extended or re-conceptualised, so as to be conceived not as binaries that exist in separation and as having a neat influence and cognitive consequences on learning and development and hence applied neatly according to the specific demands of the activity setting in question. At this point, the present study becomes relevant.

The cultural contexts of learning and development for TshiVenda²-speaking learners are, as is generally the case in most rural South African and African settings, very diverse to what is normally encountered in relatively stable social settings. The region that forms part of what is generally called Venda comprises the Zoutpansberg Mountains. This is a remote rural part of northern South Africa with three smaller urban centres of Thohoyandou in the east, Makhado in the west and Musina in the far north bordering Zimbabwe. The region is mostly subtropical with lush vegetation, but with some arid areas in the far north and north-western parts. Subsistence crop- and livestock-farming activities still abound, although these are gradually being supplanted by modern labour-based economic activities, forced upon the area by the historical loss of land and changing climatic conditions (see Muthivhi, 2010). The far eastern part of the region is bordered by the national game park, while several smaller game parks dot the entire region. Relatively larger commercial farming, mainly crop-farming activities chiefly in the hands of White farmers, constitutes a major economic activity in the region.

The study was, however, conducted in two primary schools situated on the border of the semi-urban "township" of Makwabela and the more traditional, yet transforming village of Mbaleni. Although it comprises an emerging urban environment, this area is essentially rural and traditional in its outlook and cultural traditions. In this instance, the modern and the traditional exist together in intriguing contradiction, with traditional villages sprawled where relatively large urban residences dot the landscape. Motorised vehicles contest for the right of passage with livestock such as goats and cattle in the streets, while village women plant mealies along the pavement of town streets for lack of subsistence land, which is fast disappearing as a consequence of urbanisation. The modern is in a constant tug-of-war with the traditional, and the contradictions reveal themselves everywhere and not least within formal schooling.

TshiVenda is the language predominantly spoken in the entire region and is also the language for just over a million people in South Africa predominantly residing in this region. The language is also an instructional medium for some quarter of a million primary school children below the age of twelve, according to a 2005-snap survey statistics of the *Vhembe* district administration. TshiVenda is used as the medium of instruction from Grades 1 to 3, while English is the official medium of instruction from Grades 4 to 12. This does not, however, mean that English is, in practice, the dominant language used for classroom instructional purposes in Grade 4 and above, as TshiVenda continues to be the dominant language in this area – in what teachers often describe as "code switching" (see Muthivhi, 2008; Fleisch, 2008).

This study explores the contradictions that manifest in learners' development of verbal thinking through a series of experimental tasks adapted from Luria's (1976) original study in order to uncover the connection of thought to sociocultural settings and the specific institutional practices of formal schooling.

Methodology

Design of experiment

The design of the experiment was informed by the theoretical assumption that participants with the experience of schooling solve problems using the psychological tendencies that are shaped by the practices of formal school learning. When faced with problems that require classification of objects, schooled participants use a formal mode of classification that characterises school-specific forms of knowledge and learning, emphasising a systematic organisation of knowledge through linguistic concepts, rather than a purely experientially derived organisation of knowledge to establish object relations.

Participants were presented with questions that embodied problem solutions resembling the increasingly complex sociocultural practices in which they participated. That is, the task problems embodied the alternative modes of classification that characterised daily spontaneous activities, on the one hand, and formal school, abstract-categorical modes of classification, on the other. The experimental conditions required that participants be familiar with the procedures and content of the experimental tasks, while questions took the form of 'clinical' interviews, during which a question is posed and the participant's response leads to further probing questions by the experimenter, with the aim of uncovering the meanings that underlie the participant's initial response. Participants could respond in each of the alternative modes of classification that resembled the activity settings in which their learning and development took place, namely formal school learning and the spontaneous, daily life situations of practical rural sociocultural contexts (Luria, 1976; Moll, 1994; Cubero *et al.*, 2008).

Participants

Eighty pupils took part in the experiment. Participants were randomly selected from the class registers of Grades 1, 3, 5 and 7. The average age of the participants was six years in Grade 1, eight years in Grade 3, ten years in Grade 5 and twelve years in Grade 7. Twenty participants were selected from each grade.

Participation in the interview was voluntary and participants who expressed unwillingness to continue participating in the interview were allowed to withdraw. Participants were selected from the class registers, and names of selected learners were sent to teachers who invited learners to join the researcher, one at a time, in a room where interviews were conducted. Teachers were not involved in nominating learners, as the random selection ensured that learners of different learning abilities within a single class were represented in a sample. The interviews for all learners took place at the same period of time, and the results were compared, during the analysis, only across the selected grades.

Consent for the children's participation in the experiment was obtained from the school whose principal and teachers sought the consent of the parents, advising that any child was free not to participate and to withdraw his/her participation at any stage during the study. It was impossible at the time to obtain written consent from the majority of the parents in the community, as most children did not stay with their parents but, mostly, with illiterate grandparents. Anonymity of the participants was strictly adhered to throughout the different stages of data-processing and analysis.

Materials

The materials comprised four A4-size white cardboard sheets, each having a group of four black ink drawings. The following objects were represented for each of the tasks:

- Task A: *pick, panga, hoe* and *wheat*.
- Task B: *kraal, giraffe, goat* and *cow*.
- Task C: *tree, donkey, lizard* and *cow*.
- Task D: *hut, wheat, tree* and *mealie*.

An additional A4-size cardboard sheet, with drawings of a *knobkerrie*, *bow and arrow*, *spear*, and *antelope*, was used for the pre-testing or demonstration stage.

The tasks were adapted from Luria's (1976) original study and were first adapted for use in South African rural settings by Moll (1994) (see also Muthivhi, 1995). The task items represented natural objects found or used in the participants' culture such as plants that grow naturally or are planted; animals found in the environment or kept as livestock, and tools that were traditionally employed for subsistence farming purposes. However, some items such as *donkey* and *pick* were more recently introduced into the culture, but have since become an integral part of, and are more widely used in daily life activities of the participants' sociocultural settings.

Procedures

In the demonstration stage, the participant was shown the task materials and the procedures were explained to him/her. The participant was encouraged to touch the task materials and ask what the different pictures represent. The drawings of a *knobkerrie*, *bow and arrow*, *spear* and *antelope* were used during this stage.

The demonstration stage was followed by the testing stage, with the experimenter asking the participant to classify the objects, using one of the two alternative classification modes. The experimenter started by asking a question that required classification, namely "Which of these does not belong with the others?" or "Which three of these four objects belong together?" After the participant had classified the objects by pointing to or naming one object that did not belong with the others, or pointing to or naming the three objects that belonged together, the experimenter asked a second question for which the participant had to provide the reason for his/her chosen mode of classification. This was the crucial question, because it determined the quality of the participant's thinking regarding the actual classification mode of the participant's overall response or solution to the task's problem. The question seeking the participant's reasoning behind his/her classification was "Why do you think the object (naming it) does not belong with the others?" or "Why do you think the three objects (naming them) belong together?"

Probing questions were asked in situations where a participant provided a concrete, functional classification to determine whether the participant would change his/her classification and adopt the formal, categorical classification proposed by the experimenter. For example, the experimenter proposed an alternative classification mode by posing the question "What if I take this (naming the object) out?" or "What if I group these three objects (naming them) and take this one (naming it) out?" Should the participant maintain his/her chosen classification mode, the classification pattern was determined to be characteristic of his/her chosen mode of object classification.

Interviews took place between the researcher and a participant, one at a time. All interviews were conducted in the medium of TshiVenda, in which both the researcher and the participant were fluent. Participants were more open and free in their interaction with the researcher, by contrast to the 'unnatural' appearance of normal classroom behaviour which is usually strictly controlled from the outside by the teacher. Children were aware that the interviews were less formal than classroom lessons and that they did not risk failure, as is normally the case with formal learning in class, which is almost always followed by assessment of learning and allocation of scores.

Recording of data

The interview was tape-recorded at the same time that the pattern of the participant's responses was recorded in a notebook. The participant's response to the question requiring him/her to classify the objects was recorded as either 'functional-graphic' or 'abstract-categorical'.

A classification was recorded as graphic and functional if it reproduced the relations that objects had in real-life situations or if it emphasised the concrete form of the objects to be classified. For example, a *panga* and *hoe* may be grouped together with *wheat*, or a *goat* and *cow* grouped together with *kraal*.

A classification action alone was not considered sufficient to make a decision about the fundamental nature of the participant's thought processes. The participant's reasoning behind each of his/her classification was always probed. The participant's overall response was recorded as categorical only if

it was supported by reasoning based on the use of linguistic concepts such as ‘animals’, ‘tools’, ‘plants’, and so on. These concepts denote the category to which the objects identified are deemed to belong. However, if the participant revealed reasoning based on the functional relations of objects or their concrete manifestation, the overall response was recorded as functional and graphic.

Method of analysis of the results

The analysis focused on whether the participants’ responses revealed a functional-graphic or an abstract-categorical classification mode. A functional-graphic classification mode involved the classification of objects according to their appearance and functional significance. The abstract-categorical classification mode involved the classification of objects according to their abstract linguistic categories, established on the basis of the use of linguistic terms or conceptual relations.

For an abstract-categorical classification of a group of drawings that comprises a *giraffe*, *goat*, *cow* and *kraal*, the *giraffe*, *goat* and *cow* will be grouped together and a *kraal* excluded because the former are *animals*. On the contrary, a functional-graphic classification would emphasise the real-life relations the objects are deemed to have as experienced by the participant. Therefore, the *goat* and *cow* would be grouped with the *kraal*, because the *goat* and *cow* are kept inside the *kraal*, but the *giraffe*, as a wild animal, will not be kept in the *kraal*. A reasoning pattern that justifies a categorical classification (*giraffe*, *goat* and *cow*) in functional terms was identified as a functional mode of classification. This comprised reasoning patterns that classified these objects together, because they all eat grass or would be found together in the bush. The emphasis that the participant placed in justifying his/her classification determined what underlying mode of reasoning s/he used to obtain such classification.

The data in Tables 1 to 3 illustrate only two classification patterns: the abstract and the concrete classification, when all reasons (including abstract-functional reasons) are interpreted (following Luria’s (1976) original study) as concrete, because they employed no explicit linguistic terminology to subsume objects in a single class structure. This is however, re-interpreted later on in the discussion of results section to include the third, abstract-functional mode which the present research contributes to knowledge in the field.

A total of 20 participants in each Grade responded to the 4 task questions comprising Tasks A, B, C and D. There were, therefore, a total of 80 responses per Grade which are reported on in terms of percentages for each Grade. In the discussion of the results for the three Grades (Grades 3, 4 and 5 combined), the percentages refer to the total scores for each of the three Grades, added together into a total of 240 responses per task.

Results

Grade 1

The Grade 1 participants emphasised a functional and graphic mode of object classification. Only 2.5% of their responses to the task questions were, in appearance, abstract and categorical (see Table 1 for a full breakdown of results). Only on two occasions, in Task A and Task B, did the Grade 1 participants offer such responses. In some instances, the Grade 1 participants offered what appeared to be categorical classification, which was accompanied by functional reasons. For example, in Task A, the Grade 1 participants classified a *pick*, *panga* and *hoe* together, but were unable, except for a single instance, to justify their classification by using the term ‘tools’ as a basis for their classification. The Grade 1 participants did not, therefore, use the linguistic concepts to establish conceptual relations among the objects. Almost all of the reasons for the Grade 1 participants’ classification (97%) emphasised the graphic and functional relations that the objects have in concrete, everyday situations where they are encountered.

Table 1: Summary of the subjects' overall response patterns

| Grades | Grade 1 (n=20) | | Grade 3 (n=20) | | Grade 5 (n=20) | | Grade 7 (n=20) | |
|-------------------------------------|----------------|------|----------------|-----|----------------|-----|----------------|-----|
| Abstract-categorical classification | 2 | 2.5% | 36 | 45% | 39 | 49% | 45 | 56% |
| Functional-graphic classification | 78 | 97% | 44 | 55% | 41 | 51% | 35 | 44% |

Grades 3, 5 and 7

The performance of the participants in Grades 3, 5 and 7, with regard to the use of the abstract-categorical classification mode, was not significantly different. The Grade 3 participants obtained an overall performance of 45%, Grade 5 participants 49%, and Grade 7 participants 56%. The results showed that these participants used both the functional-graphic and the abstract-categorical modes, with equal emphasis. None of the two distinctive modes stood out as particularly dominant.

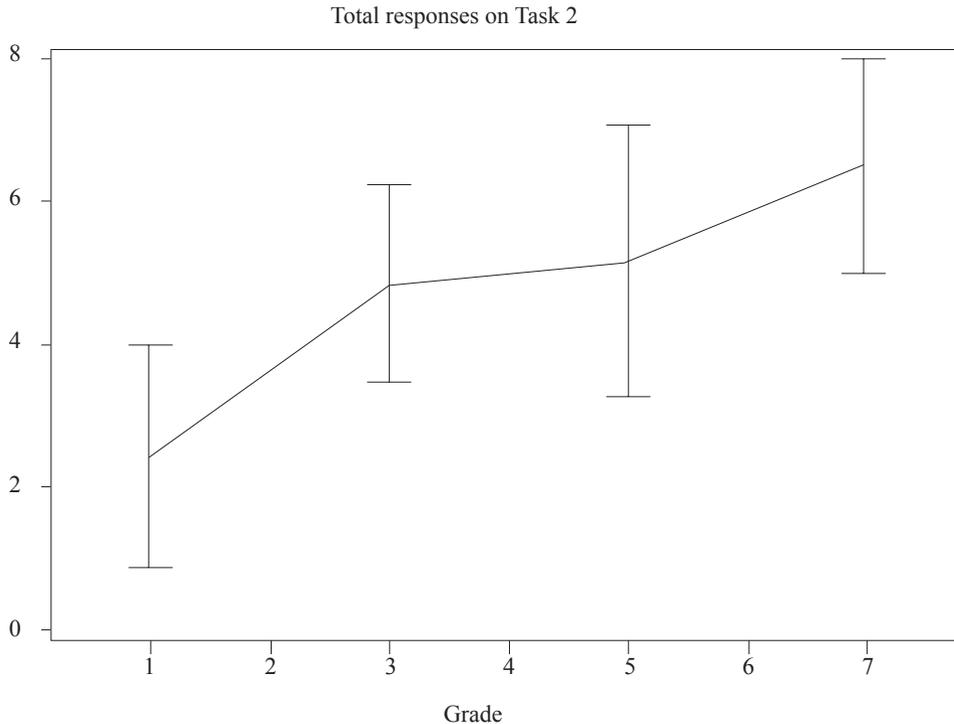
A one-way ANOVA procedure was conducted to determine whether the change in performance across the four grades is significant. The results of the ANOVA procedure (see Table 2) indicate that there is a significant difference ($F(3, 76) = 22.52, p < .0001$). A *post hoc* Bonferroni correction indicated that the significant difference is located between Grades 1 and 3, and between Grades 3 and 7. Table 3 shows the means and standard deviations in each of the four grades. Figure 1 shows the developmental trend demonstrated by the participants' performance. It is also clear from the means and standard deviations in Table 3 that there is little improvement in performance between Grades 3 and 5 and between Grades 5 and 7, respectively.

Table 2: Results of the ANOVA procedure on classification and generalisation tasks

| Source | DF | ANOVA SS | Mean square | F value | Pr > F |
|-----------------|----|----------|-------------|---------|--------|
| Grade | 3 | 175.1 | 58.4 | 22.52 | <.0001 |
| Model | 3 | 175.1 | 58.3 | 22.52 | <.0001 |
| Error | 76 | 196.9 | 2.6 | | |
| Corrected total | 79 | 371.95 | | | |

Table 3: Mean and standard deviations on classification and generalisation tasks

| Grade | N | Mean | Standard deviation |
|-------|----|------|--------------------|
| 1 | 20 | 2.4 | 1.54 |
| 3 | 20 | 4.85 | 1.39 |
| 5 | 20 | 5.15 | 1.93 |
| 7 | 20 | 6.5 | 1.54 |

Figure 1: Developmental trend in participants' performance across the four grades

Discussion of the results

Grades 3, 5 and 7

The pattern that dominated the responses of these participants revealed an interesting phenomenon. Two distinctive modes of object classification were used. These modes were either categorical or concrete. However, subsequent justification of the initial classification actions revealed that there were three, rather than two modes of reasoning underlying the participants' classification performance.

Task A

- Concrete classification

Only 10% of the participants' classification was concrete in that it included *wheat* together with two of the three remaining items. The reasons provided to support these were similarly concrete and functional-graphic, that is, emphasising the concrete appearance and the functional relations of the objects. For example, a *panga*, *hoe* and *wheat* were grouped together and the *pick* excluded from the grouping. The common reason for this classification was that a *panga* and *hoe* are used in the fields for planting *wheat*, while a *pick* is not used for that purpose. Alternatively, the objects would be grouped together for the reason that a *panga* and *hoe* can be used at various stages of the preparation of the fields for planting *wheat*. Unlike the *hoe* and *panga*, which have always existed in Venda society, a *pick* is a relatively new tool that is not extensively used in Venda homes.

- Abstract classification

The majority of the participants' responses (90%) classified a *pick*, *panga* and *hoe* together and excluded *wheat* as not belonging with the others. However, when it came to supporting this classification mode with appropriate reasons, only 45% of the responses made use of linguistic terms such as 'tools', 'animals' and 'plants' as a sole basis for their classification action (for example, a *pick*, *panga* and *hoe* belong together, because they are tools).

- Abstract-functional classification

A third mode of classification seems to be peculiar to the participants' specific sociocultural and linguistic context. In this task, 45% of the 90% apparently categorical classifications were, in fact, 'abstract-functional' in that the participants argued that a *pick*, *panga* and *hoe* belong together, because they complement each other in their use. This mode of performance manifests a pattern that is peculiar to the specific sociocultural context of schooling and the linguistic experience of the participants. The participants employed the available TshiVenda categories which, according to the analytical framework derived from the Vygotsky-Luria study (Cole *et al.*, 2006; Luria, 1976; 1979) would probably be classified as functional because, although the objects are classified in an abstract manner, they are subsequently justified in terms of their functional relations or how they are used, or work, in relation to each other. The participants, therefore, employed multiple linguistic categories, derived from TshiVenda, which would be undifferentiated in English and, possibly, in Russian.

Task B

- Concrete classification

Twenty per cent of the participants' classification was concrete. They grouped the goat, cow and kraal together, for example, and argued that *goat*, *cow* and *kraal* belong together, because a *goat* and *cow* are kept in the *kraal* at night, whereas a *giraffe* is a wild animal that is found in the bush and that cannot be kept with domestic animals.

Children in this context become familiar with these concrete functional categories at an early stage in their life from the subsistence activities of their everyday life experiences. Goats and cows are still kept in most families and boys participate in their care, whereas animals such as giraffes are common in the game parks. The latter are also a common feature of their environment.

- Abstract classification

A similar pattern as in Task A is evident in this instance. In this task, 80% of the participants' classification responses appeared to be categorical. The participants classified a *giraffe*, *goat* and *cow* together and excluded a *kraal* as not belonging with the others. However, only 61% of the reasons the participants provided were based on an abstract linguistic term such as 'animals'. Valid to the requirement of the task, 61% of the participants thus argued that a *giraffe*, *goat* and *cow* belong together, because they are animals.

- Abstract-functional classification

The 19% responses comprising the reasons for the apparently abstract classification of task objects above were abstract-functional, in that the grouping of the objects was abstract and could have been justified by using a single linguistic terminology which, however, did not happen probably due to the fact that TshiVenda language does not seem to emphasise such class relations. For example, participants argued that *giraffe*, *goat* and *cow* could be grouped together, because they eat plant leaves or that the *giraffe*, although a wild animal, would not harm the other two. In essence, the reasons participants provided for their classification action avoided using a single linguistic terminology that subsumes the relations implied.

Task C

- Concrete classification

The participants' responses that classified the objects using a concrete classification mode (20%) usually excluded *lizard* from their classification and argued that the *lizard* was not 'an animal', or that the *lizard* did not eat plant leaves and would, therefore, not need to feed on *tree* leaves, as would a *donkey* and *cow*.

These participants generally disagreed with the experimenter's identification of a *lizard* as an 'animal'. They preferred to identify it as a 'creature' (*tshikhokhonono*), or something similar to the concept 'organism'. In TshiVenda, a *donkey* and *cow* are identified as *zwifuwo* (domestic animals). A *lizard* would not normally be identified as a 'domestic animal' (*tshifuwo*) or a 'wild animal' (*tshipuka*), because it is neither kept domestically as a pet or as livestock, nor does it live in the 'wild', as other wild animals such as a giraffe or elephant. A *lizard* is identified as a 'creature' (*tshikhokhonono*), a concept that seems to suggest that it is neither 'wild' nor 'domestic', but is a creature that is found both in the wild and in the home. The concept 'animal' in TshiVenda does not, therefore, seem to equate directly to the English concept as it seems to be more differentiated in its TshiVenda occurrence. As a result, the participants would argue that they cannot group a *lizard* (*tswina*) with domestic animals (*zwifuwo*), because a *lizard* is not kept in the home like domestic animals.

- Abstract classification

For Task C, 80% of the participants' classification responses were categorical, but only 58% of the reasons for these classifications were based on abstract-linguistic concepts. The 58% of the participants who offered reasons based on an abstract-linguistic category to justify their classification argued that a *donkey*, *lizard* and *cow* belong together, because they are 'animals'.

- Abstract-functional classification

Of the 80% of the participants' responses where *donkey*, *lizard* and *cow* were grouped together, 22% of these responses provided what could be referred to as abstract-functional reasons as basis for the classification. For example, participants argued that these could be grouped together, because they eat the leaves of the tree or that they have blood, whereas tree does not have blood or does not move. The reasons seem to resist subsuming task objects under linguistic terminology that could serve as basis for the classification. This could possibly be explained by reference to the differentiated nature of the concept 'animal' in TshiVenda.

Task D

- Concrete classification

For this task, 17% of the participants' classification responses were concrete and functional. That is, they classified *hut*, *mealie* and *wheat* together and argued that the *mealie* and *wheat* would be stored in the *hut* when harvested. These forms of reasoning dominated participants' justifications of the objects' classification.

The possible object relations implied in this task may have invoked images, on the part of these participants, of the subsistence activities which still dominate their daily domestic activities in which participants actively participate.

- Abstract classification

For this task, 83% of the participants' classification was abstract and categorical. That is, participants identified *wheat*, *tree* and *mealie* as belonging together, and excluded *hut* as not belonging with the others. However, only 33% of the reasons offered made use of the linguistic term 'plants' as a conceptual basis for the classification.

- Abstract-functional classification

Of the 83% classification responses, 50% of the reasons given to justify this initial classification were abstract-functional in that, although they emphasised the objects' categorical relations, the reasons seem to appreciate the contextual relations of objects as experienced in the participants' daily life experiences. The participants argued, for example, that *wheat*, *mealie* and *tree* provide food, whereas *hut* does not. Some argued that a *hut* can be used for storing *wheat* and *mealies* at harvest, but that a *hut* is not built in the fields where *wheat* and *mealies* grow, because the roots of the *tree* growing next to it would cause it to crack and collapse.

Even in situations where a linguistic term *zwimela* (the equivalent of 'plants') was used to justify the classification, this was further extended to relate to the functional relations of these objects in their concrete situations. In TshiVenda, *tree* is called *muri*, whereas *wheat* and *mealies* can collectively be called *zwimela*, which is generally equivalent to the concept 'plant'. There is, therefore, in TshiVenda a peculiar distinction between plants that are *miri* (trees) and plants that are *zwimela* (such as *mealies* and *wheat*). There is, therefore, an apparent tension, in the responses of the participants, between the school-specific concepts such as 'tree', on the one hand, and the TshiVenda-derived concepts such as *zwimela* (plants other than trees), on the other.

Conclusion

Performance in these tasks suggests that the acquisition and development of concepts, and the specific modes of thinking and problem-solving, are related to the sociocultural context and the learning activities in which learners participate. The cultural context in which children's learning and development takes place is multifaceted and multilayered, encapsulating the traditions of learning in their specific schooling as well as their development in a rapidly changing sociocultural context of rural Venda and South Africa.

With no substantive improvement on the quality of TshiVenda as a crucial cultural-psychological tool, the relational processes of classroom teaching and learning will continue to be constrained, remaining largely at levels such as described in Muthivhi (2008) where teaching comprised mere reiteration of the concrete, spontaneous concepts, while learning did not lead to the transformation (and transcendence) of spontaneous concepts and empirical forms of knowledge into formal-abstract concepts and theoretical forms of knowledge that should characterise formal schooling.

The fundamental difference between TshiVenda and English concepts seems to derive essentially from their respective levels of development for use as instructional mediums within classroom teaching and learning situations. While TshiVenda concepts arise from, and through the specific sociocultural activities that make this society distinctive, curriculum development (and language development) for instructional purposes needs to take the psycho-pedagogical realities of TshiVenda-speaking learners into serious account, by ensuring that curriculum and pedagogical demands are explicit and that instructional tasks are structured so as to provide learners with opportunities to transcend potential conceptual constraints immanent in their everyday, spontaneous activities.

For example, translation activities that characterise curriculum development for TshiVenda-medium classrooms need to elaborate on the formal concepts in ways that clearly engage with and eliminate the ambiguities that may persist when the world is conceived from the perspective of someone whose conceptualisations may have been influenced by, and shaped through participation in sociocultural activities that constitute the TshiVenda life-world. Meanwhile, classroom pedagogy could similarly proceed from the perspective that thought, language and sociocultural activities such as domestic life or classroom teaching and learning are inextricably intertwined, and that concepts arise out of (and through) participation and engagement with these activities.

As a result, teaching and learning would, therefore, emphasise the use of language as a cognitive (or cultural-psychological) tool rather than as a carrier of meaning and facts, and thus privilege learners' meaningful engagement with ideas and knowledge. Teachers would, for instance, clarify and elaborate on areas of potential sources of ambiguity and misunderstanding, while simultaneously probing learners' ideas

and conceptualisations so as to provide them with conceptual resources for transcending the constraints of spontaneous concepts and empirical forms of knowledge.

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