The Language of Thinking

UNIVERSITY OF NORTHUMBRIA

Mr. Danny Gendelman

JANUARY 1999

LIST OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1 Preface

This research is being written after four years, during which I, together with colleagues, developed a program for Teaching to Think with The Aid of Games. I shall try, within the framework of this chapter, to examine the development of the program, the way I see it, during the current stage of the project. The objective of this chapter is to enable the reader to understand the philosophy guiding me in structuring the program for Teaching To Think with The Aid of Games, and at a later stage within this dissertation, I intend to evaluate the students' understanding of the objectives of this program. This subject, the students' understanding, shall become the central axis of our research, the reason for this deriving from my need, as an investigating teacher, to analyse the attitude of my main partners in the learning process – the children. In this review, I shall try to examine what has been done, and to lead the reader to understand the stage of the program in which we presently find ourselves. The objective of this research, as shall be presented in Chapter 2 of this dissertation, is "to reflect the understanding of the learners regarding the objectives of the program and to examine reflectively the central subjects that the teacher has to be better acquainted with, according to the understanding and the perception of the learners regarding the Teaching To Think with The Aid of Games Program.

It can be said that my process of working is by triangulating my various perceptions in comparison of those of the learners, so as to acquire a deeper understanding about the gaps existing between the worlds of the children – who, in my opinion are

the best informed about their needs – and mine, the teacher who developed the Teaching To Think with The Aid of Games Program.

This process is at all not an easy one for me, and I do not know in which direction this route shall lead the Teaching To Think Program, or me, personally. On the other hand, I feel that this is a real and important requirement for acquiring a better understanding and for carrying out a thorough investigation regarding possible future development directions.

As mentioned, I shall further on attempt to review the development of the Teaching To Think Program and the objectives of the program, from my point of view, and to share with you my thoughts and feelings as the developer of the program and as a teacher implementing it. Already in this dual definition of my functions, there is an inherent problematic that derives from the fact that these functions are not congruent, and therefore giving rise to situations containing contradictory considerations relating to decision making. This state of changing identities, and at times even of contradictory ones, finds it emphasised expression in this research. I fulfil the functions of researcher, of teacher of the developer of the program, of a thoughtful individual with his own personal inclinations. This state of affairs becomes the source for many difficulties I had to cope with in my research. For example, I cannot always prevent my identity as the developer of the program from taking over my discretion as a researcher – a state of affairs in which I might loose my credibility. In an attempt to cope with this problem, I shall try to be attentive to the different situations in which my various views conflict, and to share with you my emanating dilemmas. Notwithstanding, this situation also contains some benefits by providing an immediate and unmediated trial to the theoretical ideas that I formulate, and in such a manner I alter details, consider the various issues from a

number of angles, adapt them to the reality and come up with new ideas according to the feedback from the students and from my various considerations.

1.2 How Has the Teach To Think through Games Program Developed?

In my childhood, my father taught me to play chess. After a while, I started to learn to play chess on my own (from books) with great interest. The game of chess was, and still is, for me a valuable and important source for the understanding of dynamic processes in life in general, and for a better recognition of my processes of thinking. Moreover, the game of chess is for me a source of great pleasure and a central hobby in my life. About thirteen years ago, I started to teach chess to children. My foremost goal was to award the children the initial experience, which I remembered from my first acquaintance with the game and my love to it.

Later, I would teach them various strategies related to the game, various tricks, etc. During the years of teaching many children, I modified the learning program, became familiar with many subjects related to teaching, and most of all gained practical experience. Five years ago, I stopped and thought about the problems afflicting the chess teaching program, and why were we not able to attract more children to our study courses. These questions led me to the following conclusions:

1. **The game of chess is perceived as a very difficult game to master.**
2. **There was not enough variety in the chess study group and the children commented about it.**
3. **There were other games that children love very much, that require different ways of thinking than the one applied in chess.**

After analysing the situation, I realised that the program had to be revised and I added additional games to the study group, including: Checkers, Four in a Row, and Mini Bridge, but Chess remained the central game.

The new program was tested for about one year in the framework of extra curricular study groups. By the end of that school year, I was offered by the principal of a certain school, to introduce the program during regular school hours. I began teaching, although I had no knowledge about the many differences existing between the regular framework of schooling and the extra curricular one. I searched for a way to define the objectives of the lessons in the new setting and to adapt the contents of the lessons to the classes I taught. (See Appendix : Definition of the 1st Year Program).

The first year was indeed a very innocent and interesting experience, during which I learned from my students at least as much as they learned from me. The students learned something that was not routine, were active in learning about the games, learning the principles of the games, and basic models for decision making and how to avoid making errors (See Appendix about Models). I encountered problems of different standards and in familiarity with the games, in the absorption of new material, of different desires of the learners, disciplinary problems, and of teaching relative large groups (half class size) in which I was inexperienced. I became

familiar with actual problems in teaching and found partial solutions based on my intuition and as a result of conversations I held with the home class teachers in the teachers' lounge. The central problem that I identified that year regarding the contents of the study was that the game of chess taught in that teaching pattern, was unsuitable for being taught in a regular class, but in view of my emotional problems (my great love to the game of chess), I failed to introduce the necessary revisions. A very important conclusion that I was able to reach from this error of mine, is that I had let my emotions to affect my decision making process. This tendency has some benefits, but also some disadvantages – like for example ignoring changes that have to be introduced as required. Examining the program at the end of the first school year, I considered the program to have been a great success, evidenced by the increased demand for teaching hours. In hindsight, I am able to see today the many errors that I had committed Some of them could have been corrected had I acquired a thorough knowledge of the area of education and by a thorough analysis of the process that I had undergone that year.

During the following year, I was joined by a partner and by instructors that taught the program at other locations. There was a need to define more clearly the learning process to the new locations and also to the instructors, that had entered a completely new area. The definition of the program's objectives (See Appendix: Program Objectives for the 2nd Year), derived from the intuitive conclusions from the first year and not from a orderly evaluation process. That year many problems were exposed, deriving from the fact that new instructors taught the program. As I mentioned earlier, my dual position as the developer of the program and as a teacher actually teaching it, caused many problems and all the practical problems that I had succeeded to overcome during my first year, arose again more intensively with the other instructors, although we had thought from the beginning about the

potential problems that might arise and we had prepared an instructor's guide book, that included chapters relating to dealing with disciplinary problems, and practical advice deriving from cognitive and social psychology. During that year, I began reading theoretical literature related to the different problems that arose during the activity, and to try to solve the problems together with the additional instructors.

That year I first felt the sensation that I was chasing after the rapid development process of the program and that I was unable to stop it and to correct the occurring errors. At that time I felt that it was necessary to stop the whole process and to start all over again from the beginning, but obviously reality prevented me from doing it.

During the 3rd school year, the major expression of the conclusions from the activity that was carried out during the 2nd year, was the alteration in the definition from **Thinking Games** to **Learning to Think Through Games**. This was not merely a semantic change, but rather an essential one. The game became the means for imparting thinking processes, various concepts, etc. Actually, we had tried to achieve those values also during the first two years, but the objectives had not been clearly defined and although the effect of the lessons had been partially achieved, it could not be evaluated. I felt, at the time of the change, that it was a significant development of the program, yet nowadays, with more practical experience and after much more reading on subjects like thinking, teaching and games, I am not fully convinced whether the cognitive development that we created in the program, i.e. the clarification of the value that is illustrated to the student by the game through a formal definition, contributes or damages the deeper significance of learning to think through games. This open question is for me a difficult dilemma and I still deliberate extensively about the place of the teacher in the framework of the natural learning processes of the child.

The developments that took place during the 3rd year as a result of the change in the definition were: New training courses provided to the instructors that included conceptualisation techniques, the search for different meanings of processes that take place during games like decision making processes, problem solving, creativity, etc. We also published the first exercise book (See Appendix) and added new games to the curriculum.

The process detailed for the 3rd year, continued also during the 4th year and included the important change of changeover from teaching individual games and the presentation of ideas that could be taught independently through each game, to learning a concept or a pivotal process and its illustration by a variety of games. This change derived from the new concept that placed at the centre place the understanding of the concepts and/ or the processes, and in addition the consideration of the variance among the students. The issue of adapting the program to different students, is indeed one of the central issues that we are confronted with. This is one of the directions that we have to consider if we wish to see the program progressing in additional directions:

a) **How to adapt the learning of thinking through games to the various students?**
b) **Is Learning to Think through games a method that is limited by definition, and will we have to search for additional mediums within the learning processes, that will be appropriate to the variance among the students?**
c) **Whether and how will it be possible to integrate this lesson within the framework of the different studies in the school?**

These questions that derive from the reflective analysis, are not the focal point of my research, but they may arise from the reaction of the students in the course of

the research. The nature of this research, as may be seen from my reflections about these questions, is a new experience for me in an attempt to discover the deeper thoughts of the children regarding the program of Learning to Think through games. During the initial stages, I shall present a number of ideas and dilemmas that perturb me, some of which will become subjects for examination and part shall remain open for personal consideration as deriving from the analysis of the thoughts and the actions of the children. The possible significance of these discoveries, shall become my way of considering and of searching a way to adapt the program to the real and authentic requirements.

1.3 The Socio – Political Background of the Program's Development

In addition to understanding my personal background relating to the development of this program, it is necessary to be acquainted with the reality of the school in which this program developed, and above all the social – political circle in Israel where the various forces that influence the Learn to Think through Games program, operate.

The school where the program started, is known to be the origin of many innovations in the area of education in Israel. The children studying in this school belong to a high social -- economic standard and they enjoy enrichment classes provided by the school in many and varied areas. This school is known for being able to integrate children with special requirements in the regular scholastic system. From the point of view of the school and from the childrens', there was nothing exceptional in my being integrated into the regular school system. My feeling is that this starting point was a very important component in the structuring of the program. Is the situation described regarding this specific school representative of the prevailing education culture in Israel? Regarding this question, it is necessary to increase our understanding regarding the social – political relationships prevailing in Israel. Cohen & Cohen (1996) in their research, examine the attitude towards additional curricula in schools. This is a unique Israeli phenomenon deriving from the fact that there is in Israel no private education, only public one. Due to the gradually increasing pressure applied by the parents for improving the quality of education being provided by the schools, a situation was created in which education, defined as "grey education", has been allowed to be carried out in schools. This "grey education" is neither established nor funded by the Ministry of Education, but nevertheless it is legal and recognised by the official representatives. According to Cohen & Cohen, the argument about the character of the "grey education", which is

usually funded by the students' parents, complicates the attitude of the various official entities towards the issue of education in general in Israel – on one hand, striving for progress and for the improvement of the different education frameworks, compared to a contradictory approach that strives to achieve social equality, even if at the cost of the development of certain parts of the Israeli education system. Indeed we see, at the national level, the conflict between social equality, which is one of the most important official objectives of the State of Israel, compared with the desire of certain portions of the population to develop above and beyond what is officially being provided. The frame work into which I entered (Extracurricular Activity) , became the temporary solution to this national problem. From the aspect of the timing in which I operate, there are various problems that derive from the instability of a temporary framework which is not established or defined in a clear manner (as explained above).

As it can be seen, these problems (See Appendix: Difficulties of the Extracurricular Activities) make it difficult for the program to develop and to achieve stability.

We shall examine now the objectives of the Learn to Think through Games program, according to our own definition. This is the basis from which we shall start to research the understanding of the students of the Learn to Think program.

1.4 The Objectives of the Learn to Think through Games Program

In the framework of the definition of the objectives of the program, it is possible to find the expression of the development processes that were reviewed while trying to adapt the execution of the program to the present reality and to the Israeli culture. We shall now examine the program's objectives at the following levels:

1. Pedagogic – Educational. 2. Social. 3. Moral. 4. Emotional.

1.4.1 Pedagogic – Educational Objectives

- 1 To impart a culture of thinking through games
- 2 To familiarise the learners with thinking processes and to encourage self consciousness: to become acquainted with methods of decision making and of problems solving.
- 3 To provide the ability for transference among different areas of interest: connecting the study subjects to real life and vice versa.

1.4.2 Social Objectives

- 4 To carry out interaction with friends and colleagues.
- 5 To pay attention to all the factors in the reality of the game.
- 6 Development of social initiative and activism.

1.4.3 Moral Objectives

- 7 To respect your fellow person.
- 8 To maintain the law.

1.4.4 Emotional Objectives

- 9 To maintain a reflective process

- 10To acquire the ability to handle difficulties and failures.
- 11To create emotional strength by creating a learning environment adapted to each student.

(See Appendix: The Rationale of this Year)

The objectives creating process is not a static one and we perceive extensive dynamism in the development of the objectives and in the means to achieve them. Within the framework of developing the “credo” of our program, which was created through our execution process, I came across the philosophy of one of the important thinkers of the previous century in the area of educational philosophy – John Dewey (1859 - 1952), who shed light on many ideas in the area of defining the objectives of education, on the dilemmas that are created during the various teaching processes and the attitude towards teaching. I feel that had I been acquainted with his ideas at an earlier stage, it is possible that our activity would have been of higher quality. In his many writings (1933, 1960) the needs of the student as well as the framework rich with real experience find their expression as the central pillars of education. It is my intention to enter deeper into his doctrine and to examine in its light, in a thorough manner, the attitude of the children towards the Learn to Think through Games program, while attempting to analyse which changes to the program have to be implemented to adapt it to the true requirements of the children in the class.

1.5 The Research Question

Let us now halt in the description of our activity in Eshkolot Hashiva and turn to the examination of the objectives of our specific research. **How do children understand the objectives of the lesson of Teaching to Think through Games?**

This question is the central point of this research. This question is not only needed for the theoretical understanding of the point of reference of the children towards this study program, but also for the development of a program better adapted to the children, according to their attitude towards the objectives of the program.

Is, according to the children's point of view, the acquaintance with the game and its study, the central objective of the program ?Is it possible to find among the children's understanding an expression for seeing the world that guides the developers of the program, as we see it (according to the defined objectives)? Is it important that the student shall see the Learn to Think through Games lesson, in the wider context, as we expect them to do? And what is the game's contribution to this process?

These questions that deal with our and the students' attitudes and understanding, lead us to attempt to try and understand the reality in a two dimensional manner and to develop through such a perception, a reflective consciousness towards the significance of the students' understanding.

At the basis of the research question regarding the students' understanding, lies, in my view, a more focal question, whose wording would be: Is it possible to see in the teaching of Learn to Think through Games a transference among games (a close transference) and a transference to other study areas or to other areas of life (a farther transference).

I do not focus my research specifically on this question, because of a number of reasons:

a) My personal feeling that it is necessary, first of all, to study this subject in a more general manner (the students' understanding) but not too general (the students' attitude towards the study program).
b) My fear that focusing on a too defined question may jeopardise the validity of the program by putting it to a too difficult and premature test.

I am aware that in this consideration, a number of problems that I mentioned at the beginning may find their expression:

1. I, as a teacher and as the developer of the program, coming to defend his programs from a premature exposure to questions regarding the essence of the program. The reason for it, in my view, is that by examining the personal process that I am undergoing in my work (the Learn to Think through Games program) and in my present research, I have to develop a certain harmony to prevent conflicts that may lead to my personal imbalance and to the lack of credibility in my research.
2. The concept of validity that I used as part of cause b) above, and taken from the area of positivistic research, stands against the nature of my research. The reason for my introduction of this concept derives from the fact, that the early judgement of many, is based on their reference to the bottom line. This approach is logical in many areas and, in many cases, I also tend to examine issues in this manner, but in education that examines processes, I do not think that the bottom line should be looked for, but the whole process should be examined and to see how do we contribute to the development of the students. Therefore, I do not wish to enter in the scope of this research into the question of validity and the examination of precise subjects, like the question whether it is possible to find expression of the subject of "transference" from the activities of

the students and from their talk about the activity, but to analyse in a more general manner the students' understanding , and from this starting point to turn in the future to the examination of the issues that will arise from these understandings. In view of the above, I shall deal in this research with the question of transference, but in a relative limited manner.

We shall now examine two aspects that in my opinion are a central foundation of the Learn to Think through Games program:

The cognitive aspect – What do the students understand and how do they perceive the objectives of the lesson and the processes that are creating during its course.

The emotional aspect – How do the students feel during the lessons. In my opinion, it is impossible to separate between these two aspects, mainly because of the great interrelationship existing between them.

From these aspects, we shall form the criteria for reference to the students' verbal, written, action and non action attitudes.

The cognitive criterion: How do the students interpret the objectives of the lesson and the attempt to create a thinking culture and an awareness to thinking through games. In this part we shall examine whether a process of transference from the field of one game to other games (local transference) takes place, and to another fields of life (global transference).

The emotional criterion: The various mind games demand a direct coping with demanding emotional situations such as loss, helplessness and other emotionally charged states. We shall have to examine the significance of the various situations and to understand them in a broader context. For example, the attitude towards

failure will lend us a criterion for a cognitive examination of the children's understanding of the reflective process in problems solving.

I do not ignore the fact that this journey of research shall lead us to new provinces and we may have to change many things as a result of the findings that shall derive from a more thorough acquaintance with the children's vision of the world, but nevertheless I am aware of the serious need for taking this step.

1.6 The General Structure of the Research

The children who were chosen to participate in the research process were students of the 3rd and 4th Grade classes of a regular school, located in a central part of the country (we teach children from the 1st to the 8th Grade classes) This decision was taken due to a number of factors:

a) A group of average age.
b) A good acquaintance between myself , the environment and the children.
c) A very positive climate prevailing in the school towards me, and towards the program.
d) The children had been following this program since their 1st grade class.
e) I believe that they represent the development of the understanding of the program in a most thorough manner.

As it may be noted, there are some objectives as well as subjective reasons for my choice. During the research, I shall try to examine the subjective influences and to be attentive to their effects on the research.

The research shall be composed of five main parts:

1.6.1 Theoretical Review

In this part we shall examine the reference in the literature (education, psychological and philosophical) to the central circles of our research –

How do the children relate to learning to think through games.

We shall examine the following concepts:

Thinking and its instruction: In this part we shall examine the objectives of instruction of thinking in elementary schools.

The game and its significance: in the children's learning process.

The students' understandings: How do they understand the objectives of the subject under consideration.

Teaching towards transference: we shall examine the concept of transference and how is it seen in the instruction of thinking.

Connecting between these circles will provide us with the basis from which we shall start our research and shall seek a way to evaluate the actions taken.

1.6.2 Methodology

In this section I shall elaborate on the method of research, that is based on qualitative action research. We shall examine the research methods and shall provide the explanation for the choice of the stages and of the research tools. We shall also structure different categories for the evaluation of the research. A discussion about the ethical problems that may arise and have actually arisen, shall take place and we shall review the processes that have taken place during the research.

1.6.3 The Presentation of the Research

I have decided to present the various categories of the research in a separate chapter, due to the extensive problematic that I feel as being the result of my many functions in the course of this research. I therefore found it to be correct to present the data to the reader in an orderly fashion according to the categories and only at a later stage to carry out the significance analysis according to my perception.

1.6.4 Research' Analysis

In this section, we shall analyse the significance of the research data. During the analysis, I shall try to explain the significance of the processes according to my point of view and to expose the dilemmas that arise from the content.

1.6.5 Plans for the Future & Summary

The final part shall be a summary and I shall try to examine in it the future directions for development, as a result of this research.

We shall now embark on the long road of our research. This is, for me, a trying process, because of the need to focus on some elements and to deliberately ignore others. I am not accustomed to do so and at times when I approach any subject in a manner other than holistic, I loose the meaning of the whole point I am trying to convey. On the other hand, I am aware that I am not able to reach true profoundness in the subject being discussed, unless I break it down into smaller units. I shall therefore do my best to convey the message of this research without straying off needlessly.

CHAPTER 2: LITERARY REVIEW

2.1 General

This chapter deals with the theoretical research of the extensive knowledge that has been accumulated in the professional literature. I chose to focus on the four main subjects, that, in my opinion, cover my attempt to better understand the manner in which the students understand the question – What are the objectives of the thinking games lessons?

The chosen subjects are:

1. Thinking and its instruction – in reference to the study of thinking processes at schools.
2. The game and its significance to the students.
3. The students' expressions of understanding.
4. Transference and its instruction in education.

The combination of all these subjects shall enable us to examine at a higher standard of quality the various expressions of the research data, in comparison to the knowledge available from the theoretical sources.

We shall now examine the reason for choosing each of these categories for this review:

1. **Thinking and its Instruction --**

> *" At a time when the concept of knowledge, undergoes numerous changes and we no longer see knowledge as absolute, finite and valuable in itself, when knowledge is not the goal of the educational process, the education towards a thinking culture is one of the greater pillars of education. " (Harpaz, 1995.)*

We shall review this process and see how we may examine the goals of the program from the point of view of the students. This review is composed of two parts: The subject of daily (reflexive) human thinking, its advantages and disadvantages (Perkins & Swartz, 1992), in comparison to the reflective observation that requires the thinker to be aware of the process s/he experiences and to search for the dynamic changes which this observation calls for.

2. **The game and its significance to the students** – In the scope of our study program, the game serves as a central tool for the imparting of concepts related to the thinking culture. We shall explore the ideas that appear in the literature from the philosophical, psychological, social and pedagogic aspects. We shall look for the meaning of the game to the students, as theory sees it and as they themselves see it. We shall try to pinpoint the pluses and the minuses of using the game as a tool for teaching conceptual ideas in schools.

3. **The students' expressions of understanding** – This sections concentrates on the understanding of the program's objectives as expressed by the actions (practical knowledge) and by talking about the understanding (declared

knowledge), by the students. We shall also try to determine the level of knowledge which Vygotzky defines as “the reflective awareness which is based on thinking rather than on daily understanding and knowledge.” (Strauss, 1996)

4. **Transference and its instruction in education** – This is the theoretical super foundation of the student’s cognitive comprehension of the program for teaching to think through games. The principal objective includes:

> *The acquisition of knowledge in one context and its application in other contexts.*
>
> *The application of strategies and of thinking tendencies in many different contexts.*
>
> *Linkage of apparently divergent fields and understanding the contribution of one field to another. (Tishman, Perkins & Jay, 1996)*

The ability to transfer knowledge acquired by the students in our lessons, is in my opinion, the most important indicator for the cognitive examination of the program.

The combination of the above four elements, will give us the theoretical background of the process, the objectives and the tools that are included in our research. In the methodology and research part that shall be presented in the following chapter, we shall examine our way in this research for the purpose of exploring the main question of the research and its implications. We shall try to form reference categories from the search after the students' understanding of the different meanings of the instruction of thinking. These categories will be established on the basis of the students' conceptual and practical worlds (declared knowledge and practical knowledge, according the D. Schon's taxonomies.(Strauss, 1996).

2.2 Thinking and its Instruction

I found this section of the work quite confusing and had to rewrite it several times. The reason for my confusion was that I felt that this is for me, in fact, the most important part, in my daily work as well as regarding my present research, and therefore I wanted to convey an important and accurate message. I read a lot of material for this part but I still feel that I have been unable to digest all the messages presented by the main persons active in instructing the culture of thinking in schools. The main stream that influenced me on this subject was the Harvard University's Project Zero, USA, which deals with research on thinking and its instruction in the education system.

What is this section composed of? This question demands the consideration of the concept of thinking by itself, of instruction in a more general manner and the combination of thinking with its instruction. What composes human thinking ? Regarding this issue, there are various approaches. It is not our prerogative to

express our opinion regarding what is correct and what is incorrect, but it is possible to indicate a number of approaches used for defining thinking:

1. **Conceptualisation** – the meaning of words and of thinking. A true representative of this approach is Vygotsky (1978; 1962).
2. **Solution of problems** – the approach that defines thinking as a way to solve problems (Dewey, 1933; Dankner, 1945; Elshout, 1985; Nevo, 1997). Problem solving is linked to all the mental tests and this obviously included also all the intelligence examinations, because all examinations are in a certain way problem solving. (Nevo, 1997).
3. **Decision making** – which I see as a sub - group of problem solving (Bruner, 1956; Sternberg & Wil, 1980)
4. **Censorious thinking** – the ability to direct our thoughts to criticism and to modify it as a result of the output of the processes of censorious thinking, are a major part of human intelligence. (Binet & Simon, 1905) Contemporary theoreticians (Sternberg, 1985; Perkins, 1995) have emphasised the key role of mental self control and self regulation in intelligence (Perkins, Tishman, & Jay, 1996).
5. **Creative thinking** – In my opinion, this is the complementary part of censorious thinking, in terms of the continuity of conscious thought (To convey this idea to my students, I give the example of the acceleration and the braking pedals in my car, and their interrelationships). Many researchers of thinking have dealt with the subject of creative thinking, and it is possible to mention the special approach and the creative workshops of De Bono (1995), and the theory of creative thinking investment of Sternberg & Lobert, (1996) Perkins, Swartz, Gardner and others.

What is then my greatest difficulty in the presentation of the main theories that are connected to thinking and its instruction? I feel, after deep consideration, that I

have to maintain a very difficult separation among my three parallel selves, that are simultaneously active: I as a teacher and as the developer of the Thinking through Games program, I the researcher and my study, and I as an independent thinking human being. Each of these selves will direct the investigation in a different manner, for example: the teacher will search in the theoretical material the justification for his professional practice, as an independent thinking human being I shall try to direct the investigation to the way I am aware I think, but my objective here in this chapter should be to present the subject as a researcher so as to achieve the research objective, and this is what I shall try to carry out.

2.2.1 Defining the Objectives of Learning to Think and its Instruction

In order to investigate the understandings of the students, we should first make a censorious examination of the objectives of the instruction of thinking in schools. We shall try to continue and expand our comprehension of the five elements of thinking – conceptualisation, problems solving, decision making, creative thinking and censorious thinking (Kaspi, 1973), in an attempt to find guiding criteria for our research, that will serve as the basis for searching for the significance of the comprehension of the students.

2.2.2 The Ability to Develop Conceptualisation

Any conscious idea of a person is transmitted in the language that describes his thoughts and ideas. As best described by Vygotsky :

> *"The relationship of thought and word is a living process; thought is born through words. A word without thought is a dead entity, and a thought unexpressed in words, remains but a shadow" (1962).*

With words we try to convey messages. A theoretical idea can be illustrated by an example, as the one I shall try to demonstrate now: I am trying to convey an idea to the reader by writing this sentence. If I am successful in expressing my understanding in a clear manner, and I defined my thoughts using the correct words, I will have a greater chance that the reader will understand the idea that I attempted to convey. Within the processing of this idea, there are numerous stages and something might become distorted. In our example, the various stages are:

1. Transforming an idea of mine into a defined concept, comprehensible by others.
2. From a worded and defined concept in my mind, into a written concept.

3. Translating the defined, written concept from Hebrew to English.
4. Receiving feedback in English, which in turn will be translated into Hebrew and back into English.

There is a danger that during the above process, a technical or conceptual error might occur in the conveying and the understanding of my idea.

We may obviously apply this example to the educational process, whose objective is to convey processes composed of reception, processing and output (Feuerstein, Feuerstein & Shor, 1997). In this research, we examine the significance of this objective and how is it being understood by the students. What do we do to achieve the objective of developing a thinking culture through language? We **teach in the classroom the language of thinking**, to achieve the following objectives:

1. **Helping the students in the organisation and the description of their thinking.**
2. **The development of the ability to accurately convey messages**. In order to achieve this objective, it is necessary to demonstrate (see Appendix: Selected "words of thought"), to explain to promote interaction amongst the students and to provide positive feedback for making use of the thinking language in the classroom (Tishman, Perkins & Jay, 1966). We have now presented the objectives and the tools for developing a culture of though by using a language of though. It is difficult to separate the ability to conceptualise (the verbal expression) and the thought itself. Personally, I was not so aware of this part in the teaching of thinking before carrying out this analysis, and I surely have not paid enough attention to it during my lessons. I therefore foresee difficulties in the expression of the language of thought by the students. The question being put to the teas is **how do the students comprehend the meaning if the conceptualisation and the word in the framework of their own thinking?** To

understand this, we shall search for other techniques, in addition to the use of words (association games, songs for clarification of the location of the word within the cognitive set - up, this subject being expanded in the chapter on methodology). I shall also search for the meaning expressed by the indirect activity of the students.

3. The representation of ideas and elevating tacit knowledge to the level of awareness. We may illustrate this idea of natural understanding and the attempt to develop it together with the students, by looking at the development of artificial intelligence. This comparison teaches us that human competencies contain common sense, that enables the understanding of the language in the appropriate context, in spite of the many meanings and forms. A well known example from the fields of artificial intelligence (that illustrates in a negative manner our need for providing the students with skills for logic judgement), is the translation of the following sentence from English to Russian and back into English: “The spirit is willing but the flesh is weak” becomes “The vodka is good but the meat is rotten” (Nevo, 1997). This example illustrates that learning a language is not a technical matter, and the need to convey the human logic through language requires to **emphasise the significance of the word and its representation.** The function of the teacher is to provide many opportunities for this to take place and to create ample space for the understanding of the thinking through the spoken language.

2.2.3 Awarding Reflective Skills for Problem Solving

Some see problem solving as the major aspect of thinking (Nevo, 1997; Elshout, 1985). Problem solving is related to all the mental tests, including of course all the intelligence tests, since all tests are to a certain extent problem solving (Nevo, 1997). What are the various stages of the problems solving process?

For this analysis, I have chosen to present five distinctive stages of methods of solving human problems in a reflective manner, based on an analysis made by Dewey (1993). I chose this particular paradigm out from a great selection of approaches to problems solving as it is appropriate to the nature of my research and to my personal character as a problems solver. I am certainly aware that there are various approaches to the issue of problems solving, and I do not want to express any opinion either confirming or refuting them Following the presentation of the model, we shall confront the question of how we evaluate the process of conferring reflective thinking in problems solving. And how do we manage to understand the students' comprehension.

The five phases of reflective thinking (Dewey)

1. ***Suggestion*** – We may say that thinking is an activity directed towards itself, examining its objectives, conditions, means, sources of assistance and obstacles confronting it. A suggestion of a solution of a problem is a kind of substitute for action or pre action. In case there is only one suggestion, and we do not doubt it, then we would act. When two or more suggestions are involved, we need to consider carefully all the variables prior to making a choice.
2. ***Intellectualisation*** – In reality, a problem is in a way a task that has to be executed. To begin with, we do not face a situation on one hand and a problem on the other hand, least of all a problem without a specific situation. There is a situation that is disturbing, uncomfortable, bothering, problematic – if we may say so. Had we known what the difficulty would be and its origin, the role of reflective thinking would have been much simpler. As people say: "A question well put is half the solution". In fact, we recognise the problem to its full extent, only once we have solved it. Any occasion that stimulates reflective thinking, requires intellectualisation.
3. ***The guiding concept (the assumption)*** – The first suggestion appears as from itself. We have no direct control over its appearance. The appearance of the idea does not contain any intellectual factor. The intellectual element "lies" with what is being done with the idea, how we make use of it, once it has popped up. A controlled use of the idea, is possible in the described fashion – once we isolate the difficulty (by stating it in factual terms), we get a better idea of the solution being sought after. The facts or the data, present us with the problem, the insight leads us to a correction, modification and expansion of the suggestion into a defined assumption or to a more technical wording of the assumption.

4. ***Inferring (in a limited sense)*** – Observations supply us with the existing knowledge and they provide us with the facts. The facts are the basis for ideas and assumptions that undergo repeated investigations as to their value as possible solutions. The ideas rise in our mind and may undergo there significant development. An experienced and knowledgeable mind is able to formulate a productive suggestion into a completely different idea than the one it initially had.
5. ***Testing an assumption through action*** – The concluding phase is a test done through open action, aiming at authorising the experiment or verifying an assumption. A person who is accustomed to reflective thinking, has the advantage that a failure is not considered as a mere failure, but as an instructive failure. The real thinker learns from his failures the same manner he learns from his successes. A failure resulting after orderly thinking, rather than blind groping, directs the person how to carry out his future observations. Sometimes a failure raises a new problem, and sometimes it helps to define or to clarify the given problem. Nothing is more beneficial for the practised thinker, than the use he makes of his errors and mistakes. (Adapted from Dewey, 1933)

The expression of the reflective process above described by Dewey is not easy to be conveyed to the students. It is not an technical instruction in the usual sense. In my opinion, this method is a way of life that consists of thoroughness and a desire to improve on every conscious action, with an ability to make constant changes, even fundamental ones, in our life. Schon (1988) (from Silberstein, 1998) sees the openness to surprising experiences and the ability to be surprised, as the first and opening step in the process of acquiring reflective skills. We find in Silberstein (1998) an additional source detailing the difficulty in teaching reflective skills:

"It is not the reflective activity that usually characterises the state of the human being, but the purposeful activity which turns towards the outer world striving to achieve results".

Therefore, when we come to teach the process of reflective thinking, it is at all not easy. We must believe in it wholeheartedly and actually apply it in our lives. It is also necessary to manifest daily during our work in the classroom.

How can we test the progress of the students and their understanding of the skill of solving problems by a reflective manner? In fact, my feeling is that it is possible to find a way the evaluates the comprehension of the reflective idea, at the emotional level: that means **the issue of the attitude towards failure in any action, is one of the criteria for understanding the way the student thinks**. We see this in the fifth phase of Dewey's model, that contains a comprehensive explanation about the nature of failure in reflective activity (1933). An additional factor that might serve as a criterion for checking the student's comprehension of the reflective process for problem solving, is **the attitude towards the different stages in the process of problem solving**. We may examine this point by talking about the action on a meta - cognitive level, and through the examination of the student's actions.

2.2.4 Awarding Decision Making Skills

At first, the subject of decision making seemed to me as being a branch of the problems solving skills, as making a decision = solving a problem! After extensive deliberation on this subject, I reached the conclusion that these concepts should not be combined, and that it is necessary to consider decision making skills, separately. The reason for that derives from a number of factors:

1. The practical importance of the subject of decision making, in our life. This reason ways heavily in many of my decisions in the field of educational action, because of the importance I award to imparting skills of life in the scope of the instruction of thinking.
2. If we consider decision making as a crucial stage in solving the problem, then this is the most important stage and it is entitled to extensive analysis and comprehension, and therefore the subject of decision making is awarded a complete analysis.

What constitutes our decision making processes? According to Perkins & Swartz (1992), there are two kinds of thinking for decision making. The first kind is reflexive but not reflective thinking. In most of our daily situations, that we encounter, we apply reflexive but not reflective thinking, that contributes to rapid decision making , saving time and efforts. The characteristics of reflexive thinking is that we deal with known patterned activities, from a content area that is well known to us. It is easy to draw our knowledge from the memory and to act rapidly for reaching a decision. We can see an example of the above, when we enter our car and we start to drive. The pattern of the activities and the field of content, are familiar to us, and we therefore do not carry out a lengthy decision making process. The advantages of reflexive thinking become its disadvantages, in cases in which we need to make careful consideration and thorough thinking about non trivial decisions: hastiness, one - dimensionalism, lack of clarity, are according to Perkins & Swartz, the typical pitfalls to human thinking. How then, may we change that into the development of reflective decision making skills? Their suggestion for solving this issue is to use thought organisers: proverbs, (haste is from the devil), concepts and analytical terms (questions focusing the search for the definition of the proof, etc.). Another

solution suggested by Nevo (1997), examines the representation of data in the appropriate forms for the problem, in order to formulate a strategy of decision making. Various strategies for decision making, are known to us, from the extensive material that has been collected (Perkins, Goodrich, Tishman & Owen, 1994; Tishman, Perkins & Jay, 1996). The general definition of the term “strategy” is important to us, to enable us to try to understand what is in fact the common denominator to all the decision making strategies in a variety of circumstances (see Appendix from “Education towards thinking, page 8).

With regards to our research, this subject of general decision making strategies is a source for the examination of the general comprehension of the students. We shall investigate this in various content situations, where similar decisions have to be made and by the reference to the expressions of the different students regarding the issue of decision making. We shall try to check both states of decision making – reflexive and reflective.

2.2.5 Conveying the Awareness for Censorious & Creative Thinking

I combined the analysis of the creative and the censorious thinking into one category. The reason being my personal understanding that these cannot be separated: An example that I developed and that I usually present to the classes regarding the interrelationship between them, is the manner the acceleration and the brake pedals of a car function. It is impossible to drive a car without either of these two components, and in a similar manner, creative thinking functions as the acceleration pedal and censorious thinking as the braking pedal. We shall initially define the terms of censorious and creative thinking.

Censorious thinking

Many have defined censorious thinking (Anis, 1962; De Bono, 1993; Swartz, 1995; Paul, 1987) as the part in which we test the validity of the issues in the logical and the practical contexts, meaning the matching of the facts to the context in which they find themselves. Censorious thinking consists of evaluation and judgement of factual matters, as well as scientific and technical issues and matters of opinion. Paul, (1987) claims that one must create a justified judgement. Important issues may be comprehended from several points of view, or from different frames of reference. Without the development of censorious thinking, in a set-up of open discussion, censorious thinking will become an additional tool of rationalisation of prejudices and to self persuasion about the correctness of the personal opinion.

We shall attempt to examine the place of censorious thinking in the analysis of children, as a part of our attempt to comprehend how they understand the importance of this subject in the framework of their function as thinking persons.

Creative thinking

Creative thinking complements censorious thinking. What is that skill that enables the creation of new, original and special things? There is no complete agreement on the definition of the term creativity. Taylor (1988) who dealt with the research of creativity since the 60s, found more than 60 different definitions for the term creativity. We may examine creativity according to Persons (1971) division, in three dimensions:

1. Definitions related to the creative process, whose existence may only be confirmed by its product (the process is not a tangible one). It is also possible to claim that this process is different from daily thinking. For comprehending this process, it is possible to consider Sternberg & Lobert (1996; 1991) theory of

investment, that defined the creative process as the acquisition of an idea of low value, to reprocess it and to selling it at higher price (similar to a financial investment).

2. Definitions related to the creator. What are the inter personal differences, what are the qualities of the creative person (Gardner, 1994; from Education of Thinking, 1995).
3. Definitions related to the product. These definitions emphasise the actual materialisation of the idea, mainly the fact that the product is an innovation, and it being different from the presently existing ones.

Simontson (1988) called the three groups of definition as the three P's: Process, Person, Product, and went on to add an additional defining dimension: Persuasion, that relates to the effect that creative people and products have on the society and on the culture. (Adapted from Nevo, 1997).

From these four dimensions, we shall establish categories for the examination of creativity and the reference of students in our research: reference to the process, to the difference among the students and their creations, the products that the students produce, and the extent of persuasion that creativity has on the educational process and on the climate in our classrooms.

Why did I choose to combine the contents of creative and censorious thinking in the classroom and in this review, and how may the students interpret this interconnection? According to various approaches, we may find that indeed separate instruction of creative thinking and censorious thinking are possible, but it looses from the power and the shared significance of creativity (that motivates and promotes) and criticism (that analysis the quality and the direction of progress). We encounter this at De Bono (1993), Swartz (1995) Perkins (1990) as well as in many

other sources. De Bono expresses very nicely the connection that is presented by all the others, in a variety of forms:

> *" Censorious thinking is valuable if one operates creative thinking as well. There is no point in reins if there is no horse." (1993)*

In my opinion, we may examine the different understandings of the students regarding creative and censorious thinking by their processes of activities and by their descriptions (especially the written ones). We shall try to examine the outcome of the students' creativity and the description of the process that accompanies it, including the censorious thinking that followed the process.

2.2.6 Summary – Thinking and its Instruction

To conclude and summarise this section that dealt with a short examination of the instruction of thinking and its significance in my personal learning process and as apart of an attempt to develop through the use of this section, criteria for our research, I shall try to indicate the criteria that arose from my analysis.

The development of the ability to use language for expressing thinking:

The categories that may be analysed according to the development of the thinking language are from the development of expression skills:

1. From actions – the description of the students' activity and the analysis of their ability of making use of the language.
2. The students' verbal reflective ability.
3. The students documented reflective ability - in writing.

Development of competencies of problem solving in a reflexive manner.

The categories to be examined in this part are intended to analyse the children's comprehension in an indirect manner. I believe that the more thorough the children understand the reflective process for problem solving, their attitude towards loss and failure will become more mature. This assumption is expressed in a theoretical manner in Dewey's (1933) descriptions, but I do not know how the integration of the children's feelings and their cognitive recognition, may find their expression.

The children's attitudes to losses and to failures as a means to understanding the reflective process:

1. An extreme emotional reaction – indifference or r alternatively a "strong" emotional reaction (crying, refusal to try again) demonstrate lack of understanding of the reflective process that involves experiencing.
2. A balanced emotional reaction – including reference to the intrinsic and extrinsic reasons for failure and a search for the significance for the future, shall demonstrate a process of understanding the reflective process and the place of personal experience.

Decision making

We have two forms of decision making: 1. Reflexive – by which we function under regular conditions, and 2. Reflective – that is composed of an orderly process of analysing the situation, consideration of the options and an orderly choice of the alternative that seems to us to be the more correct one. We shall analyse various situations in which the students have to make decisions in games and look at the way they make them. According to these conditions, we shall try to see how do children analyse the situations in which they find themselves, and what is the strategy (if at all implemented) which they apply for decision making.

Censorious & creative thinking

We shall analyse the process the children underwent while creating new knowledge, and we shall see their attitude to the creative and the censorious parts. The criteria that we shall attempt to find in our search are:

1. Use of language that demonstrates censorious analysis.
2. Identifying patterns of creativity in children, while in a process of creating games.
3. The integration of creative and censorious thinking.

All these criteria that came up in this analysis, serve as the basis for many studies. At this stage, I still do not know which of the criteria will find its expression in this present research, and which shall be dropped. The process in which I presently am, is one of entering various materials (after having undergone initial processing) into a kind of funnel in which we shall try to combine them into a new material, that will become the theoretical framework of the research. In addition to that, I feel that were I to stop my research at this point, I would feel that I achieved already very much. The processing of the material, the analysis of the professional literature and the exposure to such extensive knowledge, contribute to my comprehension

and to my personal awareness regarding many processes that I underwent but was not aware of them. It is clear to me that would I have known even only a part of this material, it would have been necessary to introduce many changes in my programs and to ask essential questions regarding the change of objectives and the means to achieve them. I am writing this during an intermediate interval, and it is logical that after further progress, we shall encounter additional issues and we shall have to think how to change again. This process is very thorough from the aspect of comprehension but nevertheless it demands extensive emotional forces and the ability to change (which I do not always have).

2.3 The Game as an Educational Tool

"Not out of obligation shall the youth learn, but out of play." (Plato)

One day, on my way to a meeting, I saw a sign advertising a kindergarten: "For us, education is not a children's game" , and I thought that for us exactly the opposite is true! In the following pages, we shall examine the meaning of play in education and how several philosophers saw the game as a tool to train man and animals in their process of achieving maturity (Gross, 1896), what are the values added to play and may it help the student in his process of development. We will also look at the significance of games in economy, computer sciences and in the understanding of human thinking processes.

2.3.1 Definition of the Term – Game/ Play

A central issue that we shall examine in our research is the significance of the action of playing, as it finds its expression from the point of view of the children – whether there is any differentiation between the reality of the play and the reality in which the child finds itself during the playing process.

The definition of the term game/ play – the meaning of the game and its value were discussed and researched throughout history. Many definitions and different criteria were awarded also to the significance of the term game. The first problem that I encounter is the translation of the word from Hebrew to English --, whether to translate the term as Game or as Play, as both are the same in Hebrew. As I understand it, we shall call it Play whenever we refer to the process, and whenever we shall be referring to the tool with what we shall be playing, we shall call it Game.

Following is an analysis of play according to the socio - psychological approach:

1. The game has a frame that defines it, in which the internal reality precedes and takes over the external one. Therefore in a game, new meaning can be

bestowed on objects, and actions within a game can be performed differently than out of it. The state of **as if**, enables us to ignore limitations of here and now, and to experience new, and sometimes otherwise impossible, situations.

2. The motivation for the game is **intrinsic**, that is, derives from the individual and the activity is done for its own sake.

3. In a state of play, the player's attention is focused on the activity itself rather than on its objectives. The lack of obligations to fulfil a purpose and the fact that the activity itself is more important than its output, allows for a state of freedom and for experiencing different variations of the activity. In this manner, the framework of the game allows greater flexibility, compared to situations in which the behaviour is intended to achieve objectives.

4. Playful situations are usually accompanied by positive emotions. That is, the process of playing is an enjoyable and attractive one, for the player. Even when there is an element of suspense or fear involved in the game, there seems to be also an element of pleasure, as the player repeats the experience again and again.

5. Free choice is an essential factor in the perception of a situation as a game, especially when speaking of young children. As they get older, the relevance of this factor in the definition of play, seems to diminish. (Fein & Van der Berg, 1983)

Two other factors are, according to Robin Fein et. al, not imperative, but in our context, they are of pre-eminent importance: liberty from external rules and active participation of the players. As can be seen, the definition of play includes many valuable moral and educational elements. In addition to this definition, this section

explores different references to play, as provided by different philosophers relating to different fields: the cognitive, the psychological, the social and the moral. Obviously many philosophers analysed the term “play” (see Appendix: From Akavia 10 - 13). I wish to analyse some of the definitions, not because I refute or do not agree with the philosophers’ definitions, but because I wish to focus on the significance of the game in an educational – instructional context, as I do in my program. I shall analyse the different definitions and concepts that are of interest to me for developing the program of learning through play.

Game

1. For self fulfilment and empowering (A. Adler)
2. A form of labour that satisfies: labour, thinking, realistic art, imagination and relaxation. (Arkin)
3. Having pleasure from the activity itself. (K. Bihler)
4. The natural way in which the child can learn to overcome difficulties in life. (H. Bristol)
5. Instinctive training without serious intent to carry out actions that may be important in the future. (K. Gross)
6. An safety valve for emotions. (A. Dulles)
7. For the child, the play is growth, the intensification of life and its improvement; for the mature person – renewal and recreation of life (Joseph Lee)
8. A tool for creating the child’s correct attitude towards reality (Florina)
9. The most spiritual and purest activity of the human being at his level of development . (F. Farbel). (From Akavia, 1977)

Among these different definitions, we see that there is reference to a number of central motives, that are of special importance to me within the educational process: **the pleasure derived from the activity itself, the play for the child is growth, a means to create in the child a correct attitude towards reality**. We see the matching of these qualities with those of Dewey's philosophy, that saw the validity of education in present action, expressed by

> *"each person must first try out in a game or at work, to do something with matter, in order to carry out his impulsive action, and to later see the interaction of both forces, his own power and the power of the material he used." (Dewey, 1960)*

We also see the important psychological aspect: for self fulfilment and for empowerment, an emotional safety valve, the ability to smoothen the violent instinct and to channel it into war games (chess for example). My personal opinion is that the potential of the game in education for the instruction of thinking and for personal awareness programs, has not been fully exploited, and it is possible that it is necessary to try to examine the effect of playful activity on other areas.

2.3.2 Various Theories – The Value of the Game

A number of theories have been proposed for explaining the value of the game, its importance and its place in the development of the human race. We shall examine here a number of different approaches and their contribution to the educational process of the student.

The Game as a Tool for Exercising and for Illustrating Processes (Simulation)

At the close of the 19th century, the German philosopher K. Gross published two notable books – The Games of Animals (1896) and The Games of Man" (1899). According to the theory Gross developed in these books, it is possible to see the game as being among others the tool for training and developing highly evolved animals as well as human beings:

a) The game is extremely valuable in the training of the youth (this is also the reason why childhood of humans is so prolonged). "Animals and children do not play because they are young, but because childhood had been awarded to them, for them to play". This statement served as the basis to many circles of educators, who studied the importance of the game in the educational process.
b) The play is what assists the child to develop his physical and spiritual competencies towards his future life; it also instructs him in social activity, discipline, obeying laws and leadership, etc. The life of play is important and real to him, the same as the life of work will be serious and real for him, once he grows up (Gross, 1899)

And indeed, when coming to analyse the physical game as training the body, we surely see in all the education systems the recognition of the high value in strengthening the body, the co-ordination and additional values that are imparted through various games of sports. And the question is asked: Is it not possible to make a similar use of the game to train our thinking skills? In our present society, maturity find its expression in the ability to think and to implement it at the highest levels, and therefore it is necessary to discover how to adapt the values being taught to the most appropriate means for it.

Play as an Outlet

As opposed to Gross, some philosophers like Hall (1920, Tollman (1932) and others, see the play as an outlet for extra energy. It is seen also in Animals, those that are not engaged in their fight for survival, that the play is for them a similar tool for letting out extra energies (see Appendix: Akavia, p. 16). We see indeed that this theory that is also called the Extra Energy Theory and the Spencer Shiller Theory" is most relevant to games that require physical activity.

The Psycho - Analytical Approach to Play

When examining the significance of play and its value from the psycho analytical aspect, we see that also Freud (1905; 1920), Klein (1929), Erikson (1902) and Adler, see play as an expression of the emotional processes of the child and of the mature person, and a way for expressing requests and conflicts, of which the child is unaware of. Freud described the maintenance of the connection with reality during play, by explaining that the child processes unpleasant experiences and changes the circumstances, for example from a fearful and passive victim to an active and leading role during the play. Regarding the motif of repetition, Freud offered two reasons: analogy of traumatic experiences and reliving enjoyable ones (Glatt, 1997). Other theoreticians have explained the role of play as an experience that enables to lessen anxieties and to create an illusion of having control over the situation. Erikson also added that play is also a tool to acquire control and to develop physical and social competencies. Adler expresses his opinion, that play has a future significance, qualities being developed by the child are discovered and developed in play, like leadership, passivity, initiative etc. and through the play it is possible to examine these future qualities and to develop them.

The psycho analytical and the psycho sociological analysis may obviously be widened, but in the framework of this research, we shall not further focus on these processes. I shall only mention that it is necessary to be aware of the strong connection between play in general and games that are involved in thinking and in self awareness, and psychology and psychiatry. In the framework of games that children play in the classroom, there are emotional processes that the children undergo, that include: coping with difficulties, self examination, fear of failure. We shall, in the part about analysis, examine this subject, that becomes one of my main centres of conflicts as a teacher (and perhaps also to teachers in general).

The Philosophical Approach to Play

In his classic “Man - Player”, Johan Huizinge presents interesting approaches to the meaning of play to humans. Reviewing chess, checkers and bridge, he expresses a negative attitude to the meaning of these games in our culture, and claims that “it is but a futile ability, that sharpens the spirit in one sided manner, but does not enrich the soul. It enslaves and devours much wisdom and mental tension which have other much exalted uses...a man does not truly play, unless he reverts to being a child when he plays. If this element is missing, the essence of the game is missing.” (Huizinge, 1984)

This direct assault of the Dutch philosopher is a source of grave dilemmas for me:

1. Am I destroying the true meaning of play in the use I make of it in the program teaching to think through games, by making it an obligation rather than a choice?
2. Does the act of playing in the scope of my program, sharpens thinking in an one sided manner?
3. Does the playful act induce waste of soul and thought powers?

These are the starting questions for the investigation of the significance of play to children and to me personally. I do not intend to search for a way to solve Huizinge's claims, to the contrary – one must keep those things in his mind and recognise the possible negative effects of play. I only know too well these effects as an active player of chess in competitions – some players become addicted to the game and fail to see the wider context, inflicting on themselves, the results pointed out by Huizinge. There is the exceptional example of the former world chess champion, Bobby Fisher, a genius of the game but very limited in his social and emotional functions. On the other hand, being skilled in games serve us a great deal in the economy (see Appendix: News Reports), in developing applied economic theories making use of illustration of economic processes through games (which awarded its researcher the Nobel Prize in economics) and the exploration of human thinking processes, not to mention the development of computer artificial intelligence:

1) A checkers software which showed extraordinary ability of learning from experience (Samuel, 1963).
2) The famous battle between world chess champion Kasparov and the Deep Blue computer program (1995 – 1997), which raised new questions concerning the ability of Man Versus Machine.

One of the important reasons that computer researchers find the field of games a welcoming ground, is the use of strict and finite rules in the area of games, that enable to define to the computer, the area for solving the problems, in a more easy manner. There is a similar advantage in child education, but it raises a difficult dilemma of lack of authenticity in studying true processes of life. Does this contain limitations? If I would want to make it easier on our life, I would at this stage ask -

- are there not limitations in problems in the field of mathematics, as these are being taught in schools? But to be candid, I have to admit that this is a real problem with which we shall have to contend and examine what is the children's opinion on the subject/

Towards the final portion of this review and to improve my mood, I shall present the opinion about the power of play (Kaplan & Kaplan, 1974), that says that play is the source for the transference of the children's ideas and feelings, and turning them into action. The child is the one that decides and it has the feeling of control. The play combines the reality with the child's fantasy. In view of these words, the writers claim that the power of play in education has not been examined and in their view there is a dire necessity to examine this, and to find out whether play, as a tool, does not contain such great power that should be channelled towards enhancing the quality of education. This is therefore the positive aspect that believes in play as an educational tool.

2.3.3 The Significance of the Game in our Program

We shall start from this point in our analysis, after having become acquainted with the various opinions regarding the significance of play, and we shall see how do children relate to the various dilemmas and to the significance of play for them. We shall propose the following criteria for our research:

1. What is the significance of the game for children? The objective or the Means?
2. What is the children's attitude towards the process of the game? Is it a pleasure or a torture?
3. What contributes to the development of the student following the play process?
4. What negative feelings arise in children in the process of playing?

This chapter, that was meant from the start to clarify the significance of the game in our teaching program and to assist me in focusing the significance of the term play/ game as we shall explore it from the understanding of the children, has cause me to feel some uneasy feelings, which I would like to share with the reader:

1. For many years, games have been for me a subject of personal and professional interest. I never saw in games so many meanings as I have exposed here. Is there a necessity for understanding all those meanings? I am not certain that is beneficial and contributing. The many dilemmas to which I find myself exposed to, in the scope of this research, might paralyse actions. What are the criteria for correct action? How to decide on moral dilemmas that raise from the various texts?
2. Similarly to the process that I went through in my progress as a chess player, I feel that the more I learn the subjects relating to games and education that I thought I knew, I realise that I know less and less.
3. It becomes apparent to me that mind games are not sufficient and that they must be complemented by diverse tools for the providing the class with a culture of thought.
4. The fact that so little has been written on the subject of mind games and education, makes me wonder if this is so because it was seen as a fruitless tool in education (like Huizinge thinks) or perhaps the opposite is true and that the right forces able to recognise the great power of the game in illustrating the processes of thought have not been detected yet?
5. The journey in reverse that I am taking, from education to the academic field, might be both an advantage and a disadvantage.

I feel that the directions are not parallel and that contains a mutual difficulty in understanding the requirements of the field by the academe and vice versa the academe the field. This might be the reason that the significance of mind games as a tool for learning thinking processes has not been detected by those in charge of forming the curricula. On the other hand, I feel I do not see things in a wide enough spectrum.

2.4 The Students' Comprehension of the Program's Objectives

2.4.1 General

The central question of our research deals with the comprehension of the students and their point of view regarding the objectives of the program. The reason I chose this to be the main issue of my research, is that I seek to gain a better understanding of the point of view of the children, and to use this as the starting point of my activity, improving it according to the needs and desires of my main partners in the educational endeavour. Such an approach is expressed in Dewey's philosophy:

> *"The starting point and the directing compass of the educational process must be the immediate needs, spontaneous interests and the impulsive actions of the child itself. Its life as a child are the supreme objective of education and also its only means." (Dewey, 1960, "The School & Society).*

Similarly to this approach in education, The field of marketing has also gone through a process of development, from a production oriented approach in which the

manufacturer believed their product to be good and that they should focus on marketing it, to a social marketing approach, which is nowadays being followed by commercial organisations, and that believes that:

> *"the organisation should find out the needs, the desires and the requirements of its target markets and to supply them the desired satisfaction, in a way that maintains or enhances the well being of the consumer and the human society." (Kotler & Armstrong, 1994)*

There are obviously great differences in the essence of the objectives and of the valued reference between the area of education and the marketing one, but here too one may claim that the understanding of the customer's real needs and desires should precede over whatever we think or find it easier to provide. This should be the correct approach to follow.

From among the subjects indicated above, I would like to address two dilemmas that bother me at the personal level and only then shall we continue in our review:

1. One of the more problematic questions in education is in my opinion, who is the real customer of the education process? The way this question is answered forms the basis for defining the objectives and the means for executing the education processes. In my opinion, there is no absolute answer to this question, and there is no specific customer of the educational process: the children, the parents, the society – all these are the customers of the education process and the main stakeholders in it. According to this definition, objectives should be defined so as to combine the different desires of all stakeholders. My concern lies mainly with the students as the customers of the process and as such I shall attempt to examine their views about my program.

2. The second issue that bothers me and that I want to mention is the analogy that I am making between the marketing and education. Is there justification for integrating ideas from a discipline so far away from our subject? The answer in my opinion to this question is yes. To the extent that there are in one field good ideas that may assist in enhancing the educational process, they should be adopted and absorbed within the educational activity. The desire in the area of marketing to succeed based on quality and on adapting the production and the product to the requirements of the customer, are an important milestone also for our field of activity! At times, we forget the objectives of our actions and the real requirements and desires of our customers and therefore we have to be attentive and understand the requirements and the understandings of our children in the area of education, as we do it in other areas.

This is the answer to my question – Is it important to know what is the children's understanding. We shall now analyse what we know about the children's understanding and what they think, and how should I consider their understanding. These questions compose this part of the research, and we shall have to find out whatever is known on this subject in the theoretic literature. Professor Sidney Strauss (1995) indicated in an article about "the U shaped behavioural development of students", that:

> "*When observing only behaviours, what teachers do most of the time, misunderstandings arise. When we begin to examine our own assumptions, we open ourselves to new insights, which are sometimes not very intuitive, but certainly very eye opening."*

From this I clearly understand that if I want to understand the understandings of the students, **I have to look for the fundamentals and not analyse only externally the behaviour.** This is a very important criterion, a guideline in my search for the understanding of the students.

2.4.2 What is Comprehension?

Let's search, first of all, what are we trying to find: What is Comprehension? Not an easy question! According to David Perkins (1993), we all have a reasonable idea of what consists knowledge: "When a student knows something, he is able to demonstrate it on demand – to report it or to show his skill. His understanding of a subject is a more complex issue... understanding contains something that is beyond knowledge – but what?" We see that a differentiation was made here between knowledge and skill on one hand, and understanding, on the other hand. There is no automatic connection between understanding and the methods we see as expressing understanding. A number of education researchers, from the Zero Project of Harvard University, (Perkins, 1992; Gardner, 1991) expressed their opinion regarding the question how to evaluate understanding, and their conclusion was that that this is done by the clarification of what was implicit in the concept, and the generalisation of what was expressed in a limited fashion. In fact, what is defined here is the ability of the students to make a broad use of the tools and materials that they had acquired. Their perception expresses the constructivism which is a common feature in the contemporary learning theories. Another important subject to notice to observe what we know about the understanding of the children is their evolutionary stage. In the past, according to Piaget, it was believed that to the extent that the child is in an evolutionary stage that conforms to his age,

then he is limited up to this stage, and all that is beyond this stage is no longer appropriate to his understanding (Inhedler & Piaget, 1958). Nowadays, (and I agree with this approach) the present theory (Fisher, 1980; Case, 1985), suggests to see the development of the children's understanding as a central conceptual structure, a narrative structure and other interdisciplinary elements (Case, 1992). The important basis for it is flexibility and the open attitude to the understanding and to the understanding of the children.

2.4.3 How to Create a Comprehension Promoting Environment for the Students?

Our above discussion led us to the view that understanding may be discovered through the use of knowledge and of new skills, in as many and as broad contexts as possible. One should consider the issue of creating the right environment for such approach. Perkins, (1993) mentions the question of "**HOW**" (to teach towards transference) and the question of "**WHAT**" (may be taught for understanding):

1. **Learning through a focused and long termed thinking process** – we should see that the students think by using the ideas that they have learned and that they implement them over the longer term.
2. **Providing a diverse and continuous evaluation** – in order to study in a significant manner, the children need to have criteria, feedback and opportunities for exercising reflective thinking. (Baron, 1990; Gilfford & O'Connor, 1991; Perrone, 1991).
3. **Learning through powerful demonstrations** – using conceptual models, analogies, visual demonstrations, etc.

4. **Reference to developmental factors** – including usage of the children's intellectual evolution and rating their performances.
5. **Understanding the discipline** – knowing the way the disciplines operate and not merely the terms related to them. The purpose is to acquire awareness regarding the structure and the logic of the disciplines being studied.
6. **Learning to transfer** – teaching to create transference is a task close in essence to teaching for understanding. The objective is to carry out transference (In the following section, there is an expansion about the meaning of the issue of transference and its significance in education and in my program). (From Perkins, 1993)

Concerning the question of the content – what to teach in order to reach the desired comprehension, Perkins suggests the following three components:

1) **Fertile knowledge** – this concept deals with knowledge that is connected to reality, that promises a fruitful future connection to various applications in the child's life and society. This concept was first brought up by Dewey (1916), when he wrote about fertile knowledge. What exactly is that knowledge? For example, knowledge concerning enterprise or statistical calculations (Perkins, 1986, 1992; Perrone, 1991) This is the kind of knowledge that should be imparted for achieving the objective of understanding.
2) **Making use of the teachers' wisdom** – the teachers' experience in life, their ability to broaden the concepts and to connect them with multi disciplinary contexts, should form an important part of the learning material in the classroom.
3) **Powerful conceptual systems** – conceptual systems and examples that provide insights and significance under many circumstances. Diversification of the examples and demonstration of the concepts and the ideas in as many contexts

as possible so as to empower the contextual systems of the concepts and the students' thinking processes.

2.4.4 Comprehension and the Thinking Games Learning Program

What is the significance of such understanding regarding the scrutiny of the students' comprehension? I am trying to think how do the children perceive the issue. Can I utilise this program of teaching thinking through games to make this combined process to any extent more effective? (I do not want to deal with the issue of efficacy in this research, as I have not yet formulated my opinion regarding the meaning of this term in education). We shall examine the comprehension through three major factors:

1. Reference to the external behavioural component (not sufficient by itself as a factor for increasing our understanding of the children's comprehension).
2. Reference to the children's actions during the lessons and the existence of a basis for intertopical transference.
3. Reference to the children's inaction and an attempt to understand its origin. This is, in my view, a key factor for our comprehension of the children's understanding of the program's objectives.

2.4.5 Summarising the Comprehension Issue

The following section of this review, is a natural continuation of our ideas and focuses on transference and its instruction. As we see, according to Perkins (1993):

> *"Teaching towards transference is a task similar to teaching for understanding. Actions demonstrating understanding include per definition a component of transference, as the child learning to step beyond the given information is required to verify, to explain, to find examples and additional performances that deviate from what is written in the book or said in the classroom. Moreover, many actions of understanding exceed the limitations of the subject, the discipline or the classroom. Teachers teaching towards a complete and rich understanding have to include demonstrations of understanding that surpass the clear and accepted boundaries of the subject being studied."*

In addition to searching for comprehension through transference (our following category), it is possible to find many direct demonstrations from the actions of the children. We shall, in the course of our research, search for other ways of expressing comprehension, so as to focus on the main question of our research that includes consideration of all components of comprehension and of miscomprehension of the objectives of the mind games teaching program and their significance to the writers of the program and to the teachers implementing it.

2.5 Teaching For Transference

2.5.1 General

The subject of teaching to think through games, is per definition based on teaching towards transference. The emphasis on providing thinking skills and awareness of the many uses we may have for our personal ability, are not only areas for a playful framework. The objective is to manifest and to comprehend diverse ideas and thinking processes through games, and to implement them in all areas of study and life. Important questions in our research shall be, whether the significance of this objective is being recognised by the children? And whether the game as a instrument, contributes to achieving this objective?

2.5.2 Defining the Term Transference

What is actually teaching towards transference and why is it important to introduce this kind of teaching? In order to clarify these questions, we shall at first define the concept of transference and we shall then examine in a censorious manner its significance in education in general, and particularly regarding the program for learning to think through games.

Transference:

1) Acquisition of knowledge in one context and its implementation in other contexts.
2) Realising strategies and thinking tendencies in many different contexts.
3) Creating linkage between apparently different areas of knowledge, while gathering understanding about what they teach each other. (Tishman, Perkins & Jay, 1996).

Perkins & Solomon (1989) distinguished between two kinds of transference. **Local Transference** that signifies the implementation of the learned knowledge in a

context similar to the one which was studied. The second kind is the **Global Transference** – the implementation of the knowledge in contexts that intuitively seem to be distanced and not interconnected. For example, it is possible to see linkage between a game of chess and the studied principle of "controlling the centre" – in politics and in business. This is an example of **Global Transference** (Perkins & Suarez 1992).

Another transference that psychologists characterise is: Positive and Negative Transference. This distinction is based on the outcome of the transference.

After having clarified the meaning of the concept being discussed, we shall clarify its significance in the educational context.

2.5.3 Teaching for Transference

Assuming that we have understood somehow the significance of the concept of transference, we shall now examine the issue of teaching for transference. We shall first seek the reasons why is it so important to teach for transference. According to Perkins & Suarez (1992), there are two main reasons:

1. The main effect of education depends on transference. We are not teaching for having success in quizzes, but to acquire skills and abilities to serve us during our life. The study is the gate for understanding, for sensitivity and for the ability to react to the reality.
2. The research teaches us that it is not possible to relay on natural transference. Educators at times assume that there is transference between different areas of content and of competencies, but this does not always takes place. And indeed, the situation in which transference cannot be achieved during the learning

process becomes one of the major problems in education in general, and particularly regarding learning to think. (Suarez, 1987).

3. The ability to transfer knowledge enhances the extent of the utilisation made of all the knowledge and competencies that were acquired at school.

The difficulties confronting the educators in their desire to teach for transference, are based on a number of fundamental problems, which have to be recognised. I shall now mention a number of difficulties, and later we shall examine the different approaches for teaching for transference. At the end, we shall choose a number of issues that seem to me to be essential for future improvement of performances, utilising our present research.

What are the difficulties mentioned in the professional literature regarding the use of the transference?

1) Children who learn any skill, at times do not identify the possibility of making use of the learned skills in a different situation. (Johnson, 1995).
2) Difficulty in establishing a set-up that links between the different parts, for enabling transference to take place. (Fogarty, 1994).
3) Students that suffer from symptoms of inert knowledge and skills – the subjects have been studied but remain locked in the depth of their memory and are not applied when the student needs them (Tishman, Perkins & Jay, 1996)

There are in my view, two additional difficulties in the process of teaching for transference, that should be mentioned:

1) The need for the teacher to have an interdisciplinary view of the world, and his ability to devote thought and time to linkages that are not pertinent to the area of his discipline.

2) Allocating time during the lesson for implementing the acquired knowledge and skills. Without this allocation of time, it is difficult, in my view, to demonstrate the issue of transference. This requires a change in the perception of the objective of the lesson, and in my view, turning the lesson into some thing of higher quality and less quantitative.

What are, then, the methods for teaching for transference? One effective framework for teaching transference was developed by Fogarty, Perkins & Barle (1991). It is possible to define this method by the following sentence: **"Subjects are transferred by different methods to other locations."** (Tishman, Perkins & Jay, 1996).

The **Subjects** are all that has been learned and may be transferred by the student.

The **Different Methods** are the things teachers are able to do to clarify the idea of transference and to encourage its use, so as to develop the culture of thinking in the class.

The **Transference Locations** are the new locations to which the previously acquired knowledge and skills shall be transferred and integrated with.

Another approach for teaching for transference was presented by Perkins & Solomon (1992) and is called the **Encompassing & Abridging Approach**. The main idea of the **encompassing** approach is to turn teaching into world encompassing, this means to have vision and a comprehensive outlook for the various possibilities imbedded in transference. In the **abridging** approach, the teacher follows up and demonstrates the possibilities of transference, and does not assume from the start that the child will execute the transference by himself. It is

possible to analyse the differences between these approaches in the following manner:

The encompassing approach is the associative experience from the child's world of experiences. The abridging approach is analytical and conceptual.

2.5.4 Connecting Transference and its Teaching to Learning Mind Games

From the definitions and the teaching strategies and difficulties that have been mentioned, I would like, in this research, to examine the perspective of the students regarding the subject of transference, and to try to identify whether transference takes place as a result of the teaching process. In case that no transference does take place, I would like to identify the source of my difficulty as a teacher, and the students', to create links in their understanding that shall contribute to the transference of knowledge of content and of processing, to other areas in their lives.

2.5.5 Summary

The issue of transference is, in my opinion, a basis for additional research. The ability to transfer the knowledge acquired by the students through our lessons, is from my aspect, the most important indicator of the cognitive examination of the program.

Despite all the above, we shall examine the foundations of transference and its teaching in my program, and we shall in the course of my research, try to identify whether there is any connection between the teaching for transference and the students' comprehension of the learning to think through games program.

CHAPTER 3: THE METHODOLOGY OF THE RESEARCH

3.1 General

In this chapter, I shall deal with the definition of the methodology of the research, and my objective is to systematically examine the correct frameworks for this research. The factors I shall try to identify in this chapter are:

- 1 The research approach most appropriate in this case and why have I chosen it.
- 2 What are the most effective research tools, in view of the objectives of my research, the advantages in using them and also possible disadvantages.
- 3 Consideration of ethical issues that might arise during the research, and searching for possible solutions to it.
- 4 Defining categories and the processing of the data.

The greater importance of this part for me, is in providing a formal order to my work. Part of the tools that I shall utilise in this research, have been made use of in the past, but I have not defined the process and have not systematically organised the various stages (I do many things in my life in an unorganised manner and therefore this chapter that deals with order and structure are of special importance for me). For the reader, this chapter should be important for entering into the world of the researcher, for perceiving the decision making process in research and for illustration of the research circumstances.

3.2 Theoretical Review

The objective of my research is to examine the behaviours and the comprehension of children and to interpret them for qualitative development. For achieving this objective, I decided on a quality oriented activity research which is a method that

connects the active participation of the researcher in the research area, with his real activity.

To further clarify this method of research, I shall now present the foundations for the development of my research method, in a circular fashion, that includes the wider circle which contains this approach – the interpretative paradigm, and following it the circle of the qualitative research and finally the activity research and the case study presented in this research.

3.2.1 The Interpretative Paradigm

The interpretative approach deals with the understanding and the interpretation of human processes. According to this approach, the claim is that research of social studies cannot be reduced to the research methods of natural sciences, as human beings are much more complex research subjects, and because the researcher himself is a participating partner in every social research process, and therefore he will always have a subjective angle of observation. So to research human phenomena and processes, it is necessary to thoroughly understand them and to interpret them. The understanding and the interpretation are tools with which it is possible to present as much as possible a complete and rich picture of the human circumstances. Whereas the positivistic researcher confirms doctrines from the area of laboratory theories, the interpretative researcher creates theories from the events in the field in an inductive manner, and tries to emphasise and to interpret the unclear aspects that are revealed to him from the field of research. The interpretative approaches place the human beings as carrying out actions while having interrelationships with his fellow man, who understands the social reality on the basis of the significance established from these relationships (Hitchcock & Hughes, 1995).

There is criticism directed towards the interpretative approach, that contain three central components:

a) The interpretative research is based on the subjective observation of the researcher, who interprets the world from his personal point of view and therefore the research has no objective validity.
b) The interpretative research presents a report of a subjective reality, but it does not provide a criterion for validating and confirming the assumptions and the conclusions.
c) The interpretative research deals in emphasising the difference and not in searching for the similar, and therefore it does not provide generalisations at a level demanded by the academe.

I do not see in this criticism a strong enough reason for not undertaking an interpretative research. The reality that I am researching, is the one that interests me. For achieving qualitative development and improved performance, it is necessary for any person engaged in social sciences, to create a reflective process (see Dewey Chapter 2), through which we improve our performance. This is also the reason why I choose the interpretative paradigm.

3.2.2 The Qualitative Research

The qualitative research is a research method based on the foundations of the interpretative approach. There are those who see the source of the qualitative research in the works of Kurt Levin, who intended to lead a new direction in studies about social phenomena. Levin strove to understand the phenomena, not only to explain them. The main concept of this approach is the understanding, that, according to Kemmis, is a process that demands empathy and close contact with the phenomena being studied, and therefore the qualitative researcher , contrary to

the quantitative researcher, has to be in a procedural connection with the object of the research and with the environment being researched, to acquire a more thorough understanding of them (1983).

In a qualitative research, we do not search for explanations of phenomena and for the absolute truth, but we do look for the empathic understanding of human phenomena, so as to achieve a harmonious integration with our environment.

The qualitative research is characterised by a circular process, that includes the drafting of questions and of problems while maintaining contact in the field with the data, and return to previous stages of the research, after a new understanding has been created regarding to the previous material (and so on.) This circular process contributes to the improvement of the quality of comprehension, provided the researcher is sensitive and pays attention to all that happens in all the stages of the process.

During the circular process, there are always results that contribute to development, and even events that we consider as failures, contribute to our new understanding (Strauss & Corbin, 1990).

I shall now summarise the characteristics of the qualitative research, as presented by Naama Zabar (1997):

a) The qualitative research draws its data from the field under research.

b) The qualitative research is of a descriptive nature.

c) The researchers carrying out qualitative research are more interested in the process itself than in the research results.

d) The qualitative research is of an inductive nature.

e) The qualitative research attributes importance to the significance of the events in the eyes of those being researched.

The qualitative research is of an ethnographic nature, this meaning that it is based on a variety of data sources. The ethnographic researcher participates, for a certain period, in the life of the research subjects, carries out observations, interviews and collects all available data that may illuminate the phenomenon being researched. (Hammersley & Atkinson, 1995).

3.2.3 Action Research

Activity research is a method that requires the active participation of the researcher in the implementation and in the creation of a real change in the area of research. The methodology of activity research was established against the background of the criticism that had been directed towards the research centres, according to which, a significant gap was being created between the academe and the theories being defined there, on one hand, and the activity in the field, that demanded solutions to practical problems, on the other hand. The academe was demanded to get out into the field and actually change whatever needed to be changed: to carry out research and to immediately implement its conclusions, or alternatively, to study the actual process taking place, with the objective of improving it. In a complex activity research, the research activity is composed of a combination of actual research and actual implementation by the researcher.

Tchelrmeir (1997) defined six principles, according to which, a qualitative activity research, should be carried out:

1) The reflective principle – the research subjects participate in the collection of the data, in its processing and in establishing its validity.
2) The dialectic principle – according to which, the researcher does not establish in advance what is relevant to the research, but structures his decision according to

the dialectic between the findings and the theory, and among the findings themselves.

3) The participation principle – a symmetric weight is awarded to the contribution of each of the partners to the research, and to the interpretations suggested by them, about the findings.
4) The risk principle – the initiators of the research take a risk, as they do not know where to, will the research lead them. (This paragraph finds its expression in my research)
5) The principle of pluralism and variety – the research has to present the participants' different points of view.
6) The alteration principle – the research has to demonstrate how the research process becomes a process of change to the various participants.

3.2.4 Case Study

Sanders (1981) defines the case study as the descriptive research of a specific event. The event may be a person, a class, an education system or any other entity. The event has boundaries that are determined by time, place and participants.

Guba & Lincoln (1981) consider the case study as an information framework, ranging from the description of one individual to extensive information about organisations, firms and cultures, the content being determined by the objective. This means that there is no comparison with other fields.

According to these definitions, the case study is technically limited: in time and in extent. By essence, it is limited: there is an internal objective without comparison

to any other reality, and without generalising the research reality into any other reality.

It is possible to notice the compatibility between the case study and the qualitative research and the activity research, in Stenhouse's (!979) statement that the case study is inductive, and it presents the data from a situation independent from assumptions. It enables to express great sensitivity and to analyse complex situations, from a number of angles. Shaw (1978) determined that the case study is distinguished by all the identification signs of the qualitative and naturalistic activity research: it is unique, cannot be returned and is nor representative and therefore it does not allow for generalisation.

It allows the readers to get the impression, despite not having been at the research location, and to reach new insights regarding relationships and unknown variables occurring at the phenomenon being studied.

3.3 Why Did I Choose This Approach?

To receive an answer to this question, I searched for the approach that would be an appropriate answer to my personal character and to the objectives that I had set to myself in this research. After searching, I found that the qualitative activity approach is the right answer. The reasons for that are in the combination of the activity in the field with known theories and their development into a grounded theory that is in accord with my personal reality and with the problematic that I mentioned in my function as a teacher, as the teaching program developer, and as the program director. In my present function as researcher, I find the activity research, perhaps as the only method that allows me to combine all my functions. The ability to direct, through the results of this research, my preferred development directions for defining educational objectives, as they find their expression in the children's comprehension of the objectives of my program, and their combination with the school goals as they are expressed in the curriculum and in the school's credo (see Appendix: School Credo), are an important consideration in my decision regarding the approach of this research. The necessity to study the integration of my program in wider circles, meaning the school circle and at a wider level the socio - political circle, in addition obviously to my own personal circle, are an additional factor making the activity research approach suitable for achieving the objectives of this research.

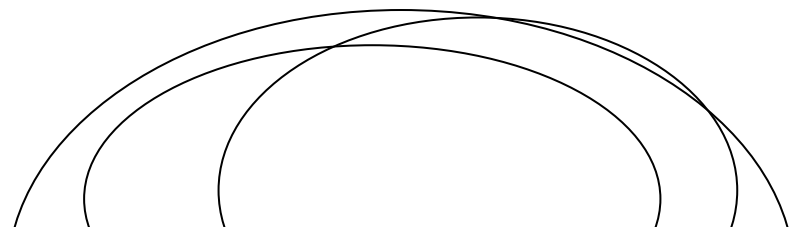
Kemmis (1983) writes regarding the significance of the activity research:

"Action research is a form of self reflective enquiry undertaken by participants in social (including educational) situations, in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and © the situations in which the practices are carried out ...In education action research has been employed in school based curriculum development, professional development, school improvement programs and systems planning and policy development." (From Hopkins, 1985)

The centre of a research of this kind is focused in my view' on the concept of "Reflective Practitioners", that expresses not only my practical aspect as a teacher carrying out his program, but also myself as a reflective researcher who examines the activity intending to find what is needed to be corrected and to change it as required. There is in a research of this kind, no attempt to establish an universal truth that shall conform to the general reality, but to focus on my reality as a researching teacher, and to try to characterise the changes that can be made in the course of the activity in the personal reality of the researcher (Hitchcock & Hughes, 1995). This research approach is, in my view, appropriate for teachers, as a way of life within the education systems in which they work, and not only for achieving academic degrees or recognition of their programs. This is the way for researching teachers to achieve reflective awareness and to examine their activities in a systematic manner, intending to qualitatively improve their activity.

What are the various stages in the process of activity research?

Schon (1983) and Car & Kemmis (1986), characterise the researcher's process as circular (the researcher's circle).




Performance
Observation
Planning
The Micro
Environment
The Researcher
Change
Reflection
The Macro
Environment

The circles that I added to this diagram represent the personal circle of the researcher, the research circle - the micro environment circle (and the circle being researched) and the macro environment that includes the external influences on the micro environment and on the researcher's circle.

As we can see from these circles, there are areas that are shared by all the three circles but there are also elements that influence only a certain part of the research process.

An additional reason for choosing the indicated approach is my belief that the reflective process that is being discussed in the framework of research, is also a central subject in my teaching: "Thinking processes and self awareness through mind games", in which an analysis is made of the reflective problems solving process, similarly to the research process. The objective of this process is to enhance the self awareness and turn it into action and in such a manner to contribute to the qualitative improvement of the activity (see the Literary Review, in previous chapter).

3.4 The Structure of the Research

My present research is the result of my need to improve my activity by understanding the processes that take place during the lessons of teaching to think through games. These processes deal with the development of the children's understanding of the thinking processes and in my research, I am interested to concentrate on the children's understanding of the program's objectives. This activity about the understanding of the curriculum and the research objective, is at all not an easy one. For us, as researchers, to understand, we have to recreate the reality, to feel the atmosphere, the mentality, the thoughts, the emotions and the motivations of the

research' subjects. The explanation belongs to the area of the observed and overt knowledge; the understanding belongs to the area of tacit knowledge – the one that is not overtly observed but is implemented and understandable (Zabar, 16). We shall now look for the best way for identifying the signs that express the students' understanding, and thereafter to try and analyse the significance of the detected signs.

To meet the research objective, it is necessary to employ research tools that analyse understanding and perceptions of children. I therefore searched for a way to analyse the class reality as it finds its expression in the way I see my lessons' reality, and the different manner it is seen by the students.

3.4.1 The Scope of the Research

I decided to choose five students from the 3rd and 4th grade classes at one of the schools where I teach. These students have joined the program since their 1st grade and this is therefore their forth year following the program. This decision derived from a number of factors that were taken in consideration, and after having many qualms to which I have not yet found a suitable solution. The reasons that I decided to choose five children of that age were:

- 1 My teaching program is intended for children from the 1st to the 8th grade. To enable a considerate choice that would allow to consider the processes that we undergo in the classroom, without considering the aspect of endmost age, I decided that the 3rd – 4th grade age group, would provide a more truthful expression of the development of the children's understanding of the thinking program.
- 2 The children that were chosen, are acquainted with the thinking learning program since their 1st grade, and therefore it is possible to better see the development of

their understanding in regards of the thinking program, or alternatively, to see where they encounter problems in understanding the objectives of the program.

- 3 The school in which the research is taking place, is open to new initiatives, and its atmosphere enables me to act and grow in a positive manner. This atmosphere contributes to my activity and this factor is very important to me.
- 4 I have good working relations with the children's parents and with many other members of the community. This fact will surely assist me to collect important data for my research.
- 5 The issue of the number of children that were chosen and the decision regarding which children will be chosen for this task, was a very difficult one and at the end, I chose five children, so that I would be able to establish with them a deeper relationship and the ability to identify their understandings.

  On the other hand, I did not want to choose too few children and therefore I thought that the figure of five would suffice for my work. The choice of the children was carried out randomly in the classroom , as I wanted to collect the understandings of different children that participate in the program.

Nowadays, even after having made the decision, I am not completely convinced about the scope of the research, but I feel that after progressing in the activity, we shall be able to examine this question again and to reflect about the suitability of this decision to the requirements of the research.

The research will take place during three separate lessons with these children and the observation of their activities will be carried out in the framework of the lesson.

3.4.1.1 The Time Table for the Research

Research Proposal	1/2/98 – 15/3/98

Reading theoretical material	1/2/98 – 1/12/98
Initial research meetings	1/6/98 – 30/6/98
Initial analysis	1/7/98 – 15/8/98
Additional meetings	1/9/98 – 1/10/98
Additional analysis	1/10/98 – 1/11/98
Writing the assignment	1/8/98 – 1/12/98
Final processing & editing	1/11/98 – 15/12/98

3.4.2 The Research Tools

For collecting the relevant data for my research, I tried to find the most appropriate research tools. The choice at the end might not be the optimal one, and the use I shall be making of these tools may not be of a high standard, but my experience in a process that includes thinking, searching and deliberating about appropriate tools, and structuring a strategy for making use of these tools in my research, have helped me extensively in understanding the importance of the type of research that I am dealing with. As a result of my search, I identified three main tools that will assist me in reaching the difficult objective of deducting the children's understanding of the program's objectives.

3.4.2.1 Observations

- 1 My observation as a participant in the activity taking place in the classroom.
- 2 The observations carried out by an additional person, who does not participate in the activity and joins the lesson for an additional examination of the occurrences in the classroom.

The objective of observation will be to examine in general the activity during the lessons and thereafter to focus on the subjects relevant to our research. It is most important, for the reliability of the research, to examine the similar and the difference between the way I see the matters, and the way they are expressed from the point of view of the additional observer.

The problems that are expected to arise from the observation method

- 3 The children do not always collaborate with strangers and therefore, in case I shall invite someone to observe the activity in the classroom, it would be preferred that this person is well known also to the children.
- 4 Focusing is a difficult issue when carrying out an open observation – how to describe the events occurring in a complete and reliable manner and in addition to that, to concentrate on the research subject.
- 5 The boundaries of the observation are not so clearly defined and therefore it is necessary to determine them during the research, while providing explanations to the decision making process.
- 6 It is necessary to remember that the notes taken are not only intended for me as a researcher, but also to enable the examination of the research by other parties. Therefore, it is needed to provide a complete description, while distinguishing between descriptive material and reflective material, which contains the observer's thoughts, comments, ideas and sources of his interest. (Zabar).

These are only a part of the difficulties to which I have to be attentive to, during my observations, and those of any third parties in this research.

3.4.2.2 Interviews

- 1 An open interview with the children for identifying their attitudes and their way of understanding.
- 2 An interview with colleague teachers who teach the subject being researched in parallel to me.
- 3 An interview with the children's parents.

According to Spardley (1979) there are three major elements in an open ethnographic interview:

1. An explicit objective – it has to be clear to the interviewer and the interviewed that the interview has a purpose.
2. Ethnographic explanations – the interviewer has to receive the explanations from his interviewed persons and also to suggest to them explanations. These explanations assist the interviewed person in arranging his thoughts.
3. Ethnographic questions – there are three main types of questions: descriptive questions that include description of details; structured questions – that enable to find out information about the manner the interviewed person organises his knowledge, the third type of questions being comparative and contradicting questions, that enable to find out the way the interviewed persons makes differentiations.

The reason I chose to interview children, parents and teachers derived from my desire to receive a more general picture of the world of the children for analysing the research objectives.

Possible disadvantages

- 1 Such interviews are difficult to process. It is possible to interpret different situations and different answers in opposing directions.
- 2 There might arise problems of validity and reliability because of the interaction established between the interviewer and the interviewed person.
- 3 There might be situations of misunderstanding of the intentions of the parties during the interview.

3.4.2.3 The Children's and My Personal Diaries

The objective of the children's and mine diaries, from the research aspect, is to enhance the understanding of the subjects that were discussed during the interviews and the observations, and to add the aspect of personal feelings, of perspective analysis of occurrences during the lessons, and general outlook on life as provided by the children and by myself, from the point of view of a researcher.

Possible disadvantages

- 1 The children's written language might not be rich enough to express their feelings and their thoughts and therefore the dairies might not accurately reflect the children's understanding and emotions.
- 2 My diary as a researcher is a subjective tool for observing the reality and therefore it might be difficult to accept it as an additional tool for understanding the reality.

3.5 Research Ethics

In this research, it is necessary to maintain all the rules of ethics that are acceptable in ethnographic research. In addition to these rules, I shall discuss a number of ethical dilemmas that disturb me, and I shall have to find for them the most appropriate solution, under the given circumstances. At first, I shall indicate some

points related to following ethic rules and thereafter we shall discuss the issues that are specific to this research.

Hitchcook & Hughes (1995) in their book “Research & The Teacher”, point out three basic approaches towards ethics:

Combination of research and profession – reference to other factors in the research process; the explanation of methods, objectives and research tools; protecting the anonymity of all concerned.

Having the agreement of the interviewed – the objects of the research have to be aware of the research and to agree to take part in it; it is required to obtain their authorisation for publishing the research; the ethic rules have to be known to all those participating in the research.

Involvement of external elements – to the extent that external elements are involved in the research, it is necessary to indicate this and to be aware of the possible different influences deriving from this. Kemmis & McTaggart (1981) indicate additionally the necessity of reporting on the research’ progress to all those in the school that are involved in it. It is necessary to state the point of view of all those that are involved with the research:

“ The question is not whether we should take sides, since we inevitably will, but rather whose side are we on?” (Becker, 1967: 239)

This sentence illustrates the uniqueness of any qualitative research and the ethical problematic deriving from it. My analysis of this important sentence, indicates to me that it is necessary to be aware of what side one is taking in a research, and it is important to notify the reader of your feelings and your thoughts when adopting the position of the researcher.

In my present research, a number of ethical dilemmas arise, that find their expression in my search for solutions and in finding my correct place in the process.

My first dilemma **is whether the use made of children for development of the research is appropriate, and may it in any way harm the children's feelings or their social standing?** I searched for the answer to this question in my relationship with the children, the parents and with various colleagues in the school (see Appendix). Based of the different references, I understood that the danger involved in this is very limited, because of the positive atmosphere prevailing in general in the school, that encourages openness, understanding and searching for different avenues for developing. In addition to this explanation, I feel that being engaged in research is, from the aspect of content, similar to a lesson teaching to think through games, and therefore research is a good illustration of a reflective process, which I am trying to introduce to all the students.

Another and for me difficult dilemma is regarding **my place in this research and in my daily work as the developer and director of teaching programs and as teacher and researcher.** The solution to this problem, as per Becker (above) is to clearly define in what side one is active, and in such a manner enabling free expression to additional elements for analysing the different situations. In this research, I am not trying to prove anything but to describe a process and searching for ways for improving the awareness towards objectives, to means and to understand my partners in the learning process.

My attitude towards ethics is not limited to the research framework. This is an attitude of respect and appreciation to all the individuals I am connected with. Maintaining the honour of your fellow man, protecting his privacy and protecting ones various collaborators in research, specifically, and in life in general, from encountering situations in which they may feel uncomfortable following ones desire to arrive at information in a manner that might harm them.

For maintaining the code of ethics it is necessary to think about the possible results of every action that I am planning to do, and to consult with persons with other experiences, to read books describing other events, but mainly making use of sound moral judgement and good reasoning.

3.6 Establishing the Categories

The characteristic approach of this research, provides in general the guidelines for setting the criteria in this work. Connely & Clandin, (1984) propose the clarifying and the descriptive approach, that includes a multi stage connection between the perception of the researcher and his interpretation, and the reactions of the research subject to this perception. The analysis includes a reflective look between the researcher and the subject of the research, the practical and the ideological aspect. The objective is achieved by establishing a dialogue between the understandings of the researcher and the subject of the research, while the criteria are established and changing stage after stage, according to the actual development of the research (Zabar).

This approach to the development of the criteria by using the progress in the course of the research process and the new discoveries, is similar to the process that Spradley (1980) simulates regarding the similarity between the type of this research and the activities of the jungle researcher, who describes whatever he sees and from this point he builds his knowledge and understanding. The development derives from validating general knowledge or from change in the course of the process, and so also the feelings regarding the desired directions of development. This comparison is the best illustration to the way we indeed execute this process.

The main question that guides us in this part is: how do we award valid and reliable significance to our qualitative research. By establishing categories and by

analysing the significance of the data collected in the course of the research, we shall try to characterise the reality to the external observer who examines the research, in a clear and reliable manner. How shall we do it? To achieve this objective, I would like to establish initial criteria as they derive from the literary review. In the second stage, in which we shall try to develop the research through the use of these criteria that derive from my question marks and from theoretical sources, and we shall see how these criteria find their expression in the "research field." In case this criteria will be central and relevant, we shall develop and analyse them, but in case we shall discover new authentic and relevant criteria, we shall adopt them and we shall try to analyse them as required.

3.7 The Criteria

We divide the criteria into four parts, that derive from the definitions that were analysed in the literary review. Each part is a stage in the understanding of the learning to think through games program. We shall try, by using all the stages, to reach the central understanding of our research: **How do the children perceive the objectives of the program?**

Part A: Understanding the objectives of acquiring a culture of thought. This part deals with the expression that is found in their activity, their words and the children's attitude towards the subjects included in this chapter:

1. The development of skills for solving problems in a reflective manner. For this test, we shall try to examine the children's attitude to loss in a game – what is the place of failure in the reflective learning process, in mind games and in general. My feeling is that to the extent that the child possesses a procedural understanding, his attitude towards loss becomes a more mature one.

2. The way children make decisions. Are we able to characterise the understanding of decision making processes, in the same way that we try to teach it in the course of the program? We shall examine various situations in which decisions are being taken, and how do children understand this.
3. Examination of censorious and creative thinking. What is the children's attitude towards the ideas expressed by this kind of thinking and its expression in the curricula.

Part B.: We shall try to understand the significance of the game at various levels in this program to the children:

1. What is the significance for the children of the game? Is it in the curriculum as an objective or a tool?
2. What is their attitude to the playing process?
3. What are the difficulties that derive from the game's process?

Part C.: The children's understanding of the implementation of the objectives of the learning to think through games program:

1. Analysing the children's behaviour during their activity.
2. Examination of the children's cognitive reflective aspects, using its expressions, verbally and in writing.
3. Consideration of subjects that do not take place in the children's action and in their reflective expression. By making use of this part, that deals with something that does not exist, we shall be able, in my view, to understand a lot about children's understanding.

Part D.: The last part deals with the central objective of the learning to think through games program, which is the ability to carry out transference of knowledge from one area of content to other areas. We shall try to identify whether the ability to carry out transference does exist, and how do the children relate to that.

3.8 The Research Validity

Validity is providing to my research by making use of various sources. Within the framework of the criteria that have been established for focusing on the research objectives, it will be important to find more than one source for validating and for relying on concepts that are raised in each level of analysis. We shall make use of two main tools for validating this research:

1. Cross checking sources – triangulation, that includes locating references from three different sources in studies, for the subject under consideration.
2. Separation of the data presentation part from the analysis part, as detailed further on.

3.9 The Structure of Data Presentation & its Analysis

Because of the reason presented earlier in my research, regarding my place in this framework and the possible lack of objectivity in the analysis of the significance of the research and in decision making, I have decided that I shall present the research according to categories in one part, and only then shall I analyse the research. My objective is to present the data to the reader and to enable him to carry out the analysis process in a manner similar to the one I carried out in this research. I hope that such a structure will reinforce and validate the cross check strategies which I employed for the analysis of the research.

CHAPTER 4: PRESENTATION OF THE RESEARCH

4.1 General

During the execution of the research, I have tried to examine its main objective, which is: **"How do children perceive the objectives of the mind games lessons**", by focusing on four components of the program:

a) The children's attitude towards the culture of thought and their understanding of thinking processes, as it finds its expression in problems' solving, decision making and censorious and creative thinking.

b) The children's attitude towards games and their perception of the significance of the game in our lessons.

c) Identifying expressions (by the children's language and actions) that signify the children's understanding of the subjects of the "thinking through games" lessons.

d) The last part deals with the search for a wider significance of the lessons' contents and examining the issue of transferring the knowledge, acquired in the lessons, to other fields of study and life. I had many doubts regarding this category, whether to combine it with the third category (expressions of understanding) or to keep it as a separate category. At the end, I decided to keep it separately, because of two reasons:

a) It is possible to detect demonstrations of understanding, without transference, but not vice versa, and therefore I wanted to separate the demonstrations of transference.

b) The great importance that the issue of transference has, in my view, in the area of teaching to think.

The road to reach the objective was escorted by an extensive exploration from within the children's world, observation of their actions, conversations held with their parents, regarding the various expressions about how they see it, conversations with the children, and an attempt to analyse their various written expressions, conversations with colleagues and with school home class teachers. The objective of employing the various research tools, that were chosen, was to collect multi faceted data regarding the processes that take place in school, during the mind game lessons, as well as outside school, and mainly to identify what the children feel and understand about the objective of the lessons. The way to achieve the validity and the reliability of my research, is based on cross checking of data collected from various sources and on searching for the similar and the different between the various approaches, and their expression by all the elements participating in this research. I shall now present what has been collected according to the four categories, without any analysis, this to be carried out in the following chapter, in which I shall also analyse their significance on the basis of my own understanding.

The first thing that I would like to mention is the failure of my assumption that the reflective personal diary, mine and the children's, would be an important research tool for collecting information about understanding the children's mind. After having asked the children to keep a dairy, in which they would describe their feelings and their thoughts after each lesson, they told me that some of the teachers oblige them to do it and that they do not like at all to do it, as they do not find the right words to express their wishes and therefore it becomes frustrating and difficult to carry out (see Appendix: page 15). I therefore changed my original program, and during the course of the research I asked them, at particular moments, to describe their feelings in writing. In contrast, my own reflective dairy, "illuminated" to me many

things that took place during the lessons, of which I had not been aware. An example that may be seen from this dairy is the use made of the language of thought, which is of great interest, and additional examples found in the dairy (see Appendix: page 31).

We shall now try to examine the various expressions in relation to the defined categories (for each category, I indicated the number of times that it was found at the different factors participating in the research).

4.2 First Category: The Attitude Towards Thinking Processes

In the initial interviews that we carried out, we can find a great number of expressions of thinking processes, as they were defined (73 different references). A great number of expression of the different subjects that compose the various thinking processes, that include processes of problem solving, of decision making, of censorious and creative thinking, was provided by all the factors participating in the research. We were able to see that this subject was awarded by, the observers, their relative highest expression (15 references), similarly to the number of expressions found at my teacher colleagues, as a researcher (10 references).

4.2.1 Problem Solving

It is possible to detect various expressions relating to the subject of problems solving. In a number of cases, the expression was a direct one and was an answer to a question related to the subject raised by the researcher, or, on the other hand, an indirect expression that derives from the child's language and from its analysis relating to different situations from his own making (7 references were identified). We may see a demonstrative example in the interview with Z':

" A game like 'The Zenith Hour' contributes to training the mind in overcoming obstacles" (see Appendix: page 7).

Another expression from the material collected from J':

"This is intended to assist the child throughout his life. It helps me, teaches me to think, to plan and to search for everything before I do anything. To solve things, creatively". (see Appendix: page 14, section 29).

An additional nice example regarding the solving problems process, can be seen in J's words. J' explains how, while solving a problem in mathematics, he does the same he does while playing 'The Zenith Hour' game: *"I divide the problem into easy parts, similarly as I do it when playing 'The Zenith Hour', in which I break the problem down"* (see Appendix: page 14). We see an additional example from the various observations that were made during the lesson (1 reference):

*"There is a solution and a problem, strategy, thinking, concentration, understanding, to rely on previous learning: to remember previous things, to apply in daily life, solving a problem together with a friend" (*see Appendix: No. 7 - 26).

In the second observation, we encounter a number of problems that derive from focusing only on the game itself, and the inability of applying it on a general principle:

"The children understand the expression of the principles in the examples, but the teacher is the one that provides the final and summarising conclusions" (see Appendix: page 33).

It was possible to find the understanding of the problems solving process in a reflective manner, in a number of expressions that are based on the children's attitude towards error and loss. An example, can be found in Z's words:

"I learn from my mistakes. During the game I try to detect mistakes and to correct them during the game. Mistakes that have caused me to lose the game, I then

examine what has the second party done and I also ask him, what was, in his view, my error and I then try to correct it the following time". (see Appendix No. 7)

R' explains to us also his personal attitude to the learning from errors processes and then how he sees the attitude of others:

"I transfer the correction of my errors to the following game and improve my skill by....There are children who do not know how to lose because they always win, and cannot accept that someone else may be better than they. On the contrary, there are children that know how to accept their loss, despite being skilled, they profit from learning from their loss." (See Appendix: pages 11 - 12).

Also during the reflection over a simultaneous chess game that I held with the children, it is possible to find expression of the learning process based on solving problems in a reflective manner:

"I am in a difficult problem and I am deliberating how to get out of it" (see Appendix page 18)

In my conversation with colleagues, it is possible to detect reference to the understanding of the ability to learn how to solve problems through experiencing and the negative experience involved with it, as a maturing insight (2 references). TS' indicates that: *"in understanding the attitude to loss in a rational manner, there is a point of no return, a sort of the "falling dime" moment, after which the children understand the significance of loss as getting the best out of the bad*." (see Appendix page 22).

A' expresses his view on this subject: *"The attitude towards loss derives from the character of the child and from the maturity of the children's understanding their attitude towards the results of their actions."* (see Appendix page 23). Also in the researcher's diary we find expression to it (2 references): *"This process has been*

successful and important issues regarding the problem solving process, were brought up." (see Appendix page 4).

We do not see in material relating to parents/ home class teachers, any specific mark relating to the subject of problem solving.

4.2.2 Decision Making

The way children make decisions tells us a lot. In an interview that I held with a colleague of mine A' (1 reference), he expressed the following opinion, which he portrays from his own experience:

"There are children, that their decision making process can be characterised by having strategy and planning, then the decision making process is more clearly defined and it easier for them to explain themselves." (See Appendix page 24).

We find in children an expression (4 references) that contains the description of the decision making process. The child Z' describes his decision making process:" *I think about each step and only at the end ,I choose the best option, examine in advance, choose a plan, and I decide on the basis of the plan."* (see Appendix page 8).

The child R' describes his decision making process in a slightly different manner:

"I stop and think, for example in chess ,I analyse the merit and the achievement of the move, this helps me for instance now, I think about an example to give you and monitor what I want to say to you." (see Appendix page 11).

In the summary of the researcher (1 reference), we find the event that took place during the lesson and assisted in reaching a decision: *"The definition of objectives, problems, asking questions and searching for solutions. The solution of one group was reached in an original and creative manner, while responding to a problem that arose from the definitions."* (see Appendix page 31).

Also A', the mother of one of the children, explained: *"His decision making process is based on more complex and deeper processes* ."(see Appendix page 9).

4.2.3 Creativity & Criticism

The subject of creative and censorious thinking is awarded great consideration by the children. This was expressed in various sources (4 references) and it is important to see how do the various children, express it:

The child R' says: *"Mind games contribute to thinking ahead, to creative and censorious thinking and it contributes to life. For example, the invention of a game depends on creativity, in a similar fashion as to mind games. When I shall think the same way that the others do, I will not be successful in a game against my opponent if he knows what I intend to do, if I will think in an not routine manner, then I will win."* (see Appendix page 11).

The child J' indicates: *"In addition to thinking, it helps me to search for all, before I do to solve things in a creative fashion."* (see Appendix page 14).

We can find an expression of censorious thinking in actions that children take and in their explanations of it. E' says: *"The reasons for my mistakes are my lack of attention to others and because I do things too rapidly. I am aware that the traffic light method helps me but I do not always remember using it."* In a reply to the question – **Have you thought how to make use of the traffic light method also in other areas?** E' indicated: *"I have not thought about it, but this may really be appropriate also to other games that are not mind games, and also to my relationships with my brothers. And perhaps also for other things."* (see Appendix page 13).

A', the home class teacher of lower grade classes, also found an expression of it (1 reference): *"The most prominent example is the use of the traffic light method which came up when we spoke of rejecting gratifications."* (see Appendix page 25). It is possible to find in the words of the researcher, that expressions of creativity and of criticism (3 references), are an inseparable part from each other in children's actions*: "After analysing the ideas and carrying out shared censorious thinking, the children searched for ways how to improve their original idea or alternatively, searched for a new way."* (see Appendix page 5).

Also my colleagues Ts' and A' express their view (2 references) that criticism is clearer and better understood, whereas creativity is problematic in is definition and in its identification in children's actions. Both of them agree that to provide these skills it is necessary to undertake a long term process (see Appendixes 21, 24). We also do not find any expression of criticism and creativity in the observer's reports.

4.3 Second Category: The Game & Its Significance in the Learning to Think Program

The issue of understanding the function and the significance of the game in the learning to think program, found the greatest expression (78 references), among all the factors in this research. It is evident that the children award great attention (51 references) to the issue of the game and its significance. It is visible, from the attitude of the additional elements in this research, that an attempt had been made to understand the interpretation the children awarded to the place of the game and its significance, in the different contexts in our program (27 references). We shall extend our explanation for this matter, in the analysis part of this research. What exactly does the game signify to the children? And what is the significance of the process of play? We find, in the children's expression, various interpretations to these questions. A very common expression, can be seen in the following definition, provided by R', in the language of children: *"I like games, its fun ...there are children who think that it is for free and that they can always play."* (see Appendix page 11) .

This is a representative example of the attitude of many children – the feeling of fun and the love of the subject of the game, which is, as described by E': *"The game grants you more confidence at school, and also provides pleasure for something that is known to you from your home."* (see Appendix page 13) .

According to J's perception, we see that it also contains: *"Dissolves boredom, and this helps to imagine things...and the objective of the lesson is to teach children who do not know how to play games, how to do it."* (see Appendix page 14) .

From the feedback received at the end of the school year from all the children of the class (see Appendix pages 19 - 20), and from expressions derived from songs the children participating in the research wrote, (see Appendix pages 16 - 17) , it can be seen

that the children's attitude to the game, is in most cases as if the game would be the objective of the lesson and not a tool for achieving a different objective. One encounters many varied and interesting expressions in the way the children conceptualise the game and its significance. Z' describes the significance of the game: *"I think that this is something that provides a way for life...I mean that this is like humanising, what happens during a game you transfer to people, and vice versa."* (see Appendix page 7) . E' says: *"..that the game teaches you about yourself, teaches you to improve. Collaboration in life is similar to a game."* (see Appendix page 13) .

In the attitude of the grown ups in our research to the significance awarded by the children to the game, it is possible to see the emphasis in the children's focusing on the boundaries of the game and the limits set on the significances of the game to the limited understanding. E', in his observation, indicates: *"during the first half hour of my observation, the children were mostly engaged in the game itself... when asked what would be the problem solving process, he emphasised only the method that was emphasised in the game itself."* (see Appendix page 33).

My colleague A' said: *"The children want games and the first perception of the lesson is as only a game. There are many reasons for it, because it is a special lesson and not one that is part of the regular curriculum, many children and parents see this only as a supplementary training session, and this decreases from the deeper significance that can be acquired from this lesson ...another very important difference in the perception that I would like to present is the completely different attitude to the subject that is demonstrated by boys in comparison to the girls ...an additional subject that I consider to be of great essence for the further development of this program, is the search for the learning significance through the means only of the game. There is no need for definitions and for background for the content of*

the studies, but only to consider the playful activity and from it alone to develop." (see Appendix page 23) .

My colleague TS' indicates that when considering the significance of the objective of the game, it is necessary to differentiate between what the children say in response to our questions, and their actual implementation. Only the person that undergoes an extended and well directed process, will be able to broaden the significance of the game. TS' refers to the game as an experience that is the basis for the children's actions (see Appendix page 21). When defining my feelings in the course of the lessons as a researcher, I mentioned the following sentence: *"Their focus is the game, and all the rest becomes a distracting factor that overshadows the pleasure of the game."* (see Appendix page 1). In contrast, A', the mother of Z' sees the significance of the game, in its positive aspect, as a relaxing element that contributes in the creation of a collaborative framework also at home among children of various ages. (see Appendix page 9).

What determines the issue is the function of the teacher. This is the conclusion reached by all those who are engaged in the art of learning: TS' (see Appendix page 22) , A' (see Appendix page 23), E' (see Appendix page 34), and the researcher (see Appendix page 1,2 -31,2), deal with the place of the teacher as the person providing the direction for realising the significance of the game, beyond its tangible aspect. We can also see the many deliberations that they have in the context of the success, in communicating these messages and the constant gap that exists between the desires of the teachers and the students implementations.

In the children's attitude towards loss, It is possible to find the expression of the extent of the perception of the significance of the game and its importance for the game. The child Z' describes his feelings: *"It is very hard for me (to loose), because during games I am very tense, and I do not want not to be the first. I*

always want to be the best possible." (see Appendix page 7). Also my colleague A' explains that: *"The attitude towards failure derives also from the context and from the interest in the subject matter."* (see Appendix page 23).

The problematic that is connected to the feelings that accompany failure is described by all the interviewed children and by all my colleagues who try to detect the differences in the reactions to loss that derive from the structure of the children's personality and their attitude towards competition. (see Appendix page 22 - 23).

4.4 Third Category: Expressions of Comprehension

In the framework of this category, we looked for expressions of comprehension, or alternatively, of incomprehension, of the objectives of the studies at the local level. By analysing the situation and its definition, by understanding its location relative to the activities taking place during the lesson, and at a higher level – connecting the learned subject to other areas (transference), it is possible to find expressions of comprehension. The number of references made in this category, together with the forth category, is the lowest one (55 references), and it is therefore possible to see that relatively this category featured the least in the children's expressions. I feel that had I been successful in making active use of the children's reflective diary, I would have succeeded in acquiring very important sources relating to this category. On the other hand, by the researcher, it is possible to detect extensive reference to this category, as well as by the home class teachers/ parents. (I shall provide an explanation to these findings in the analysis chapter).

What was included in the children's expressions of understanding? Where was it possible to find expressions of lack of understanding? I looked for the significance of understanding the awareness for learning the thinking processes in our lessons, and of the framework of the perception of the game as a tangible tool for learning

general and broader contents. For this, it was possible to detect expressions proclaiming difficulties and misunderstandings, in contrast to the understanding and the definition of the general principles, during the course of the lesson whose subject was: problems solving under different circumstances: *"A number of children did not understand what I wanted from them, in contrast to others who understood well and also defined the principles as they see them in the process of problems solving."* (see Appendix page 1).

In a similar fashion, we see in the second observation that also the teacher (I) failed twice in defining the objective from the point of view of the observer: *"Also the teacher was drawn to presenting specific problems...and put less emphasis on the requirement of understanding the process."* (see Appendix page 33).

We may also see that the children's understanding may be completely different, as E' indicates in his observation and in the interview he held afterwards with one of the children: *"From the interview with the child, it was found that the lesson's objective had not been clear to him. According to his understanding, the main part was the attempt of collaboration and not specially understanding the process of solving problems"* (see Appendix page 33).

From conversations held with the children, it was possible to find out many very interesting expressions and applications of understanding; Z' said: *"A game like 'The Zenith Hour' contributes to develop the mind to overcome obstacles ... I always look for the similar between what I do during a game and other things. This helps me because I have learned how to do things better."* (see Appendix page 7 - 8). R' said additional things that express understanding: *"I see the things in a different way, this may help me in life. Strategy and tactics contribute to any area. For example ...if I will develop a strategy for finding the specification of a number, whether it can be*

divided or not, I will not have to check each number separately." (see Appendix page 11).

In an interview with E', we find, as an answer to a question about additional possible uses of the traffic light method, a new understanding (of E's), that did not exist earlier: *"I have not thought about this, but the method may be applicable also to other games, those that are not mind games, and also for my relationships with my brothers, and perhaps to other things as well."* (see Appendix page 13).

The issue of comprehension and the teachers' desire that their message would reach the students, found its expression in my colleague's TZ' words: *"To the same extent, they do not absorb all what we would like to provide them and this gap exists in every learning framework, between the understandings of the grown ups and the children's."* (see Appendix page 21).

A', the mother of Z', explains that the understanding the necessity for maintaining frameworks, is an important achievement for her son: *"The framework of the game and the rules about it, like the 'you touched – you move' rule, contributed a lot to him in the comprehension of the importance of the framework and its existence in areas that are not only like a game."* (see Appendix page 9).

From the actions themselves, we also find expressions of comprehension: during the course of a simultaneous chess match that I organised, one of the children wrote: *"..but at the end of the game, I understood that Danny saw everything and knew how to watch out for all my plans."* (see Appendix page 18).

It is possible to detect the expressions of comprehension, but in contrast there are many situations in which the children are not successful in understanding the broader significance of learning thinking processes through games, that it serves only as a tool, and this is for them difficult to perceive. I think that in the children's attitude only towards the games and to their contents, we detect in many cases the

significance of lack of understanding of the objectives of the program: *"The children encountered difficulties in disconnecting from the tangible and the close to them (for example from the game, that had been the focus point of the lesson, to other areas)."* (see Appendix page 4). J' describes his understanding of the lesson's objective: *"to teach children who do not know how to play games, how to play ."* (see Appendix page 14).

4.5 Forth Category: Expressions of Transference

In this category, I looked for different expressions that would demonstrate transference of knowledge of content or procedural knowledge, from mind games to other study or actual life areas. The number of references to this subject is relatively small (20), but it is possible in these expressions, to detect the great richness of the children's world, as observed during the course of the conversations held with them, the attitude of the parents and of the home class teachers and the contributions made by the teachers, who teach thinking methods (my colleagues and my reflective diary). The issue of inability to carry out transference was also raised and an expression illustrating the difficulties involved in carrying out transference was found. I expressed it in my reflective diary: *"When I asked about the connection between problem solving and decision making in games and other areas, I felt that the children had difficulty in specifying this and only with my support (which might have been biased and resulting from my intentions) they specified the similar aspects in the process."* (see Appendix page 2).

My colleagues had differences of opinion among them regarding the possibility of carrying out transference, but were unanimous in their view regarding the necessity of a long term and consistent process that would include additional components for causing the issue of transference to be comprehended and carried out. E'

summarised: *"Regarding the internalisation and transference of subjects and processes, it is obvious that this is a much more complex process, that requires extensive efforts and much more time. Other factors in the children's lives should be integrated and tasks and assignments that exceed the short term allocated should be added to the mind games lessons."* (see Appendix page 34).

TS' expresses his determined opinion regarding the issue of transference: *"There is obviously! Without any doubt ...I see them in the children's development, in all their areas of interest...but I have to repeat again that this is a long term process and it will not be possible to detect immediate results."*

A', a home class teacher detects the effect of the studies on her class: *"The children maintain two -directional communication between the various subjects being learned during the lesson and the mind games."* (see Appendix page 21).

Similarly, A'', also a home class teacher, gave an example of transference and connection that the children of her class had made to the traffic light method, but on the other hand she claimed that she had not seen enough connections and expressions of transference (see Appendix page 25). In the children's expression it was possible to detect a number of tangible examples of the transference issue. R' further increased by giving an example from his answer to the question of how does he make use of censorious thinking: *"It helps me a lot, for example I am now thinking about an example to give to you and I am monitoring what I want to say to you"* (see Appendix page 11). J' provides an example of transferring a process that he had learned during a problem solving lesson and connected it to a lesson in math: *"For example, if we learned how to divide the problem in the Zenith Hour game into parts, I do a similar action in math exercises. I do the exercise 13 * 5 in two stages and in such a manner I solve it... I divided the exercise and so it is easier to solve it."* (see Appendix page 13).

CHAPTER 5: CASE STUDY ANALYSIS

5.1 General

This part of my assignment deals with analysis and interpretation. I am interested to share with my readers the connections I made between all the parts of this research and its analysis. Many interpretations may be presented for a qualitative research, and therefore it is important for me to show the method of analysis that I chose to follow, and not only concentrate on the contents. It is not my intention in this chapter, by using the analysis, to justify or to disqualify the learning to think program. I would like to examine in a candid manner the point of reference of the parties involved in the process, and to find out how do they interpret and understand what takes place in the course of the mind games lessons, from the children's point of view. Positive conclusions reached by this research, shall not mean that in the future, reservations and search for methods for enhancing and improving the program, shall be avoided, and on the other hand, things that will be detected as being wrong and ineffective, will surely not be changed in an immediate manner, but in stages. While defining the course of the data collection process and of my searches, many processes happened, that, first of all, became for me very significant factors, for increasing my awareness to my basic need for taking in consideration, the point of view and the understandings of the students, as being myself the "navigator" of the learning processes. I understood as a result from my own experience, that there were difficulties in communicating my ideas to the students, that derived from the differences in age, different knowledge and other additional components that depend on many variables. To establish good communication between myself and my target population, it was necessary to create

a common language, that was based on the daily language of the children, intended to bridge over the age and the generation gap, and in addition, a language of thinking, whose function was to define matters in a clear and accurate manner for communicating messages related to the comprehension of processes, of objectives and of desires. It is important for me at this initial stage to refer to two important points that arose from what I heard during the many interviews:

a) In an interview that I carried out with my colleague TS', he said that in his opinion: ''..it is necessary to differentiate between two cases: 1. What the children say as a reaction to out questions. 2. What they actually understand and implement" (see Appendix pages 8 - 9, 21).

This comment is very important and is in my view very correct in every context, and obviously also in the context of this case study. The combination of lack of awareness, of awareness and experience, is a source for the great difficulty (especially in children) in the actualisation of abstract concepts. We shall search for the children's expressions in their actions and also while trying to identify their understandings. As it can be seen from the interviews and from the various research processes, I gave the students complete freedom of expression and space to demonstrate their comprehension and their ideas by using examples, illustrations from other areas of content, free expression in songs and essays.

b) A second important point having an influence of the children's explanations and actions, is focused on the way the teacher operates. We see the (justified) criticism addressed to me (as a teacher) that concentrates on the game and not on the process (see Appendix page 12 - 13, 33), and in the expressions made by a number of elements related to the research (chapter 4, pages 6, 8 - 11), that claim that the reference to the subject is created by the teacher based on the structure of the lesson that he presents, whether content dependent or procedural -

reflective. A too great concentration on the content and not on the process may divert the children's comprehension accordingly.

These points are the foundation for understanding the situation of the research and also for the deeper consideration of the various analyses.

5.1.2 The Structure of the Analysis Process

We shall now carry out the combined analyses of the four categories, that I mentioned throughout the course of the research, and I shall try to combine them into one entity that becomes the answer to the central question of the research, **How Do The Students Perceive The Objectives Of The Mind Game Lessons?**

As mentioned, we examined in the course of the research, the various expressions of the students' comprehension, in four different categories:

1. Thinking processes and the culture of thinking.
2. The significance of the game in study programs.
3. The students' understandings and their expressions at the local level of the content of the lesson.
4. The ability to carry out transference of content and procedural knowledge.

5.2 The Attitude Towards Thinking Processes and Thinking Culture

In the process of creating a culture of thinking in the classroom and reflective awareness to various thinking subjects (problem solving, decision making, censorious and creative thinking), we found many expressions by all the participants in the research. One of the reasons for this richness of expression derives, in my opinion, from the extended period that the children (targeted in this case study) participate in the learning to think through games program (about 4 years) and it is difficult to imply therefore on other cases. We find an expression regarding the long

time needed for providing a culture of thinking, that includes awareness to these subjects, in the remarks made by my teacher colleagues. (chapter 4, pp. 3, 8 - 12, 4 16 - 17). Also in my reflective feelings record, it is possible to detect their expression (see Appendix page 4, 18 - 21) and in the reference made by A', the school home class teacher, that emphasised the influence that she felt regarding the extended comprehension of the children and their reference to the objectives of the lessons, as a process that demands extensive time. (see Appendix page 9, 22 - 24). We did not find in the children's comments any reference to the need for time and I assume this derives from their difficulty in evaluating long term procedural influences, that are connected with them.

5.2.1 Creating the language of Thought

During the structuring of the research, I wanted to make use of the children's reflective diary, but I was not successful in it. The explanation of this failure derived from a number of factors, that in my opinion, derive from the research data and found their expression in the literary review. These factors, are in my opinion:

a) The wish of the children not to connect the mind games lessons to other subjects, by making use of a personal writing process that was being employed in relation to other study subjects.

b) Their difficulty in carrying out a systematic method of expression in writing (chapter 4, p. 1, 23 - 27). Confirmation of this claim was received from A', my colleague at work, who explained that the children and the parents perceive our lessons as something less demanding. (chapter 4, p. 2, 22 - 25). Also in the expression found in my reflective diary (chapter 4, p. 2, 1 - 2), it is possible to detect my understanding regarding the necessity to create, for the children, a broader and more accurate language of thought, that would contribute to a richer expression regarding the

thinking processes that take place during the lessons. In the theoretical part of this research, that discusses the creation of a culture of thought, the researchers and the theoreticians deal with the significance of creating the language (chapter 2, pp. 5 - 6). According to that analysis we can recognise two requirements and the connection between them: one -- the need for recognising the importance of the language and its significance in learning thinking processes, and the second – the need for changing the attitude of the children, the parents, and even of the teachers in the school, who consider the mind games lessons as not being an integral part of the school's curriculum.

5.2.2 Reflective Problem Solving

Perceiving the attitude towards failure as part of the development process and the analysis of the solving problem in a reflective manner process (similarly to Dewey's approach as reflected in the theoretical analysis (chapter 2, pp. 7 - 8, 2 - 23), becomes to a number of participants in the research , the basis for concentrating on:

a) The expressions of the children (chapter 4, p. 2,14 19, pp. 2 - 3, 4 - 25).

b) Various observations (chapter 4, p. 2, 20 - 24).

An important problem arises in these observations, that becomes one of the most important questions in our research, which is: Is the children's reference (and at times also the teachers') focused only on the manifested and the specific (the game) or is it possible to broaden the subjects of reference during the learning process? We can find an interesting answer to this in the reference of my colleagues to the issue of the attitude to problem solving – as if towards a process of maturing – "the falling of the dime" (chapter 4, p. 3, 8 - 11). We can also find an expression of the problem solving issue and the children's attitude to it, in the researcher's diary (chapter 4, p. 3, 11 - 13).

The important conclusions that I can reach from this part are:

a) The need for widening the significance of the problems solving processes from the area of the game to additional areas, and for defining the process in a more general manner.

b) To enhance the awareness of experience and of failure, as an important stage in the reflective development of problems solving processes.

5.2.3 Decision Making

We are able to identify the systematic work of the children and the process that they undergo through the game, so as to become more successful. We see in the expression of the mother of Z', of my colleagues' , the children's and the diary of the researcher (chapter 4, p. 3, 14 - 16), a description of an orderly process of high quality that contributes to thorough and considerate decision making. On the other hand, we may also see my colleagues pondering regarding the change that the children undergo and the assumption that perhaps the whole development process is a natural one, without requiring our assistance and direction (see Appendix p. 21, 19 - 21). My colleague A' presents a ranking system regarding the contribution of the students' understanding of the decision making process:

1) Children who do not significantly improve their decision making process.

2) Children who think and search for solution in a negative manner (by elimination).

3) Children who establish a strategy, make decisions on the basis of achieving objectives in an orderly manner, etc. (see Appendix page 3, 8 - 24).

The conclusions that may be reached from the decision making processes that were described during the course of this research, are:

a) The necessity of improving the attitude towards decision making methods.

b) The need for a more structured use of models like the “Thinking Tree” and the “Traffic Light” (see Appendix) for improving the quality of decision making in situations of play, and the broadening the basis of use of these methods, into additional areas.

5.2.4 Criticism & Creativity.

This subject illustrates the way the children think. It is easier to detect an expression of censorious thinking, this being the result of the children’s familiarity with the “schematic” model (the Traffic Light Model) for controlling decisions. We may conclude therefore, that it is important to establish tangible models that assist the children in comprehending the concept that stands behind every subject. An additional reason, this being my personal view (this being an assumption and this research does not provided any confirmation for it) is that in our western society, the censorious way of thinking is much more encouraged than the creative one, and therefore we find many more expressions of censorious thinking. In the children’ s expressions (chapter 4, page 4, 2 - 12), we find their reference to criticism and to creativity (much more to criticism), but we do not see any connection between them in the children’s s distinctions, in contrast to the particular event, perhaps even not a representative one, that is presented in the reflective diary of the researcher, that shows that actually the children do connect between creativity and criticism (chapter 4, page 4, 14 - 16). A’, a home class teacher, distinguishes in her class the use made of the control method (the Traffic Light) in various different connections. (chapter 4, page 4, 12 - 13). There is agreement among my colleagues, that censorious thinking is an acquired knowledge and also that children express it after a process of comprehension, but regarding creative thinking, there are problems (chapter 4, page 4, 16 - 19). An important conclusion that I have reached from this analysis, is

expressed by the necessity of building a model that will illustrate the creative way of thinking, in addition to the procedural control and the establishment of a constructivist environment that emphasises the creation and the action.

5.2.5 Summary of the Analysis of the Category

To summarise this part of the analysis that deals with the creation of a learning environment that emphasises the attitude towards the culture of thinking and reflective thinking processes, I would like to direct the reader to the examination of the attitude of the students in the classroom, and of their parents, to the concept of "what is a student" (see Appendix), so that we will see how little do we succeed in doing to change the concept that the student is not a passive child that absorbs material and discharges it in examinations. For the promotion of this change, we shall have to consider all the components for creating a culture of thinking in the classroom, and in the school, and to refer to the various thinking processes that include absorption of materials, their processing and analyses, and their presentation in various forms (output).

5.3 The Significance of the Game in the Curriculum

The attitude towards play is in my opinion the central focus for the examination of the extent of the comprehension by the children of the objectives of the learning to think through games program. The ability to detect the wider significance of this subject, and the place of the game as a means and not as the objective of the lesson, are a milestone in viewing the children' s world.

As we can see from the analysis of the number of references to the game (78) and the children's references (51), it is possible to say that in many cases the children have difficulty in referring to the lesson in a wider significance than the literal

meaning: A lesson of mind games. The difficulty of considering a wider significance than to a lesson of mind games, is especially distinct in the free expressions of the children: from the year end feedback received from the children of the class, from the children's songs and essays regarding the significance of the lesson (see Appendix page 16 - 20). Also children that are at the centre of this research, often see the process of learning the game, the pleasure in the play, the fun, the improvement in their playing skills and the experiencing of a medium that is known to them from their homes, that provides self confidence to the children, as the main objectives of the lesson. These are the initial and the more frequent references expressed by the children (chapter 4, page 5, 8 - 15). At a deeper level, we detect an additional expression by the children that includes: humanisation of the game, reference to the self feedback received by the game and the processes of the game, that contribute to learning and to the improvement of the thinking at school and in life (chapter 4, page 5, 15 - 18).

In the attitude of my colleagues, we encounter a number of interesting issues. One deals with the question: Should a significance beyond the game itself be searched for, or is it possible to progress from the playful experience alone? An additional issue is – is there a difference between boys and girls in their attitude towards play? The opinion of my colleagues is that there is such a difference (chapter 4, pages 5-6, 22 - 4). In my reference to the reflective diary, it is possible to see that I also feel that the children want to play and all other actually disturbs them (chapter 4, page 4-5, 6). A', the mother of Z' refers to another important motive, which is – a qualitative study of attitude towards frameworks.

A feel that from all the issues that arose in this part, it is possible to develop a number of very interesting studies! For our small analysis in this research, it is possible to say on the basis of the data that in a natural manner the children consider only the

playful significance. It is necessary to enter into a long term process that includes the orderly direction of the teacher, to establish a wider comprehension regarding the significance of the game to the children. We absolutely saw in the children's expressions, that they are also able to provide a deeper expression of the significance of the game, and in such a manner to enrich the processes of their self awareness and the quality of their thinking, by using the game as a simulative medium. The way to create this broader significance is, in my opinion, through the playful experience, but it does not seem to me that it is possible to achieve the broadening of the concepts and the understanding of the processes by using only the experience. It is necessary to provide a wide variety of additional significances for achieving this enrichment. Regarding the remark made by my colleague A', claiming that as a result of boys and girls understanding a different significance of the game, it is necessary to establish different programs for boys and for girls [this subject is also known from the field of chess (Geler, 1988)] – this is not the stage to analyse this issue but it should absolutely be remembered and it is necessary to search for an expression of this difference between the students, and to look for ways how to optimally contribute to all.

5.4 The Student's Comprehension and Their Expressions at the Local Level of the Content of the Lesson.

This work of ours deals in general with the comprehension of children, and therefore it is appropriate to explain at this initial stage what is the intention regarding this specific category. Every output by the students in the framework of the lesson, any action, verbal expression, by inaction, is a sign of his understanding, or alternatively of his lack of understanding, of the concept being taught. Every expression of comprehension, is, in my opinion, composed of a number of stages:

1. Lack of understanding at various levels.
2. Non focused comprehension or dependent on different contexts.
3. Comprehension at the local level of the subject.
4. Comprehension of the conceptual significance and making wider uses of the comprehension (transference).

In this category, we shall mainly deal with the second and third stages. We shall try to examine whether there is an expression of local comprehension (and at what level of quality), in the way the students relate to their world and how do the other participants in the research, relate to the children's expressions of comprehension at the local level.

The number of expressions of local comprehension, combined with the forth category of transference, were in general, the lowest (a total of 55 references for the two categories!!) and it was specially noticeable in the case of the children's expressions regarding these categories, which were for them the lowest, contrary to the researcher and the parents, for whom this category was the highest in regards of the number of references. The explanation for these findings lays, in my view, in the different understandings regarding the essence of the subject of learning, but

in addition to that, also in the different expectations prevailing among the children, who are interested to see the game as something complete by itself, without any attached learning activity, and the expectations of the researcher and the parents, who are interested in perceiving the game in its symbolic significance, and the learning as directing towards comprehension and transference at its wider sense. My colleague TS' speaks about the significance of the expectations, and the inability to settle this by means of learning processes between grown ups and children (chapter 4, page 7 8, 27, 1).

From the children's expressions that are related to comprehension, we learn about two kinds of comprehension: **Procedural comprehension,** in the scope of which, the children understand what they are doing in a continuous and logical procedural framework. **Comprehension of general content**, from the framework of what is being taught. In this case, the reference is to the content and to the comprehension of its significance. We are able to detect from the children's expressions the two kinds of comprehension being discussed here and the extent of success or of lack of success, (chapter 4, page 7,11 - 18) as well as from the reflective feedback of the children (chapter 4, page 8, 4 - 5).

We are also able to detect important directions of comprehension from the aspect of values, or new comprehension of the children, during the course of the play process and from their talk with the grown ups. Also in the interview held with one of the children (chapter 4, page 7, 24 - 26) and in the words of A', the mother of Z': that an important comprehension that contributed to Z's development from the aspect of values, was his attitude towards the regulatory framework of the game and understanding its importance (chapter 4, page 8, 1-3).

The last subject which I would like to discuss in the scope of this part, is the most problematic and the most difficult for us to consider, to understand and to implement:

what is our attitude to the expressions of lack of comprehension and whether these are indeed expressions of lack of comprehension? The identification of expressions of lack of comprehension, in a simplistic manner, may include any expression that indicates reference to the tool (the game) as the objective, and the inability to understand the significance of the game as a tool in its teaching context. I do not agree with this answer. It is possible to see from the literature, that Dewey referred to it and searched for a deeper significance and not a simplistic one for the two concepts that were important to him: the significance of play in education (the chapter on play, page 6 -8, 3) and the significance of the means in relation to the objective, in educational processes:

"The significance of life is not simply passive existence, but a way of action, the objective becomes the means of an action, exactly as any other part of the activity (the inverted relationships). Life is development, therefore even growth is not movement towards an objective, but it becomes the objective by itself." (Dewey, 1960).

It is my opinion that, even if there is no direct comprehension of the lesson's objectives, and of the learning to think processes, that are included in it (and indeed according to the research data, the expressions of comprehension are much less numerous than the expressions of lack of comprehension), the children do learn without being aware of it. As my colleague A' indicates: *"There is no need for definitions and background to the content of the studies, but to consider only the playful activity and only from it to develop." (*see Appendix page 23, 13 - 15).

So too regarding the various expressions of the children, who see in the game the main objective and a very pleasant subject, that creates motivation for action (see Appendix page 20, 16), in my reflective diary and in the expressions of the child E' (chapter 4, page 8, 8 -11).

To sum up this part, I would like to emphasise that for defining the students' comprehension, it is necessary to take in consideration the content and the procedural levels. There are various levels of comprehension that find their expression during the different activities of the children. In my opinion, we should create a supportive environment that should include providing a more orderly feedback to the children, and through it to refer to the children's level of comprehension and to the possibility to contribute to their comprehension development process. When children refer only to the playful significance, they do

not express lack of comprehension, as this is only their partial consideration of the subject. With the help of this reference, we are able to develop, together with the students, a broader understanding that includes procedural awareness, and content dependent awareness, in the scope of the game, and later on, in any other context.

5.5 The Students' Expressions of Transference.

The issue of transference of content and procedural knowledge, is one of the most important ones, in the cognitive area of education. The ability to connect between things at a broader level, and to find for them applications in various areas, demonstrate to us, in my view, the competency of processing and comprehending knowledge at a high standard.

We do not encounter in this research, many expressions relating to the subject of transference, but from what we can identify, we see very nice and interesting connections, that were made by the children.

The game, by nature, is an illustrative and demonstrative medium of different situations and of social and personal processes, of the person playing the game. We are certainly able to detect confirmation of this statement, in the various expressions of the children, as well as of their ability to find expressions of transference into other areas or to different processes. An example to the ability to carry out a procedural transference, we can see in the two examples shown to us by the children J' and R' (chapter 4, page 9, 2 -7). An example for illustration of content, we may see in the words of Z': *"This is like humanisation, what is taking place in the game. You transfer to persons and vice versa, things that they do, for example strategies similar to the characters of wars."* (see Appendix page 7, 9 - 10).

We can also see transference expressions of the merit of playful learning to real life, as described by the child Z': *"It is a great fun that it contributes to my life ...the*

game is like real life, a combination of imagination and reality." (see Appendix page 7, 24 - 25).

The reference to the process that has to be carried out in the classroom for the implementation of processes of transference, and the difficulties involved in executing it, finds its expression in my reflective diary (chapter 4, page 8, 18 - 20), in various expressions by my colleagues, and in the observation of E' (chapter 4, page 8, 21 - 24). These expressions contain dimensions to which we have already referred to in our analysis, and they are:

a) The need for long time to establish the process and to broaden it.
b) Reference to the image of the teacher as the director of the process, who has the whole time to be attentive to the development of the students' comprehension.
c) Widening the framework of action and its points of contacts within the school and outside it. We can see a nice example of this point in the words of the home class teachers, that demonstrate the connections that children make through the comprehension that they have acquired through mind games (chapter 4, page 9, 1 - 2).

To summarise this part, that deals with widening the significance of the objectives and of the comprehension of the mind games lessons, I would like to emphasise that transference is the ability to express the comprehension of the student, at a high standard, that requires the skill of integrating knowledge of content with procedural knowledge. It is therefore very important to consider the requirement for integrating the contents and the procedures that are created during the games, with the other contents of life and the learning within the school and outside it. The need for time for expressions of transference to mature, the connection between mind games and the other subjects of study in a structural manner (integration in

the regular school curriculum), are the important conditions for making a wider and enhanced application of the mind game lessons.

5.6 Analysis Summary

During this analysis of the results of the research, I presented a number of points that combine all the categories into a complete structure. I am now interested to test what we have seen, and to try in the next chapter, to present the significance of this research for the future.

The mind games lessons deal with two main subjects:

a) To become acquainted with thinking processes.

b) To become acquainted with contents of thinking.

We shall now examine each of these parts, relative to the analysis of the different categories in this chapter.

Thinking Processes

a) According to this research, children demonstrate extensive consideration of the subject of the process of play, as the objective they see confronting them. We also saw very interesting expressions of children who emphasise the comprehension and the procedural transference, reference to wider subjects like problems solving, decision making and their attribution to a wider context. The significance of the game during the establishment of this comprehension, is very large and very important. The ability to depart from the personal experience of the children, so as to create procedural comprehension, is a most important factor at the procedural level. Building the procedural skill depends on three main parts:

At the input level – the way the student builds the process for receiving the external stimulants.

At the processing level – the way the student processes what he had absorbed.

At the output level – the way the student represents what has been processed by him.

For this to be implemented, a long time and the establishment of a large framework of contexts, are necessary. For improving the process, there is an important need for skill to create a language of thought and a culture of thought, specially for the output level, which is seen as the external expression of the students, as well as in establishing an environment rich with stimulants and creating challenging situations to the students, that form an active experience and the possibility of self examination within the process, having the support of a professional element, (the teacher). The possibility to connect with the additional school applications (the school curriculum) is also required, for forming a rich material processing system with wide significances. In this framework, the

function of the mind game teacher cannot be limited to teaching the game and the correct manner to improve in this aspect, but he has to provide examples and varied points of connection to the processes illustrated by the game. An additional important element that we encountered is, that comprehension and reference to procedural models increased, relative to the extent that we had created a tangible model that was made available to the children. An example for this can be seen in the relatively large use the children made of the Traffic Light model and its connection to additional subjects.

b) The second part of the learning deals with the acquaintance and the comprehension of the contents of the mind games. It is possible to learn many and very important values through these games, and we can see that indeed the children, in their words and actions refer to this, and also the other participants in the research have expressed it. We can see an example for this, in the value of co-operation, which is a very important value in games, but there is also great general value in learning it ,from the social and moral aspect of the student, and of the society in general. Additional subjects that arose from the direct values that are learned through games, were awarded extensive expressions, relatively to the observed comprehension of the children. We have to remember that the game is a good tool for illustrating contents, as they are by nature simulations of events from our lives, that are entered into a small and defined frame. My colleague A' claims that all learning has to be from within a playful experience, and programs that limit or decrease the importance of comprehension through playful experience, should not be developed.

CHAPTER 6: SUMMARY & PLANS FOR THE FUTURE

6.1 Plans for the Future

The Bible says:

"Educate the boy according to his way" (The Book of Proverbs, 22 - 5).

During the months that I was engaged with this research, I found for myself a new and deeper significance for this verse. Many things that are connected to the way children understand the objectives of the learning to think through games program, led me to search for adaptations and changes that would assist the children and the society, in which we live and grow, to contribute to the qualitative improvement of our thinking processes, our moral values and of our attitude towards the environment in which we live.

The great contribution of this research to me, is expressed by my processes of awareness regarding the needs of the children, as they found their expressions in the observations and the interviews: with the children, with their home class teachers, with their parents and with my colleagues.

Following this research, there are five directions in which I intend to concentrate more:

1. A regular process of feedback and a qualitative attempt to understand the students' attitude towards the lessons. For this, I intend to introduce experiences containing learning projects in the area of the game, that will be evaluated by the children and by myself – as an integral part of the thinking class. In this part, we shall emphasise three main parts:

a) Consideration of the process that the student child underwent, from the emotional and social aspect.

b) Comprehension about the cognitive processes that the children undergo during the course of the experiences containing activity, as well as the child's skills that were expressed, the advantages and the difficulties the child felt during the process.

c) Consideration of the specific content of the activity and its comprehension.

2. Creating a culture of thought that includes emphasis on high quality communication. In this part, I shall try to create, during the course of the lessons in the class, a combination of a vocabulary of thought, so as to maintain communication at a higher standard, that will also express the children's intentions in the most effective manner that is possible to achieve in a verbal form. In addition, we shall try to demonstrate other means for transmitting messages that are connected to our thoughts.
3. Search for models that illustrate processes and ideas. As we saw in the research, realistic models contributed to greater comprehension and to the application of the model's contents in various contexts. For future use, I shall search for different models that will contribute to the students in defining the various ideas that may be construed from the mind games lessons.
4. Strengthening the relationships with the school and with the home class teachers. These connections are, in my view, essential for developing wider contexts of the procedural and content significances of the mind game lessons. For this, it is necessary to reach a degree of collaboration that will include deeper acquaintance with the objectives and the tools of the various study subjects, and at the second stage, the search for ways for integration and co-operation. An additional conclusion related to this integration, is: the need for creating a

playing and thinking corner in the classroom, composed of various games for the students and for its home class teacher, to enable them to make more and wider use of it, during other lessons.

5. Carrying out my personal work and transferring it to the other elements engaged in teaching aided by games, regarding the significance we award to the results of the lesson. For this change, it is necessary to examine the lessons on the basis of different criteria, that we will establish prior to the lesson, and on the basis of which, we will examine the work processes. This requires to take in consideration the personal feedback that we award to ourselves, and the feedback received among colleagues and peers, who discuss the processes that take place during the various lessons.

6.2 Epilogue

To summarise – I cannot estimate the validity of this research to an external observer, that attempts to follow the route that I have covered during the course of this research, but I would definitively recommend every reader to go along a similar route in his area of activity, and to examine, in a qualitative and thorough manner, the points of reference of the entities with whom he comes in contact. The little discoveries that may contribute to the improvement of our actions, are the best remuneration for the large investment that is demanded for carrying out such a process.

Personally, I believe that the most important contribution of this research, is to myself as a teacher and as the developer of learning programs. It is possible, in my opinion, to define the essence of this contribution by the following sentence: **the definition of my work and the future directions of development are now much clearer to me.** I have started in the process of introducing order and organisation in the significance of the learning to think through games program. The reflective process that was introduced through this qualitative research, shall serve me and my colleagues on any road we shall decide to follow.