CHAPTER 3
A THEORETICAL PENETRATION OF SOME PRINCIPLES FOR ORDERING (ARRANGING) LEARNING MATERIAL

3.1 INTRODUCTION

In this chapter there is an attempt to delimit and describe principles of ordering learning material that seem to be of particular significance for later implementation in planning lesson situations in physics. Since the aim is not to provide a complete explication of all of the principles of ordering, a few are considered in depth. Thus, the essential characteristics of the relevant principles for practice are made visible.

In dealing with the principles of ordering the learning material the following question arises: Where have the so-called principles of ordering acquired their clarity? To try to give greater certainty to my argument I will explore an answer to this question: A principle acquires its clarity when certain characteristics that are repeated in practice are noticed and described by the didactician. As an example, we can take the methodological principles. Methodology is the science that concerns itself with delimiting, systematizing and describing what can be crystallized from practice as the essentials of methods that are repeated in various situations. Didactics is the only comprehensive science that includes, to a degree, the phenomenon of ordering learning material and the principles connected with it. However, to this day, this problem still is not handled and investigated scientifically. This implies that the current and generally acceptable ways of ordering learning material in practice and that usually leads to fruitful learning and teaching still rests largely on chance. Consequently, such principles cannot merely be accepted for the aim of this study and the significance of each of the principles of ordering must be shown. It remains a task for the didactician to scientifically work through the whole matter of ordering.

Because the principles of ordering considered here have particular relevance for learning content, first some of their aspects are broached.

3.2 LEARNING MATERIAL[23]

3.2.1 The place and value of learning material

In looking for deductions that can be made from the root word *didaskein*, the following are distinguished:

Didakalos means teacher.
Didaskalia means the occupation of teaching.
Didache means the content that must be taught.[24]

From this it is clear that content is necessary in designing each didactic situation. Instructing, as essential for all teaching, only can be realized if there is something (content) selected and presented. Furthermore, educating is meaningful because it is only possible for the child to arrive at an understanding of values and norms on the basis of content (something). Thus, the content is the means by which the child changes. This event of becoming is intertwined with the entire phenomenon that is known as learning. To bring about optimal forming and changing of a child the content first must be made one's own learned possession. The change resulting from the child lived experiencing the things around him is not merely a gnostic [cognitive] event. This forming also includes pathic [affective] moments, which means that forming claims the child in his totality. Therefore, this involves not only *what* is presented but also its *why* and *how*. In addition, the "how" implies thinking about and refining the concept of ordering. From this it is clear that the learning activity in school can only be re-constituted as a spontaneous, close-to-reality event when the content is selected and ordered in terms of particular didactic principles. Only then can the structure and meaningful relations of the subject area be unlocked *meaningfully* for the child.

3.2.2 The sense of learning content

[23] The question of learning content (learning material) is comprehensively described in the didactic literature; therefore, only a few aspects are broached with the aim of ordering learning material.
[24] Van der Stoep, F. and O.A., *Didaktiese Orientasie*, p. 37.

Van der Stoep[25] indicates that the sense of a particular matter, object or activity for the pupil is in the fact that there must be a harmony between its subjective (personal) and objective (thing-like) aspects. Here the subjective refers to the person who, on the basis of the meaningfulness of the matter (object), proceeds to give meaning to it. In the lesson situation the child is addressed by the form as well as by the content. If the above two aspects appear to be familiar to the child, on the basis of the meaningfulness of the event, he will show grater mobility and will assume his own (subjective) standpoint towards them. Therefore, receiving instruction also serves the aim that the sense of the object or matter, the demands of the historical-societal situation as well as the assumptions and expectations of the child regarding, e.g., the view of life, the sociological, psychological, ethical, the religious are summarized into a new unity and can be transferred to the life world outside of the school. Understandably, the transfer of the new knowledge leads to a deepening of the relationships that he constitutes with the world outside of the school.[26]

Thus, the teacher attempts, through a particular ordering and presentation of learning content to create the possibilities by which the child can arrive at a spontaneous involvement with reality. In addition, his design must include the opportunity by which the different learning content can grow together into a meaningful and sensible unity and, at the same time, show a correspondence with the life patterns of the adult. Van der Stoep says of this: "The *I* and the *you* of the learning situation now flow together into an *us* in the common concern with the learning material."[27]

3.2.3 Formative content

On the one hand, formative content is characterized by the fact that, as a particular example, it always can appear in the place of many other examples. On the other hand, in terms of content with formative value, certain fundamental problems, fundamental relationships, principles, laws, values and general methods can be made visible. Each particular formative content inherently includes

[25] Van der Stoep, F., *Didaktiese Grondvorme*, pp. 86-89.
[26] Van der Stoep, F., op. cit., pp. 86-90.
[27] Van der Stoep, F., *Tydskrif vir Geesteswetenskappe*, June 1965, p. 214.

a general formative quality. The success of the work of forming, however, cannot be predicted and guaranteed beforehand. Certainty about the value of a particular matter only can be observed in the results of the formative event and only to the extent that success is attained in unlocking a particular reality.[28] This unlocking of reality means that the child has come to learn to know and master the unknown and comprehensive life world of the adult. Van der Stoep indicates that a particular approach in a specific teaching situation can contribute to elevating the formative effect of the learning content.[29] The presentation that must shape the form at the same time must remain directed to unambiguously unlocking the essence of the theme for the pupils and allow it to be integrated with their already existing knowledge. Once again we emphasize the importance that each lesson situation must be planned in its form and content before the presentation can have optimal formative value and quality.

3.2.4 Reducing the learning content

A person interprets reality mainly from the structures that its character of being allows to become visible, i.e., what he has accepted as true and valid. The first and most important step in lesson analysis is to isolate the quality or being-character of the learning content. This is the only way to realize the category "unlocking reality". In other words, the didactic analysis must disclose the essential of a particular concept as well as show its mutual relations with other matters. Only when there is clarity about what is essential to a piece of reality, and when it can be seen in relation to neighboring matters, can the teacher proceed to interpret and represent for the pupils this matter (reality) as a piece of lived experience. However, it must be remembered that each person acquires experience from the appeal arising from the matter itself and also on the basis of the personal stake of the learner in his search for truth and sense.[30] In other words, the teacher must take care that the formative content that he presents to the pupils directs

[28] Van Dyk, C.J., *Vanaf vorming (Bildung) tot Eksempariese onderrig en leer—'n Didakties-Pedagogiese Strukturering*, p. 21.
[29] Van der Stoep, F., op. cit., p. 95.
[30] Van Dyk, C.J., op. cit., pp. 19-22.

an appeal to them by which they purposefully and deliberately try to solve a problem.

Van der Stoep refers to the importance of the reduction step when he says that the adult's activity of reduction always is ordering in nature.[31] This places the teacher under the imperative to give an indication of matters that, on the basis of his insights acquired through the activity of reduction, he regards as important and of which the child must acquire a grasp. *From this it is clear that in a didactic analysis the reduction of learning content is a primary and necessary step that must be carried out before the learning content can in any way be ordered further in terms of principles.* Thus, it has become clear that with any further reflection on the problem of ordering learning material the disclosures by the act of reduction always must serve as the primary point of departure.

However, in everyday practice the teacher is involved with a syllabus to which, in part, he is bound and from which his learning content must be selected. It is not the primary purpose of this study to draw conclusions about ordering learning content in a syllabus. However, to come to an ordering of learning content for lesson situations the compilation of the syllabus necessarily must have relevance. Therefore, it is necessary to make some comments about syllabi and their significance for planning lesson situations.

3.2.5 Learning content and the syllabus

a) *The concept syllabus*
In a syllabus a concrete description as well as a systematic ordering of learning content for a school over a number of years of study is summarized. It reflects a first analysis and ordering of cultural material. The syllabus concretizes the abstractly given teaching aim, especially regarding its content, and makes this aim manageable in daily school life.[32]

Often the detail of the particular syllabus content is not clearly distinguished but only the general fundamental problems and

[31] Van der Stoep, F., op. cit., p. 31.
[32] Oosthuizen, J.H.C., *Die leerplan van die primere skool as opgaaf aan die kind*, p. 8.

embracing thematic fields are shown. The choice of particulars is left to the individual teacher or school. Here one thinks of two types of syllabi—the core syllabus and the minimum syllabus.

b) *Syllabus compilation*
Nature of the learning content. The fundamental ideas of syllabus compilation is its being scientific (objective or subject directed) while the syllabus content is viewed as the means for presenting the culture-creating authorities, e.g., the church, judiciary, science, arts and vocational being. Any didactically accountable construction of a curriculum must characterize the essence of the learning material. The themes that are taken up in it must be selected on the basis of their formative quality. There must be an opportunity allowed for the child to re-disclose the theme in situations that are original and close to reality. In this way insights arise from confusion, solutions again become tasks and phenomena again become primordial phenomena.[33]

Ordering the learning content. In the didactician's reflection on the compilation of a curriculum he can and must be clear about the principles of ordering that he will implement with respect to the learning content. Here we only mention a few possibilities of ordering, e.g., the progressive, the concentric and the symbiotic.

In the lesson situations important for this study, the principles of ordering can figure separately or jointly. Each particular principle of ordering is given detailed attention with the aim of showing in which ways it can be implemented in a particular lesson situation. This study does not deal so much with the relevance of each of the principles for compiling syllabi.

3.3 PRINCIPLES OF ORDERING LEARNING MATERIAL

From the abundance of cultural content, certain content or areas are selected, taken up and ordered in a syllabus. This content already characterizes the essentials of the learning material considered necessary for educating and teaching a child who is on a certain level of becoming. However, the teacher cannot merely adopt and

[33] Van Dyk, C.J., op. cit., p. 23.

present the syllabus content. As a first step, the learning material must be reduced to its essentials by stripping it of all supplementary information. Only then can the teacher avail himself of its formative value and arrive at the essences that have made it worth taking up as a problem in the syllabus. The teacher must not merely suffice with a chronological ordering. For him, as well as for the learning person (pupil), knowledge of the structure of the formative content is of utmost importance. The simplicity or complexity of the content is determinative of the form and level of ordering and, finally, of the method that is going to be followed.[34] In his teaching the teacher must apply himself to unlocking the essence of the formative content for the pupils. The problem regarding presenting the learning content (physic problem) is that it must become a problem that totally claims the pupils and that arouses their wonder and amazement. In this way the necessary enthusiasm, questions and interest of the pupils are stimulated and gives them the motivation to discover for themselves.

Specific principles of ordering now are dealt with on the basis of their particular relevance for the natural sciences, in general, and for physics, in particular.

3.3.1 The principle of core learning material and supplementary programs

The fundamental insight of this principle is the idea of core learning material as well as a further orientation of the entire group of pupils or only certain of them by bringing in supplementary programs.

For the various subject areas it is know that depth can be acquired in teaching by looking for “elementals”, fundamentals and pregnant cases. The aim of presenting core learning material crystallizes in the teaching of formative content that possesses an inherent formative quality.

Where use is made of this principle to order the learning material in teaching there must be an attempt to bring about the right relationship between learning material flooding (factual knowledge)

[34] Van Dyk, C.J., op. cit., p. 31.

and the concentration of learning material (core learning material) where the latter necessarily is taken as a fixed point. Here there is a close connection with the concept of the "elemental" as thoroughly investigated and described by Klafki. The fruitfulness of the idea of the "elemental" is that it again brings the learning content to the center of our contemporary didactic discourse. Again, the idea has arisen for the didactician that to acquire insight into the essences of reality, the reduction of the formative content to its "elementals" must be made an aim.[35]

Core learning material must possess the possibility of being vivid or illustrative and also, as an example, possess the quality of unlocking or reflecting a general structure or idea. Roth[36] also indicates very clearly that in teaching a "core point" (core learning material) must be sought on which to concentrate. In practicing a science, we must have the courage to "remain open", or more positively stated, to have the courage to be more thorough. However, he also refers to the necessity that there cannot be teaching only in terms of core learning material because, according to him, gaps can arise and be catastrophic. Therefore, in addition to the core learning material, supplementary learning material must be offered by which there is a further orientation. Van Gelder briefly calls this broader provision of information supplementary programs. The concept "supplementary programs" is only didactically justifiable when it is supplemented with the core learning material. Further, core learning material lends itself, in particular, to being implemented as content in relation to the exemplar as a ground form. Therefore, the teacher must continually ask himself what he is doing and how. He must be able to thoroughly answer himself with respect to the time when and the tempo with which he implements the core learning material and supplementary programs in interaction with each other. In connection with the question of core learning material there is a concentration on mastering fixed points from which a better perspective on the matter can be acquired. The mastery of such points of orientation offers the pupils greater confidence and a better overview of the entire structure.

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[35] Van Dyk, C.J., op. cit., p. 166.
[36] Roth, H., *Leerpsychologie in Pedagogisch Perspektief*, p. 276 et seq.

In order to grasp the real significance of core learning material, attention also must be given to the child's level of readiness and its influence on the choice and ordering of a topic. This confronts the didactician with the task that, in his planning, he must try to bring about a harmony between the content that will be most fruitful for unlocking a particular reality and the receptivity of the child at this stage. Such a choice must be made from a broad field of available learning content by a search for the core learning material within it. After mastering the core learning material individual pupils can follow the supplementary programs according to their interests. In this regard, the concept of core learning material and supplementary programs connects very well to the principle of individualization because here there also is an accounting of individual differences.

In summary a few important advantages of this principle of ordering, especially regarding the teaching of natural science, are noted:

i) In the concept "core learning material" there is clear mention of a concentration of learning material on fundamental and necessary learning content. In physics this especially gives us the opportunity to meaningfully apply the example as a ground form.
ii) By the right choice of learning content the didactician can avoid working on less important learning material too soon and at too fast a tempo. In this way an overloaded learning program is lessened.
iii) In his preparation the didactician must plan situations in which the child's astonishment and wonder are aroused and thus arrive at a meaningful problem from the child's experiential life. His learning aim must be: Original lived experiences by which he penetrates to the essential of the matter.
iv) As already indicated, individualization is done more justice. The individual pupils now work on theoretical and practical assignments with respect to both the core learning material and the supplementary programs and thus have more opportunity for independent participation in the teaching.

Some dangers connected with this are indicated:

i) The core learning material is not always chosen in a didactically accountable way. In this connection, Van der Stoep indicates that it is the task of the didactician to express himself about what content is valuable and worth knowing.[37]
ii) To have any success with this principle and programs high demands are placed on the didactician because an incorrect handling of them can have serious consequences for the learning event.

3.3.2 Principles with the life world of the child as point of departure

a) *Symbiotic principle of ordering*
The concept symbiotic comes from the Greek *sum* that means together and *bio* that means to live. The literal translation, thus, is "living together." Symbiotic teaching is a form of teaching by which the child is directly brought into contact with reality as far as is possible and desirable.

The influence of the environment is especially great during the child's first years of becoming. However, gradually the child loosens himself from the world, i.e., he distances himself from things by increasingly thinking about them on a gnostic [cognitive] level. In this way he arrives at a more ordered way of constituting his own life world. Aarts[38] further indicates that there is a close correspondence between the modes of learning of the toddler and the beginner of the primary school. For both groups the learning activity is carried by a subjective attunement that results in moments of spontaneous play and lived experiencing totalities. He further states the precondition that the learning material taught in the first years of school must find close links with earlier experiences of the life world of the child because this experienced and lived foreknowledge already has meaning for him. In the

[37] Van der Stoep, F. and O.A., *Didaktiese Orientasie*, p. 220.
[38] Aarts, J., *Beknopte leerboek der algemene didaktiek*, p. 110.

second phase of the primary school, i.e., approximately the last three years, in his learning relationships the child penetrates to the matters themselves. He now is much more gnostically [cognitively] attuned and directed to reality. In his learning activity he searches for things as they are. Thus, the child breaks through the pathic [affective] and turns himself to the gnostic [cognitive] by which he seeks meaning.[39] Now he is ready for logical-rational methods.

The above argument implies that links must be found with physical phenomena in nature that the child already has experienced. The at hand and close to reality lived experiences of the child offer the possibility for a fruitful integration with the new learning content. By implementing the symbiotic principle not only is acquiring the necessary integration of the different subjects aimed at but the content also must be able to be applied fruitfully within a particular subject area.

b) *Principle of local lore*
Since this principle is closely related to the symbiotic principle an explication of it is justified at this stage. With the concept "heem" (Dutch), Aarts understands the material and spiritual environment in which a person lives and with which he is in relationship.[40] The significance of *Heimat* (German) for teaching is that the known and at hand experiential world of the child must serve as the point of departure. On the basis of his experiences of local lore the child now is placed in a position to proceed to a meaningful constitution of his life world. The life world is the sublimate of a person's meaning giving consciousness. The local lore experiences are united into a unity of meaning in which a particular thing refers to other things in constellations of meaning. From this trusted and known world a person moves to the strange and unknown. It is the basis of all conceptual truth of the world that is lived and lived experienced.[41]

Significance of the local lore principle for ordering learning content

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[39] Sonnekus, M.C.H., *Die leerwereld van die kind as beleweniswereld*. P. 110.
[40] Aarts, J., op. cit., p. 193.
[41] Gous, S.J., *Die skool as weg tot wereldontwerp in didakties-pedagogiese perspektief*, p. 19.

- In planning and designing a lesson situation links must be found with the experiences of the child. The immediate environment or region can serve fruitfully as the first point of departure for the teaching event.
- The child must not only learn to know the concepts but he also must learn to see their mutual relationships. These mutual connections among concepts can best be indicated when one proceeds from the totality of the child's lived experiences.
- Our ordering of learning content, therefore, must be of such a nature that it corresponds with the child's level of becoming and learning readiness.

This brings us to the integration principle of ordering that is closely connected with both the ideas of "living with" (*symbiosis*) and *local lore*.

c) *Principle of integration*
As a principle for ordering learning material it is attuned to eliminating all dividing lines between particular areas of learning material. The essence of the idea of integration is that the choice of and ways of ordering themes are attuned to learning material that can be built up (ordered) into a coherent whole. The origin of this principle must be sought in the acceptance of the knowledge that the child mainly lived experiences reality as a global unity or whole. Thus, it is related to the idea of totality teaching.

This principle rests on the following:[42]

- The learning material content shows a clear coherence that usually emanates from a core problem. Thus, this point of departure is a search for the co-experienced coherencies so that matters evoked by the core appear. (In this respect this links up with the principle of core learning material.)
- The point of departure assumes that the learning material is taken from directly present life situations. This coherence is the coherence that a child would have experienced in real life. (In this respect, it links up with

[42] Van der Stoep, F. and O.A., op. cit., p. 217.

the symbiotic principle). This leads to the child experiencing coherence in particular learning activities. Thus, insight is acquired into the mutual relations between the concepts that form part of everyday reality.

- Obviously, the learning situation designed with the help of such learning content must be motivating to lead the child to an active participation.
- In evaluating the acquired knowledge, the emphasis will not be on demanded knowledge or manipulated techniques but on the success that the pupils achieve on actualization-tasks.

However, in this study dealing with implementing ordering principles within a particular subject area, the integration principle only can have limited value regarding the choice and ordering of topics. For the general forming of a child and his causal understanding of natural phenomena, however, it is of such primary importance that thorough attention must be given to the mutual relationships among the various natural sciences.

In addition to these principles of ordering that are more directed to the use of the child's at hand experiences, there are a number of other principles that deserve particular attention.

3.3.3 The concentric principle

The concentric principle initially served mainly as an opposition to the subject class (progressive principle*) that does not allow for the fact that sometimes pupils are unable to deal with a specific part of the subject at a certain age.[43] The fundamental idea behind concentric ordering is that a subject or subjects should be presented for a particular number of years with the subject becoming progressively more difficult. According to this principle the learning material, itself, does not have an undue autonomy but

* "The progressive principle is not feasible in practice. What it amounts to is that the various subjects … are not taught parallel to one another, or simultaneously, but consecutively. A certain subject or part of it is concluded in its entirety, before one proceeds to the next." (Van der Stoep, F. and O.A. *Didactic Orientation* (English Edition), p. 110. Johannesburg: McGraw-Hill, 1973. This footnote was inserted by G.Y.

[43] Van der Stoep, F. and O.A., op. cit., p. 215.

there is a primary consideration of the child's learning readiness. The concentric principle only is *meaningful* when it is based on a particular psychological finding (psychology of becoming) that helps to realize a harmony between learning readiness and level of difficulty. This way of ordering can be applied fruitfully in various subject areas.

In planning for teaching a particular subject this involves the mastery of fundamental concepts but also good judgment in determining the level of difficulty by the teacher. The concepts must be ordered and presented in accordance with the child's level of readiness. As the child progresses more in understanding and handling concepts he becomes linguistically and methodologically refined. In this way he uses and applies the fundamental concepts more formally, correctly and scientifically.

The concentric principle of ordering does not belong only in a syllabus presented over a number of years, it also can be implemented with respect to a certain theme or concept in subsequent lessons or even in the same one. In the natural sciences and in physics, in particular, most concepts are complex and can only be made understandable in terms of a logical building up of structures and generalizations. On the basis of the insights and knowledge disclosed by reducing the learning material, the presenter discovers that mastering such a difficult concept only is possible when there is an analysis worked through to a number of related characteristics. The consequence of this is that after each analysis there must be an opportunity for a synthesis. However, to also account for the child's learning readiness, the didactician is forced to work concentrically and to build up only such structures that are within the child's intellectual grasp.

3.3.4 The linear principle

In contrast to the concentric principle, the implementation of this principle strives in direct ways, i.e., linearly, to build up to the learning aim and to hold out the prospect that the theme thus can be dealt with. Therefore, here it is necessary that the teacher first analyze the theme into fine details so that, in implementing the linear principle, he can anticipate in what ways the subparts can

again be united into a whole of knowledge or a greater unity. The matter of reducing the learning material once again enters the foreground. Thus, the teacher must not only analyze the learning material but also penetrate to the essentials or fundamentals of the matter.

The linear principle is popular in programmed instruction. In business we find that almost 80% of available programs follow such an ordering. The learning content is subdivided into small units (packets) and then each element is presented separately in so-called frames. The progressive learning of the child occurs in this way according to a fixed sequence of a large number of small learning steps that sometimes obscures the synoptic understanding of the whole.

3.3.4 The punctual (divergent) principle

This way of ordering assumes that in designing his lesson the teacher tries to give a systematic explication of the theme from a chosen center (thesis). Thus, here there is work from a complex theme or definition from which a number of characteristics or part-structures can be delimited. Then each of these aspects alternately is dealt with after which there again is a return to the original main theme as point of departure. By separately disclosing each characteristic, usually in terms of a linear or spiral *part ordering*, the child acquires a new perspective on the matter and there is a continual elevation in level. This principle of ordering is closely related to a deductive methodological approach by which comprehensive tasks and projects can be implemented.

In physics we can apply this principle by, e.g., stating a definition, or general law for the pupils and providing an opportunity for a degree of memorization of the component aspects. After that, the separate aspects of the general thesis are delimited and investigated by the pupils with appropriate examples. This orienting learning activity can take the form of directly perceiving nature itself as well as the form of a demonstration lesson. By exercising these learning activities the pupils have the opportunity to apply the concept in new situations. At the same time a pupil can acquire experience by which a particular aspect or area of application of the phenomenon

can be explained better. If all of the data later possibly become integrated by means of a class discussion, the pupils can, from the various points of view, construct a synoptic image of the central concept.

In physics there are a number of concepts that can be ordered and presented in this way. We mention only a few such as interference, energy and watt. A number of these concepts are dealt with at length in the last chapter.

3.3.5 The chronological principle

With the application of this principle the learning material is explained and successively dealt with in the same sequence that it was disclosed and described by scientist through the centuries. As a principle of ordering it can be fruitfully applied in the natural sciences, especially where the historical course of particular theories can help the pupils to delimit their subparts (part perspectives). In the past various theories in physics were formulated and accepted as absolutely valid that later had to be rejected on the basis of new insights. (An example is the particle and wave theories regarding the nature of light.)

By implementing the chronological principle pupils can acquire better insight into the sense and meaning of a particular theory from the past. However, it is important to notice that presenting learning content according to the chronological principle sometimes can give rise to unnecessary resistance and confusion. Any introduction to a theme must seek a connection with the *recent views* about it. The pupils always must be confronted with the truth. Only *after that*, if didactically justifiable, is the course (of the past) brought in if the aim is to give the pupils a broader perspective on the whole theme.

Implementing particular principles of ordering for a lesson situation by no means is an isolated matter. There are matters that influence the choice of a particular principle of ordering and certain aspects of these now are singled out.

3.4 THE CHOICE OF A PRINCIPLE OF ORDERING

Before there can be a choice of a particular principle there are certain aspects first must be taken into account. On the one hand, viewed from general didactic *theory*, it is the didactic principles that allow the categorical and aim structures to acquire relevance. On the other hand, viewed more from practice, certain principles of ordering lend themselves better than others to bringing into motion the interaction between ground form and methodological principles. From this interaction, the lesson acquires a specific form. Now we deal in more detail with certain of these aspects.

3.4.1 The meaning of the didactic principle

Before being able to make a final choice of a particular principle of ordering for presenting a specific slice of reality, the didactician first must ask himself what is the sense and meaning of the didactic principles for practice. Because planning and preparing each lesson is done for a particular class, group or child, the didactic principles such as individualizing offer an immediate starting point from which the event can be brought into motion. Only thus can learning content be ordered for a specific lesson situation in terms of a principle that will allow the didactic principles of activity, observation and creativity to occur correctly. The problems and questions of the particular pupils or class, as well as the particular aim striven for, necessarily will influence the form of ordering in which the lesson is set. Irrespective of the mentioned didactic principles there also are more particular principles that have to be taken into account in ordering learning content for a specific lesson situation. Here we only mention a few such as differentiation and a looser class context. This immediately brings us closer to practice.

3.4.2 The relationship among ground form, methodological principle and form of ordering

An important task in ordering learning content for a specific lesson situation is to try to bring about a harmony among the interacting structures. Therefore, there must be an allowance for the mutual interactions among ground forms, methodological insights and principles of ordering. If this occurs, an accountable subject didactics can be built up that is not delivered to chance. Thus, it is

clear that before one can proceed to ordering the learning content for lesson situations, first insight must be acquired into the mutual relations between the following aspects.

a) *Ground form and learning content*
Here it is essentially important that the form of a lesson pushes its content to the fore.[44] Only when the learning person recognizes the form as an everyday form of living is the lesson event meaningful to him. However, in planning a lesson there must be a decision about what form (ground form) can make the teaching most effective. The choice of a ground form for the teaching even is thoroughly influenced by the unique nature and structure of the subject matter.[45]

This mutual relation between form and content is a relationship that gives everyone's teaching a unique style. There cannot be *didaskein,* in its original sense, until a particular form structure (life form) is chosen. In primary teaching situations such as the family educating and teaching mostly occur in spontaneous ways while in the secondary or reconstituted teaching situations (lesson situations) there must be a decision (plan) beforehand about the question: In terms of what ground form(s) can the unlocking of reality best be brought about? This is one of the primary decisions the teacher must make in planning any lesson situation. This decision also necessarily is influenced by the nature and structure of the subject as well as by the child's level of readiness. However, it still must be indicated that the choice of a particular ground form does not take the initiative out of the hands of the teacher.[46] Thus, for example in implementing play as a ground form there still must be room allowed for rules of play.

This mutual relation between form and content will be more closely elucidated in Chapter 4 in terms of a number of examples from physics.

b) *Form of ordering and methodology*

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[44] Van Dyk, C.J., *S.A.Tydskrif vir die Pedagogiek,* July, 1970, p. 46.
[45] Van der Stoep, F., *Didaktiese Grondvorme*, p. 141, et seq.
[46] Van der Stoep, F., op. cit., p. 140.

There is a profound relationship between the ground form in terms of which there is going to be teaching and the methodological principles that indicate particular ways in which the child can be brought to the essence of the learning content. When there is choice of a particular ground form for the teaching event, the methodological ways that can thereby be followed already are limited. There is a particularly firm relationship between the ground form (broad way) and the lesson form (particular way).

The relationship between form of ordering and methodological principle, however, is more fluid. For example, if a particular form of ordering is chosen to present learning content, still any methodological principle can be chosen depending on the structure of the learning content (theme). When a particular methodological principle is chosen, the ordering of the learning content must occur accordingly. To amplify, with the use of the inductive principle, there only can be a working from the particular (exemplar) to the general (law). Therefore, the learning content must be chosen and ordered accordingly.

In the last chapter a number of examples are presented to more closely elucidate the problem of ordering learning material in the lesson situation.