Chapter - II
Review of Related Literature
### CHAPTER – II : REVIEW OF RELATED LITERATURE

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>Introduction</td>
<td>24</td>
</tr>
<tr>
<td>2.1</td>
<td>Knowledge and Understandings in Geography – Definition and The need in Teaching</td>
<td>24</td>
</tr>
<tr>
<td>2.2</td>
<td>Thinking Process – Meaning and the Need in Teaching</td>
<td>29</td>
</tr>
<tr>
<td>2.3</td>
<td>The use of Inductive Thinking Model in Teaching- Its Advantages in the Learning Process</td>
<td>30</td>
</tr>
<tr>
<td>2.4</td>
<td>Process Skills – Justification for Use of Processes of Science in Geography</td>
<td>33</td>
</tr>
<tr>
<td>2.5</td>
<td>The role of Process Skills in the Learning of Geography</td>
<td>36</td>
</tr>
<tr>
<td>2.6</td>
<td>Conceptual Clarity on the Development of Map Skills and its Importance in Teaching</td>
<td>38</td>
</tr>
<tr>
<td>2.7</td>
<td>Explanation of Key Terms</td>
<td>40</td>
</tr>
</tbody>
</table>
2.0 Introduction

This study is designed to investigate the effectiveness of a strategy based on the Inductive Thinking Model of Teaching by Hilda Taba, on the development of competencies in the teaching and learning of Geography at Secondary school level. The main aim is to study the Geography curriculum from the point of view of development of Process Skills, Knowledge and Understandings related to Geography; and Map Skills in Seychelles.

The review of literature on the use of Inductive Thinking Model in teaching will reveal its advantages in the learning process on the part of the students. Firstly, the investigator will define thinking and the role of Process Skills in learning in general and in the learning of Geography. The study will also be backed up by empirical support. However, part of the theoretical background has already been presented in caption 1.0, in justifying the need for the study and in formulating objectives for the study. Also details on conceptual clarity on the development of Map Skills and its importance in teaching will be discussed.

Finally, details for teaching of understanding in Geography and Map Skills in the curriculum and empirical studies relating to Geography teaching and learning are explained.

2.1 Knowledge and Understandings in Geography – Definition and The need in Teaching

In the words of (Gersmehl, 2005 p.27), effective teaching of any subject must start with an understanding of how people learn.

According to Henry (1946), the word ‘understanding’ is not readily defined; but even so, it clearly implies something more than the ability to recall facts or the ability to use skills in precisely the situation in which they have been learned.

The same author has presented a detailed description of the nature of ‘understanding’. A summary of that description is given below:

- A pupil understands when he/she is able to act, feel and think intelligently with respect to a situation.
• ‘Understandings’ vary in degree of definiteness and completeness from situation with a number of factors.

• A pupil must develop worthwhile understandings of the world in which he/she lives as well as symbols associated with this world.

• Understandings must be verbalized.

• Understandings develops as pupils engages in a variety of experiences

• Successful understandings come in large part as the result of the methods employed by the teacher.

• The kind and degree of pupil’s understandings is inferred from observing what she/he says and does with respect to the needs.

The above nature of understanding sheds a light that understandings can exist covertly and can be displayed overtly. It is influenced be a number of factors and varies according to the situation. Describing about the type of understandings that need to be developed, Henry (1946) says that they should be worthwhile understandings of the world, which must be exhibited by verbalizing. They can further be inferred by the act of a child. He further stressed on the role of the teacher in developing understandings among the students. According to him, successful understanding is mainly the outcome of the methods followed by the teacher.

With such a nature of ‘understanding’, it can be considered both as a psychological process and an educational outcome. Although, the technically exact definition of ‘understand’, or ‘understandings’ is not easily found or formulated, in other words, it can be either a noun or a verb. Hence, any discipline will have a set of ‘understandings’ which forms the components of the structure of the discipline. So if one has to master a discipline the essential understandings that constitute the discipline have to be acquired. The process of acquiring such understandings is also referred to as the ‘process of understanding’, where the term is used as a verb. According to Merritt (1962), understanding involves learning information, concepts and generalisations, where according to Schwab (1964) understanding involves formulating and interpreting knowledge.
Learning with understanding is always economical and also relatively permanent. It helps in cumulative learning with functional value. To Bruner, (1963), the fundamental concepts and relationships constitute the structure of any subject. Understanding those concepts and relationships make the knowledge more comprehensible, aids memory and promotes transfer of learning.

Understanding is required for all learning to take place. However, the understanding which is developed at school will vary in richness and in kind like any other forms of learning which is desirable. The more essential is the need for learning the greater the need for understanding. As learning becomes meaningful, built on a sufficient background of experience, understanding will come to be an actual outcome of education.

According to Mayer, (1989), understanding is the students’ ability to creatively use the presented information to solve the transfer of problems. To solve those problems, meaningful learning has to take place. Meaningful learning requires the students to attend to relevant information, build internal connections between the information and relevant existing knowledge through processing the information.

In other words, as per Bruner, (1963) ‘understanding’ besides being an output of a vast body of knowledge is achievable by training through the careful observation of the world. When understanding is the results of knowledge and training, people always look up to a centre whose main function is to help its members to acquire knowledge and provide training in developing understanding. As Henry (1946) pointed out, people look to the school to develop understandings in children as one of its major responsibilities.

Thus, the school’s major goal is to develop understandings amongst the students and emphasis should be placed on the need for students to know and deal with vast amount of information, interrelate it and draw inferences from it.

In the school situ, the amount of information that students mainly acquire depend on the various learning experiences provided to them through teaching of various subjects. Students develop a variety of understandings depending upon the subject taught.
As Geography is one of the Social Studies subjects, it provides ample opportunities to observe the world around oneself and develop understandings. Attempts have been made by some individuals with regards to identifying understandings that can be developed in Social Studies in general and Geography in particular. They are explained below.

With regards to the learning of Social Studies and geography, a few authors (Anderson et al. 1946; Srivastava et al. 1990) have identified different understandings that need to be acquired by all the students of Social Studies which include Geography.

Referring to the instructional objectives that can be achieved through the teaching of Geography from classes V to X given by Srivastava et al. (1990), it is observed that the list of objectives suggests broad areas of understanding in Geography. They are the terms, concepts, principles, generalizations, processes, symbols and trends that are to be acquired by learners. The authors have further identified specific understandings in these areas in behavioural terms as objectives to be achieved among the students. These are referred to as ‘understandings objectives’.

They are given below:

The pupil,

✓ translates one form of communication to the other
✓ distinguishes, discriminates or differentiates between different facts, terms, etc.
✓ compares
✓ contrasts
✓ classifies
✓ arranges in sequence (particular manner/order)
✓ explains
✓ summarizes
✓ cites illustrations
✓ detects errors
✓ identifies relationship between ends and means; causes and effects
✓ extrapolates beyond some given data or communication
interpolates simple gaps in data
interprets data (information) presented in various forms
identifies underlying assumptions.

The above framework provides for formulating ‘understanding objectives’ related to any given content area in Geography.

The framework provided by Anderson et al. (1946), for formulating ‘understanding objectives’ in Social Studies in general, including Geography, examining the list, it is observed that it is more comprehensive and more inclusive. They have stated three broad goals which are directly related to the development of understandings in Social Studies. Under each goal they have listed objectives of particular importance. They are listed below.

Goal I: Acquiring Functional Information.

Objectives:

i. Understanding the of the special vocabulary of the subject
ii. Understanding chronological relationships
iii. Understanding maps
iv. Understanding graphs and tables

Goal II: Analyzing Social Problems.

Objectives:

i. Knowledge of important concepts, generalisations and findings, as a prerequisite to reach valid conclusions about social problems
ii. Locating, selecting, organizing and evaluating information
iii. Drawing conclusions and stating them effectively
iv. Applying social facts, generalisations and value principles to new problems

Goal III: Practicing Desirable Relationships.

Objectives:

i. Understanding and developing values consistent with the democratic way of life.
ii. Understanding the Social implication of specific facts and types of behaviour
iii. applying democratic values consistency in judging the desirability of policies and cause of action

iv. Understanding the importance of social actions to further the solution of social problems, and being willing and able to take such action

The above twelve objectives can provide a framework for the development of the instructional Programme intended to be developed in the present study. The list provided by Anderson et al. (1946) is not only more comprehensive but also includes the list given by Srivastava et al. (1990). Thus, the list provided by Anderson et al. (1946) provided the framework for developing the Instructional Programme for the S1 students of Government Secondary Schools in Seychelles, following similar geography curriculum as CBSE in India. The details of the process of selection and further delineation of the understandings for the purpose of the study are given under Chapter IV.

Furthermore, the school is much concerned with ideas, skills, attitudes and values which influence the actual living conditions in both the present and the future. As a result of this, it is but natural the increasing attention is given to learning which is accompanied with understanding, hence learning with functions. In the teaching of Geography, like any other subject, the main aim should go towards the development of understanding. In all the above mentioned advantages, of developing understandings in any school subject, this evenly includes Geography. So there is a great need to develop understandings in Geography which results with meaningful leaning through the processing of information.

2.2 Thinking Process – Meaning and the Need in Teaching

Thinking is totally knowledge, dependent activity, to think, one must think about something. It is an ability which depends on certain fundamental processes such as comparing, ordering, classifying, inferring and predicting. Such processes are considered to have wide applicability and are assumed to be essential to the performance of many intellectual tasks. They, typically, are treated as basic and not divisible into still simple constituents (Nickerson, 1984).
Thinking is not restricted to the cognitive domain alone. It embraces imagination, includes thinking to some purpose, and invites the expression of values, attitudes, feelings, beliefs and aspirations. Thinking is also conceived as processes associated with enquiry, and decision-making (Raths, et al., 1967).

According to Webster’s 20th century Dictionary (2nd Edition), thinking is defined in a number of ways. Firstly: “To bring intellectual faculties into play; to use the mind for arriving at conclusions, making decisions, drawing inferences, etc., to perform any mental operation to reason”. Secondly, to think is: “to judge, to conclude, to decide, to hold as a settled opinion, to believe”.

Thinking is a word that we often use but is not defined precisely but rather described. The reason being on the verb ‘to think’ involving not only cognitive abilities but there are some aspects of values, attitudes, feelings, beliefs and aspiration. Human beings are always thinking and this thinking is mixed with other processes such as feeling, valuing and purposing. In this way, learning can take place and thinking improves when one is inquiring about certain facts, as when one inquires about a fact, it can allow thinking to have some purpose.

To have a purpose in thinking, during that process of thinking then, learning is taking place. It is one way of inquiring for facts. In Kamath’s words, “Teaching thinking has been a fundamental purpose of Education since the time of Ancient Greece. Teachers should not only expose the students to information but also structure the content and activities, so that the students can process the information more effectively and make better and more rational decisions”.

2.3 The use of Inductive Thinking Model in Teaching- Its Advantages in the Learning Process

The ability to analyse information and create concepts is generally regarded as fundamental thinking skills. The work of Hilda Taba (1966) presents Model from the Information Processing Family known as the Inductive Thinking Model. According to Joyce & Weil (2005); ‘The Model has been used in wide variety of curriculum areas and with students of all ages – it is not confined to the sciences’. They further noted that, ‘even if concept learning were not so critical in the development of thought, the organization of information is so fundamental to curriculum areas that Inductive Thinking would be a very important Model for learning and teaching school subjects.
The late curriculum theorist Hilda Taba developed a series of teaching strategies in the line of: (i) proper planning activities and (ii) devising sequential phases to implement the planned activities. The main aim of this Model is to help in developing inductive mental processes, especially the ability to categorize and to use categories. Taba built her approach of thinking processes around three assumptions and according to Joyce & Weil ((1996) they explained the three assumptions as, “(1) thinking can be taught. Teaching means helping the students, through practice, to develop Inductive Thinking ability; (2) Thinking is an active transaction between the individual and the data. This means that the students are presented with sets of data from a particular domain (poems, rocks, countries) They organize the data into conceptual systems, relating points in the data to each other, generalizing from relationships they discover, and making inferences to hypothesize, predict, and explain phenomena; and (3) Processes of thought evolve by a sequence that is “lawful”. Taba postulates that to master certain thinking skills, a person must master certain earlier ones, and this sequence cannot be reversed.”

In applying those assumptions Taba (1966), built a logical series of strategies where she also applied it. The three teaching strategies includes: (1) concept formation (the basic teaching strategy); (2) interpretation of data; and (3) application of principles. In each of those teaching strategies there are sets of overt activities and covert mental operations, with eliciting questions for each activity and operation.

Thus, the Taba Model consists of a series of structured steps that are initiated by the teacher’s questions. The type of question asked by the teacher will determine the type of activity that the students will engage in. So, as the students make progress through the activity selected, they are sequentially involved in the processes of forming generalizations, explanations and predicting inferences. Each of these processes is then utilized in different phases of the Model where the type of process employed is determined by the teacher’s questions.

There are studies which suggest that thinking can be developed while teaching specific content in the classroom by employing certain strategic principles.
A pilot study was reported by Edwards and Marland (1984), which described the classroom thinking in Australian as revealed by stimulated recall of four 11th grade biology students. The lessons were typically teacher-centered with the presence of cameras. The results of the study reinforced the view that stimulated recall offered the best access to students’ thinking. The data generated from the study confirmed the complexity of teaching-learning process. The major outcome identified by the study was the need to focus on the idiosyncratic nature of student learning.

Taba’s work on the evaluation of learning in Social Studies was applied to the evaluation of Religious Studies in secondary schools. The evaluation of students’ leaning depended in Taba’s view, on the interpretation of their answers to questions. Questions therefore became a teaching skill of increased significance and questions could be designed to elicit responses at three main levels of understanding: data, concept and abstraction. Effective evaluation enabled a fair and meaningful evaluation of learning which indicated the pupils’ abilities to transfer their learning into other spheres of intellectual process (Kerry, 1979).

Some proponents of the discovery learning Model were concerned to show that the antecedents of their ideas were clearly evident in the writings of Rousseau, Montessori and Dewey (Travers, 1973). Taba (1963) identified descriptions of discovery learning dating back to 1904. Glasser (1966), claimed that the inductive method (which he associated with discovery learning) was a ‘long standing procedure, recognized in societies for its excellence’, and he quoted Machner (1961) as stating that: ‘through the ages great teachers and great writers had known, intuitively, the principles of inductive teaching’ (Travers, 1973)

Although there are no specific studies to validate the effects of Inductive Thinking Model of teaching, the above literature supports and suggests that information processing Models in general have been effective in the development of thinking in students, and the understanding of the content taught. Moreover, there are certain studies and proponents in the line of discovery learning that supports indirectly the Inductive Thinking Model.
2.4 Process Skills – Justification for Use of Processes of Science in Geography

Geography forms part of Social Science, which is now heading towards a scientific form (Walker 1953). The element of scientific study has taken full control of the study, now considered as a separate science with increased knowledge about people and their environment. Geographers included in the subject, the relationship of man to the climate, relief features, and resources of the world, as well as the facts concerning those things. Science is the composite of three components- a body of knowledge, a method of making enquiry, and an influence on environment and man. Thus the process approach to science can be to some extent applied to Geography as well.

The science processes represent a cognitively active problem-solving environment and the products are often represented to be learnt in a passive reception mode. However, it is possible to develop scientific knowledge through skills and abilities in the use of these processes. Processes and products are both integral parts of science and opportunities should be provided to learn the products and to acquire the processes. Such process skills provide a means for students to solve problems and develop science concepts (Tobin and Capie, 1981).

Romiszowski A., (1986) has identified the cognitive/intellectual skills as ‘productive’ skills as different from ‘reproductive’ skills. He suggests that skills performance in humans varies in terms of a degree of creativity or productive thinking which is involved in the execution. There is a scale on which the skills can be placed, which goes from the totally automated, reflex or ‘reproductive’ type of performance to the highly creative or ‘productive’ type. He defines the skills on the two extremes as follows: ‘Reproductive’ skills are executed in a totally automated manner involving no analytical thinking, planning or evaluation of alternatives. They depend on the application of previously learnt algorithms. On the contrary, ‘productive skills’ are executed in a non-automated manner involving the analysis and evaluation of alternatives and planning of appropriate strategies of problem solving. They depend on the application of previously learnt algorithms. On the contrary, ‘productive skills’ are executed in a non-automated manner involving the analysis and evaluation of alternatives and planning of appropriate strategies of problem solving. They depend on the applications of concept and general principles. Hence science process skills which are intellectual or cognitive in nature rather than physical or interactive can be
considered as ‘productive skills’ rather than ‘reproductive skills’. Like any skill, they must be learned and then practiced until they ultimately become automatic. Generally, learning of any skill would imply passing through all the three phases of skills learning – cognitive phase, fixation phase and autonomous phase, Gagne and Berliner, (1975). The same phases may appear to be meaningful for the learning of process skills.

According to the curriculum project, Science – A Process Approach (SAPA), process skills can be classified as basic process skills and integrated process skills. For the purpose of the study, only some of the basic Science process skills were selected on the basis that the study was conducted on S1 students, and their age ranged from 11 to 14 years, and also only few Process skills was selected from the list to prepare a Process Skills test in Geography. The list below illustrates the eight basic Science process skills.

- Observing
- Classifying
- Measuring
- Communicating
- Inferring
- Predicting
- Using time/space relationships
- Using number relationships

The list of eight process skills is taken from the list of nineteen process skills advocated by the American Association for the Advancement of Science (AAAS) (1965), only four process skills were selected for the purpose of the study, namely; Observation, Classification, Inferring and Predicting. The four process skills selected are described under separate headings below.

(i) Observation

Science begins with the observation of objects and events, their characteristics, properties, differences, similarities, and changes using the five senses. These observations lead to the asking of questions. Crucial to the method of Science is the
ability to ask the right question and to make selected observation relevant to that question. Observations are influenced by past experience, often involved instruments (microscopes, telescopes and oscilloscopes) and require careful recording and description. Surprising or unexpected observations occasionally contribute new and important knowledge.

(ii) Classification

The process of grouping or ordering of information gained through observation according to the similarities or differences in properties is called classification. Starting from simple grouping of data it can extend to the level of classification into minute sub groups. The ability to classify will vary according to the age, maturity and cognitive level of the student.

(iii) Inferring

Observation and data collections are not important in themselves. Inferences based on them are however crucial. The process of formulating assumptions or possible explanations based upon observations depends on the person’s skill of analysis of data.

(iv) Predicting

An inquisitive person attempts to answer the question if…. then?, and proceeds to try out the guessed answer. Answer to this question is important in science. the process of forming an idea of an expected result – not a guess – but a belief of what will occur based on the present knowledge and understandings, observations and inferences is called predicting.

Furthermore, since all the eight process skills mentioned above might not have been adequately developed in the teaching of geography at the secondary level, only those that are likely to have been developed were selected. Hence, in this study, out of eight basic process skills; only four were chosen to construct the Process Skills test in geography. The details of the selection and preparation of the Process Skills test for Geography is explained in Chapter 3 caption 3.6.4.
2.5 The role of Process Skills in the Learning of Geography

The use of Inductive Thinking Skills has of major role in the understanding and development of skills/competencies in the learning of Geography contents. According to the Geographical Association (2005), ‘Geography can be characterised in terms of a combination of interrelated perspectives, which, to varying degrees in different periods, have directed the focus of its research and teaching. These perspectives focus on: the character of places; the relationships between people and environments; the significance of location and spatial patterns, interactions and relationships; and the relevance of place, space and environment for human welfare’. Also, ‘many parts of the Geography curriculum make use of ideas that are distinctively geographical, in the sense that they are closely associated with the geographical perspectives; (i) very general ideas which are relevant to all or most disciplines; and (ii) ideas which have their origin in a related discipline or field of study.

In the teaching of Geography students’ understanding should be at the centre of any strategy aiming to improve the quality of geographical learning and articulating the sort of geographical understanding appropriate for schools, providing that it is supported by a suitable curriculum. Following the discussion with the Geographical Association (2005) comprising of 21 leading members of the Association with direct teaching and other professional experience across all phases in the United Kingdom, they discussed that the drawbacks is mainly, ‘of a curriculum that has been imposed centrally, and is subject to control by inspection and assessment/examination systems. It was considered that, at present, many teachers have little incentive to think for themselves, and are reluctant to innovate because this is perceived to be taking risks with the curriculum’. Thus, ‘geographical understanding in classrooms is facilitated when teachers are sufficiently confident to draw on Geography as a resource. Teachers seem to have become mesmerised by what has to be covered, and have been led away from regarding Geography as a relevant, critical way of thinking about the world’.

This association decided to focus on ‘big ideas’ (or ‘threshold concepts’) in Geography. They thus stated that: “the ‘big ideas’ in Geography are associated with the ‘ability to think geographically’. There is perhaps one overriding idea, which is: ‘understanding place and space through making connections between them’. Many subsidiary ideas could be derived from the one ‘overriding idea’ - places, space and
scale (mapping out physically or mentally), connections, interdependence, environment, people and nature, process and system, sustainability and global citizenship, uneven development, change in space and time, futures, uncertainty. It is emphasised that ‘teachers should ensure that teaching and learning activities help candidates to build up understanding of these concepts throughout the course’. The concepts are to help teachers and students to think about a framework that is more accessible and flexible than a purely content led framework.” (Geography Association, 2005).

The above discussion supports the role that the development of Process Skills has on the learning of Geography, emphasizing on facilitating geographical understandings in the classroom. In order to develop this understanding it is vital that teachers also have the ability to think as well. Moreover, in Geography teaching, there is also the development of skills which involves very specific techniques, and those skills which have much wider application and require knowledge and understanding. These are sometimes described as ‘higher order skills’, including ‘enquiry skills’, ‘intellectual’ or ‘thinking skills’. They include the ability to: (i) comprehend, (ii) interpret, (iii) apply, (iv) analyse, (v) synthesise and (vi) evaluate.

A study conducted by A.M. Rambuda and W.J. Frasier supports the role of process skills in the teaching of Geography. Their study was based on the perceptions of teachers of the application of science process skills in the teaching of Geography in secondary schools in the Free State province, South Africa.

A teachers’ questionnaire on the application of the science process skills in the teaching of Geography was constructed and the questionnaire was content validated against the theoretical assumptions supported by the literature and practical applications of the subject. The questionnaires were distributed to 150 respondents and 71 completed questionnaires were returned for further analysis. The responses to the items of the questionnaire were subjected to a principal component factor analysis and a varimax method of rotation. Two prominent factors were identified and investigated. Factor 1 was labeled "basic science process skills" and reaffirmed teachers' understanding of the basic process skills as autonomous and independent functions. The second factor confirmed the existence of a higher level of advanced and
integrated process skills that build upon the basic or foundational process skills. (A.M. Rambuda, 2004). These results confirmed the researchers’ assumption that respondents could distinguish cognitively between these two very prominent constructs. They were comfortable with the fact that the science processes applicable to the teaching of Geography could be grouped into two main distinctive clusters or factors. The homogeneous clustering of items also emphasized the understanding that the classical science process skills could easily be applied to the teaching of Geography.

2.6 Conceptual Clarity on the Development of Map Skills and its Importance in Teaching

Map is derived from the Latin word ‘Mappa’ meaning ‘a sheet of cloth’ which is the size of a handkerchief. Map Skills develop the students’ ability to master “Map Language”. This is the ability to know the different signs, symbols, colors, directions, and so on, that are used on maps. Once the skills in map language are developed and learnt the students find maps an important and interesting source of information. In the words of (David Lambert, David Balderstone, 2000 p.125), Maps are one of the geographer’s most important tools, providing useful ways of storing and communicating information about people and places. If geography involves the study of the relationships between people and places, then maps helps geographers to present, describe, and explain the spatial information, patterns and processes that they observe in the world around them.

The above authors further explained that, learning to read and to use maps makes an important contribution to the development of graphicacy in children. During their geographical education, pupils should encounter a wide variety of maps drawn for different purposes and at different scales. As geography teachers we need to help our pupils develop and learn how to use the essential map skills. A structured approach involving practice in reading and using a variety of maps can certainly help pupils develop these skills and apply them in different contexts.

By observing the map once they have reached some level of understanding, the students can gather information, infer, generalize, predict and explain for themselves the basic facts given to them of the world. As a result of an understanding of the map skills, this can strengthen their Geography learning. Furthermore the
ability to read maps is not inborn, but the teacher has to direct and help the students to
develop those skills through direct instruction. According to (Weedon, 1997), the
purpose of maps are classified into four main functions. they are listed below.

- location, enabling the user to find a place (e.g. in an atlas, on a street map)
- route-displaying, allowing the user to get from A to B (e.g. a road atlas, underground map or street map)
- storing and displaying information, allowing the user to isolate and sort
information from a wide range of different items (e.g. OS maps or to consider
patterns and relationships of selected information (e.g. distribution maps):
- problem-solving, helping the user to solve problems by interpreting or
inferring form the information provided (e.g. why a road does not take the
most direct route or where to locate a factory). skilled map-users have learnt
to ‘see’ landscape from the information on the map

Important and indispensable as the map is in teaching, it is well to remember,
however, that its interpretation is not without difficulty to young pupils. Its language
seems so strange and it has so much to tell that the child looses himself in the
complexity of the symbol and fails to grasp its full purpose and significance (Walker,
1953, pp64-65).

Thus to enable the student to see beyond the patterns of lines and colours and
to perceive beyond the realities behind the map is therefore one of the great aims of
map study in schools. It is only when this has been attained that he/she will be able to
enjoy the full richness of a map and find the experience with it useful.

Effective Geography learning by students can be achieved through acquiring
Map Skills which will help in developing understandings in Geography through the
necessary learning skills. However, one has to identify and control the effects of
relevant factors in the teaching learning contexts of Geography learning. Such factors
include teacher-related factors, student-related factors, curriculum-related factors, as
well as other contextual factors including the infrastructure and learning resources.
The teacher related factors include the understandings and skills related to Geography
which he or she is imparting students. It also includes understanding and skills of
how to develop the same among students, understandings and skills on how to utilize
various sources in Geography, favourable attitudes towards students and Geography
teaching, interests in Geography teaching and learning. (Felix, 2004)
The student related factors include the development of certain cognitive capabilities for learning of Geography including an aptitude for space relations. It also includes favourable attitudes towards the Geography teacher as well as learning Geography as a subject, interest in Geography learning and suitability of learning styles for Geography learning. The parental socio-economic background, the learning resources provided at home, and so on plays vital roles as well. (Felix, 2004).

In the teaching of Geography, students can bring in their own personal experience and give a greater meaning to and understanding of the subject by ‘living through and experiencing’ the process of learning. On the other hand, teachers should be using appropriate teaching and learning strategies and activities in teaching the contents of the subject. Furthermore in attempting to explain specific processes using those appropriate strategies, Geography can help to place historical events, socio-cultural developments, and economic activities, and their processes in the context of global interrelationships.

In this study The literature related to the importance of developing Map Skills among the students learning Geography is reviewed in Chapter 3, Caption 3.6.3.

### 2.7 Explanation of Key Terms

- **Knowledge and Understandings in Geography**: They are related to the basic understandings intended to be learnt from the units on ‘Population studies, Settlement Studies and Tourism’, of Geography prescribed for the S1 students in the Seychelles Geography Syllabus.

- **Process skills**: They are intellectual skills or capabilities required to analyse information. They are also called the Thinking Skills. Process Skills also include the ability to make observations and, through the use of inference to generalize, to predict and to explain events. Through these processes the learner is able to move beyond memorization of information to the development of more abstract and useful forms of knowledge- facts, concepts and generalizations (Eggen, *et al*, 1979)
• **Competencies in the learning**: It refers to the ability of the learner to demonstrate a composite performance which is based on the acquisition, integration and application of a set of specific skills and knowledge. Competency refers to the level of proficiency in the performance in terms of expected learning outcomes. The expected learning outcomes are described as specific instructional objectives expressed in observable behavioral terms. Competencies in learning Geography include knowledge and understandings, skills, and attitudes which can be inferred from the objectives of the Geography Curriculum of the Seychelles.

• **Instructional Programme**: This is based on Hilda Taba’s Inductive Thinking Model of Teaching. It includes the various Teaching-Learning activities which intend to develop knowledge and understandings, and to develop Process Skills and Map Skills in learning selected units on Geography prescribed for the S1 Term 3 syllabus in Seychelles.

• **Expert experienced teachers**: Refer to the teachers who are recognized as good Geography teachers by students and authorities. They are trained in the field and have acquired experience over the years.

• **Understanding** is a product of experience, ideas and mental processes, and the relationships between them. It, therefore, involves much more than ideas.

• **Ideas** can be expressed verbally in a variety of ways, which include concepts, generalisations, and conceptual structures.

• **Concepts** are of fundamental importance, attention should also be given to other ways of expressing ideas, and especially the relationships between ideas.

• **Achievement in Process Skills** are the scores obtained in the test prepared by the investigator which includes sub scores on observation skill, classification skill, inferring skill, predicting skill, and total scores on all the sub scores.
- **Achievement in Map Skills** are the scores obtained in the test prepared by the investigator which includes sub scores on the different sections, namely, directions, grid references, map scales, map language and colours, map symbols, distribution, inference, and total scores on all the sub scores.

- **Intelligence** is the score obtained in the standardized Raven’s progressive Matrices (RPM) test, constructed by J.C. Raven.

- **Space Relations** is the score obtained in one of the standardized test of the eight tests in the Differential Aptitude Tests (DAT), designed by Bennett, Seashore and Wesman in 1951.

- **Experimental groups** are the students of the S1\(^1\) of school 1 (Belonie Secondary School), and the students of S1\(^4\) of school 2 (Mont Fleuri Secondary School) in Seychelles exposed to the experimental treatment by the investigator. The experimental treatment involved the use of Instructional Programme prepared by the investigator. This Instructional Programme was based on the Inductive Thinking Model of Teaching by Hilda Taba.

- **Parallel groups** are the students from another section of S1 in school 1 (Belonie Secondary School), namely, S1\(^2\); and the students from another section of S1 in school 2 (Mont Fleuri Secondary School), namely, S1\(^1\) in Seychelles exposed to the existing/conventional approach followed by the Geography teacher of the respective school.