UNIVERSITY OF SOUTHAMPTON

FACULTY OF LAW, ARTS AND
SOCIAL SCIENCE
School of Education

A SCIENCE FICTION STORY AS A MEDIUM OF STIMULATION FOR CHILDREN'S CREATIVE IMAGINATION- THE IMPACT OF MODES OF PRESENTATION AND STYLES OF LEARNING AND THINKING ON THE CHILDREN'S CREATIVE IMAGINATION

by

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ABSTRACT

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This research aimed to explore whether modes of presentation and styles of learning and thinking (L&T) had an impact on the creative imagination of Qatari children (9-11 years old). Furthermore, the research explored how to stimulate the children's creative imagination through presenting an imaginative story to them using two different modes of presentation, one verbal and the other visual.

The investigation sought answers to these three questions:

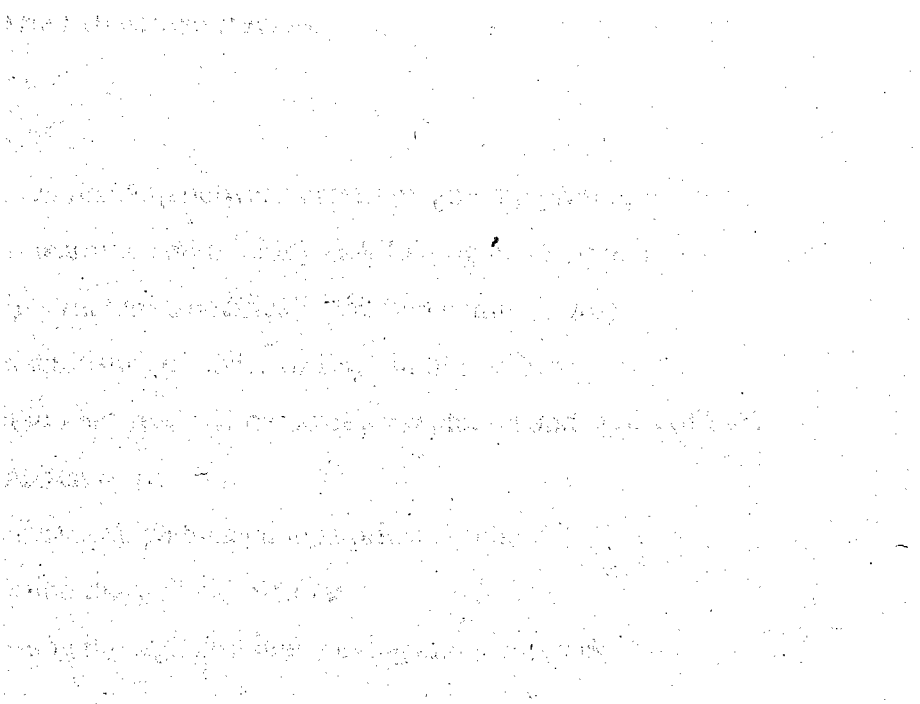
1. Does an imaginative story stimulate the children's creative imagination? If so, then how?
2. Does the mode of presentation (visual/verbal) contribute in stimulating the children's creative imagination? If so, then which mode is more effective, and why?
3. Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

This study adopted a systematic comparison technique between two groups. One group watched the story and the other group listened to the story. This technique implemented qualitative and quantitative methods to collect the data for this research.

The findings were as follows:

1. This type of story is highly engaging for the children and stimulating to their creative imagination.
2. The mode of presentation plays a strong role in the children's engagement with the story, the visual presentation being more engaging.
3. This high degree of engagement stimulates the children's creative imagination.
4. High engagement comes from matching between the mode of presentation and the children's style of L&T.
5. High originality in the children's responses comes from mismatching between the mode of presentation and their style of L&T.

This research has implications in different domains, such as cognitive studies, children's creative imagination, children's literature and children's learning and teaching.



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سَلَامٌ قَوْلاً مِن رَبٍّ رَحِيمٍ

Yaseen (58)

Peace a word from the lord, most merciful.

To the souls of my parents, who believed in my ability to achieve my goals, and were proud of me; I still feel their blessing around me.

To my brother Abdullah, my source of strength, who has supported me all the way with all his means, just because he too believes that I can achieve my goals, and make him proud of me.

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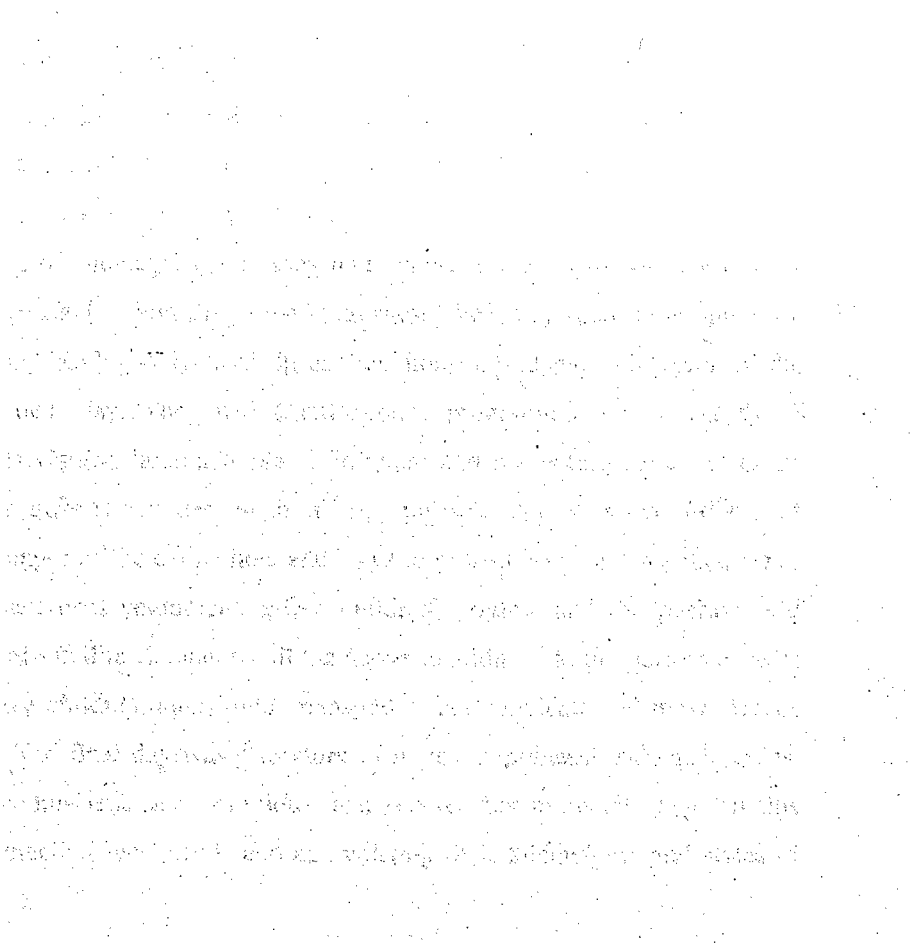
Finally, many thanks to everyone who will read my thesis, and I truly hope you enjoy it and find it helpful.

Thanks to Allah and peace and blessing upon his prophet Muhammad, his descendents, his companions and his followers.

Yesterday's wishes are today's realities.
I hope our wishes today become real tomorrow.



Chapter 1

Introduction

A portrait of the girls in the forum 1999 (published 1999)

In spring 1999, a group of twenty-seven gifted girls, aged 8-11 years old, gathered to represent fourteen countries (Australia, Bangladesh, India, Iran, Iraq, Japan, Jordan, Pakistan, Qatar, Sudan, Trinidad and Tobago, Tunisia and the USA) in the first forum in Qatar for gifted children. These children also represented some of the communities living in Qatar. The girls spent a few weeks together meeting each other regularly every day after school to rehearse the opening ceremony. It was amazing how these children communicated with each other, as the Arab girls spoke Arabic with a few words of the English language, which they had just started to learn, while the other nationalities spoke English and their own languages. Then they spent three intensive days at the forum, leaving only to sleep at their homes, and meeting again on the morning of the next day. They had a tailor-made programme with a variety of activities, such as visiting landmark places in Qatar and presenting papers at Qatar university about different issues, such as the positive and negative effects of computers, the danger of the ozone hole and ways to protect humans from its danger, the role of women in development, gifted children's rights, and the positive and negative impact of satellite channels – all the above in addition to the performance of their talents. These children, amazingly, managed to communicate and make friends with each other. The final day was a mixture of hopes, happiness, tears and smiles. They felt very enthusiastic and ambitious, and seemed yet more talented. All this came from just meeting their needs and appreciating their talents/gifts and styles of

learning and thinking, and gathering them in a healthy environment where they could meet similar children. Then and only then, all the barriers melted among them. I mention this event to show how children become encouraged and enthusiastic to present their creativity when they are appreciated, challenged and given an opportunity. This is one of the reasons for selecting the topic of this research, to find out ways of encouraging and challenging children to uncover their creative ability. I started my thesis with this short true story of success in stimulating children's creative abilities, and to give this thesis the theme of story.

1.1 Background and Purpose of this Research

This study deals with the issues of how to stimulate children's creative imagination and the impact of modes of presentation and styles of learning and thinking (L&T) on children's performance; through the study of two groups of children in Qatari primary schools.

'Imagery plays a central role in creative functioning, and research in creative cognition has provided experimental evidence on this important phenomenon.'

(Sternberg, 1999: 204).

'The biggest mistake of past centuries in teaching has been to treat all children as if they were variants of the same individual, and thus to feel justified in teaching them the same subjects in the same ways.'

(Gardner, 1994 in Tomlinson, 1999: 9).

'A different way to learn is what the kids are calling for

.... All of them are talking about how our one-size-fits-all delivery system – which mandates that everyone learn the same thing at the same time, no matter what their individual needs – has failed them.'

(A teacher in Tomlinson, 1999: 22).

'The story is the most powerful means for teaching anything'

(Carter, 2000: 24).

The above extracts outline the main issues that this research will present and deal with. These issues are mainly children's creative imagination, mode of presentation and styles of learning and thinking (L&T)

For all these, I draw upon several theories in different fields of knowledge that concern this present research; in order to place this research on a solid theoretical and framework ground. These literatures are children's creativity, children's styles of learning and thinking (L&T), children's literature and children's learning. In addition, I explore ways of presenting knowledge to children and of using technology – specifically computers – in children's learning, in order to detect how to stimulate children's creative imagination.

There has been a great deal of controversy among researchers from different domains about each of the above topics. However, there is agreement on the importance of teaching or providing children with learning methods that match their styles of L&T to obtain better results from their learning Children differ from each other in their styles of L&T, and there is conformity among researchers on the significance of matching the mode of presenting knowledge to children to their styles of L&T (Lapp, Bender, Ellenwood and John, 1975).The following brief sections illustrate the major issues of this research.

Children's Creative Imagination

To stimulate children's creative imagination, educators might need to consider individuals' needs and abilities and provide children with teaching/learning activities that stimulate their creative imagination through modern ways and create new methods of teaching and learning. Creativity in general and creative imagination in particular are the main topics to be investigated in this research. Many theories on creativity are stressed in importance and centrality in children's learning. This topic will be fully discussed in the next chapter (see the literature review, Chapter 2, pp.15-24, for more detail and relevant references).

Styles of Learning and Thinking (L&T)

Children in each single class share the same classroom. They are nearly the same age, they have same teacher(s), they study the same subjects, and they are exposed to the same activities in the same environment. However, every child has his/her own

personal interests, needs, and 'culturally shaped' ways of seeing and speaking of the world and experiencing in that world (Tomlinson, 1999), and also the aptitude to learn in his/her own way. These individual differences have to be considered by teachers and other educators while they are teaching or establishing a curriculum for these children.

Teachers make a great deal of effort to teach children and encourage them to learn in different and new ways by using different methods of teaching, and multiple types of activities and materials. Nonetheless, something seems to be missing in the academic learning process. Teachers are always complaining of the lack of effective methods to attract children's attention and stimulate their creativity. However, what children really need for this era, which has witnessed a revolution of the human mind in the use of advanced technology, and even visits to other planets, is a directed learning system that boosts and stimulates their creative abilities. Teachers need to take into account their individual mental and psychological differences (Tomlinson, 1999; Bennett and Dunne, 1994) as well as their styles of learning and thinking (L&T). Moreover, in the field of styles of L&T, researchers assure of the importance of considering different styles of L&T in order to provide children with different learning tasks or activities. Chapter 2 will provide more about the topic of styles of L&T.

Modes of Presentation

The different modes of presentation in this research are based on two main modes, which are verbal (auditory) and/or visual, as children's learning is enhanced by good presentation strategies (Bennett and Dunne, 1994). Therefore, in planning lessons, as well as considering styles of L&T among children, teachers should also consider the different ways that children prefer to learn and obtain knowledge. Since researchers insist on providing children with a clear presentation of knowledge in order to understand what we teach them or what we want them to learn. Levin (1976) argues the importance of presenting children with the right materials: 'the type of materials presented during learning largely determines whether they will resemble good or poor learners' (Levin, 1976: 129).

Levin (1976) in addition argues that visual imagery greatly facilitates associative learning. Further, at the developmental level, children appear to have 'the ability to generate effective verbal organisations' 'earlier than the ability to generate effective imaginal organisations', and therefore, the children of the fifth grade learn and recall more through pictures than younger children in second grade (Levin, 1976: 107-108). Furthermore, Grainger (2004) argues that moving images (TV, film and video) are more enhancing in children's cultural lives than still images. She noted that work on media literacy needs to be more the focus of attention. In contrast, many researchers such as Vygotsky (1997), Bennett and Dunne (1994), and Grainger (2002), insist on the importance of spoken language as a learning instrument. Combining both modes, Levin (1976) insists that children perform better if we provide pictures along with verbal presentation. (More details are provided in Chapter 2).

Alongside this debate lays also the need, stressed by many researchers about the use of computers in learning and teaching, and the necessity of engaging children with computers in the learning environment. (This issue will also be illustrated in Chapter 2.)

This research builds on the issues raised above but also considers new aspects. These aspects are:

- The impact of mode of presentation on children's creative imagination.
- The impact of styles of L&T on children in stimulating their creative imagination.
- The impact of using children's literature in combination with technology on children's creative imagination.
- Any relationships between the mode of presentation and children's styles of L&T in presenting children's literatures, and the impact of this interrelation on their creative imagination.
- The children's ideas about the planet Mars. Most studies (i.e. Sharp, 2002) in this field so far have been about the components of the solar system generally, and specifically about Earth, Sun and Moon.

The science context for the study's main tool (the story) was chosen for a few reasons: first, from my observation I noticed that children developed a rapid interest in science fictions movies and stories, as this is clear from the quantity of animation movies in the media and video games (Grainger, 2004). From my experience of studying and teaching science, and from my investigation in the field of children's

science curriculum at primary education, I realised that a particular focus in primary science was on the components of the solar system in general and Sun, Earth and Moon in particular. Additionally, the focus in science was on teaching children solid scientific facts without considering stimulating their creativity with activities such as problem solving. As well as I selected the planet Mars in particular among the other planets of the solar system because there is an ongoing research to examine the possibility of human life on Mars, and I would like to bring wider scientific research to the classroom to engage the children in it, so they can share what is going on among scientists in their laboratories outside the classroom. Therefore, I intend to contribute with a study that concentrate on the planet Mars as most of previous studies have been about Earth, Sun and Moon.

It is hoped that a study focusing on stimulating creative imagination in a science context, will add more theoretical knowledge in the field of children's creative imagination. I aim to contribute to the body of knowledge through providing an original investigation of the impact of an imaginative story and its modes of presentation (visual or auditory) on children's creative imagination. Additionally, I will consider how to bridge the gap between the use of technology, children's stories, styles of L&T, and the creative imagination.

This research highlights through its procedures and contribution, the need for providing contemporary ways to stimulate and develop children's creative abilities. A method proposed is by engaging children with advanced and current issues of life, particularly in outer space. Outer space and the mystery of the universe are a challenge and a matter of curiosity for all. Therefore, why not involve children in this challenge and encourage them to think of how to solve some of the future problems that may face humankind, and obtain the benefit of their genuinely productive imagination? Consequently, this research attempted to create a tool that interests children and stimulates their creative imagination; its starting point was children's preferences for stories, and their interest in coloured and animated pictures. In addition, children's attraction to computers was also considered in this research; and so the visual mode of presentation was built and based upon computers. This issue and others will be discussed in the following chapters, 2 and 3.

1.2 Research Rationale and Methodological Underpinning

Despite the continuous effort of educationists for providing children with modern methods of teaching, school practice in Qatar is still traditional, which identifies learners' abilities according to students' performance in examination results. It does not take into consideration children's individual learning styles and individual differences or their preferred mode for receiving information.

Therefore, this research suggests and investigates a new and original method and consideration in teaching children. This method is using a story for teaching children. As well as presenting this story which contains a scientific knowledge in different modes of presentation. In order to match children's styles of L&T, and to explore the impact of match and mismatch the modes of presentation to their styles of L&T. Then, explore the effect of these modes of presentation on children's creative imagination and their engagement with learning situation (the story in this research). This is done through analysing the children's responses and solutions to the problem in the story.

1.3 Aims, Objectives and Research Questions

This research aims to explore through its procedures some issues in order to draw out a theory and/or general conclusion about the following aspects:
First, whether an imaginative story is capable of stimulating children's creative imagination or not. In other words, whether it is a medium of stimulation for the children's basic elements of creativity such as fluency, flexibility and originality based on Guilford and Torrance's consideration of elements of creativity (Wallace, 1986b). As they consider these three elements of creativity (fluency, flexibility and originality) as central features of creativity. Therefore, only these three elements will be investigated in this research of the children's responses to the story. .

Based on the above aim, this research poses the following objectives:

- Does the mode of presenting this story play a role in stimulating the children's creative imagination (this research adopt only two modes of presentation verbal and visual)?
- Are the children's styles of learning and thinking (L&T) affect their creative imagination, and their engagement with the story?

- Which is more effective the modes of presentation or the children's styles of L&T, or both and why?
- Would the children be able to utilize their previous scientific knowledge and combine it with the new provided knowledge (which will be given to them by the researcher about Mars planet) to solve the problem in the story?

Finally, engagement as a complementary section was investigated through the children's responses to the story. By exploring the elements of how to and what engages children in a learning situation (the story in this research). Through investigating what affects the children's engagement with a learning situation, and whether they apply their previous knowledge to solve a certain problem in the story.

All the above aims and objectives alongside with the background of this research which is shaped by my experience in the field of styles of L&T research through my master's thesis, and one of my previous jobs as a teacher, then my current career with teachers and children for several years helped me in formulating the following research questions:

1. Does an imaginative story stimulate children's creative imagination? If so, then how?
2. Does the mode of presentation (visual/ verbal) contribute to stimulating the children's creative imagination? If so, then which mode is more effective, and why?
3. Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

The above questions have been formulated to conduct this exploratory research into the impact of imaginative story and its modes of presentation on children's creative imagination, in consideration of their styles of L&T.

Then as a complementary investigation after analysing the children's responses I will investigate the impact of their styles of L&T and the mode of presentation on the level of their engagement with the story (the story indicates any other learning situation, not necessarily a story).

1.4 Characteristics and Originality of this Research

This research attempts to enhance the body of knowledge with some new methodological, theoretical and practical contributions in the field of educational psychology and cognitive styles. The results may be applied by teachers, curriculum planners and other educators, in order to promote children's creativity and learning.

This research has an exploratory nature. It explores and investigates in detail – through the research questions and the data analysis some issues in order to draw out a theory or general conclusion about the following:

- Whether the mode of presentation is more effective in stimulating children's creative imagination, or the styles of L&T, or both, and why.
- Whether story is a medium for the stimulation of children's creative imagination.
- Whether the stimulation bonded with the mode of presenting this story or not.
- Whether it would be possible to engage children in a learning situation, and if so, then how.
- Explore what is the effect of their engagement in their learning situation (for example in solving a problem).
- Whether the mode of presentation and the styles of L&T have an impact on their engagement with a learning situation.

This exploration was through using a mixture of qualitative and quantitative techniques as a strategy of data collection, to maximise the validity and reliability of this research and to cross-check the indication of the children's responses. Moreover, using these strategies allowed in-depth understanding and evaluation of the results. The findings of this research, are expected to be an original contribution to knowledge.

Therefore, I carefully designed the story, the questionnaire, and the interview questions to explore the impact of two modes of presenting the story on children's creative imagination, considering their styles of L&T. In a sense that the children will provide responses that indicate their fluency, flexibility and originality in solving the problem in the story, as well as these responses will show if they utilise their previous knowledge in solving the problem.

1.5 Research Design

This research design has been developed to investigate children's capacities to think and imagine creatively, and employ their previous knowledge and incorporate it with the new knowledge in solving a problem; using a story as a tool to assess their creative imagination and learning, through presenting this story in verbal and visual modes of presentation.

This research is designed as a comparative study in which a comparison is conducted between two groups of children. These two groups are: watching group (WG), where the children are presented with the visual mode of presentation (the animation story), and listening group (LG), where the children are presented with the verbal mode of presentation (traditional story-telling). The terms listening, verbal and auditory on the one hand and watching and visual on the other hand will be used during this research process. Then, through comparing the children from both groups responses to the problem in the story; the creative imagination of the children can be evaluated according to their responses after they have watched or listened to the story. Then, the analysis will investigate whether there is any association between their styles of L&T and the mode of story presentation. In other words, does matching the mode of presentation to the children's styles of L&T stimulate their imagination more, or there is no effect of this matching on their creative imagination. This study will provide a complementary exploration of the impact of this matching on the children's engagement with the learning situation through analysing their results on the first question of this research (Does an imaginative story stimulate children's creative imagination? If so, then how).

The data sample for this research was obtained from a study of primary school children in Qatar in year 5 (9-11 year olds).

Data Tool

- For the purpose of this study, a story for the children has been written specifically based on information about the planet Mars.

The following section will briefly discuss the research process, and then Chapter 3 (Methodology and Methods) will illustrate and explain the rationale for this design and the use of these particular methods.

1.6 Research Process

The research process started by the pilot study few years prior to the actual field work and through various methods and methodologies, then all the data were incorporated and analysed in order to answer the research questions. As it follows in the next section. .

1.6.1 Data Collection

The data is collected from different sources, as follows:

1. Different pilot studies (as shown in Chapter 4).
2. Applying styles of learning assessment to children, to find out about their actual styles of learning and thinking, and answer the third research question (Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?).
3. Presenting a lesson about the planet Mars in a traditional way to inform them of basic facts about the planet, using real coloured pictures of the planet Mars as a teaching aid (data tool). This is in order to give them the required knowledge about planet Mars and to explore whether they would be able to incorporate their previous knowledge and the new knowledge in order to solve the problem.
4. Presenting the two groups of children with the story in two modes of presentation, visual and verbal, and then collecting the children's written responses to the story. Additionally, in order to answer the research questions there are assessments of the children's performance on structured assessment after watching or listening to the story (written responses). The data of this questionnaire will answer the second question of the research (Does the mode of presentation (visual/ verbal) contribute to stimulating the children's creative imagination? If so, then which mode is more effective, and why?) As well as the third question of the research (Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?)
5. Interviewing the children after watching/listening to the story. The interviews with students are to obtain their verbal responses to the story. This is as well for cross-checking data through mixed methods and triangulations with the rest of methods.

1.7 Location and Participants

This research took place in the State of Qatar, particularly in the capital, Doha, as the majority of Qatari citizens and residents live in Doha.

The participants were children from two schools; one is a boys' school and the other a girls' school. The research tools were applied in two classes from the boys' school and three classes from the girls' school, as the population of children and the possibility of application in more classes were greater in the girls' school than in the boys' school.

In the application in the boys' school, one class was presented with the visual mode of story and the other with the verbal mode. In the girls' school, two classes were presented with the visual mode and one class with the verbal mode.

Qatari schools contain different nationalities, ethnicities, religions, and backgrounds in every classroom.

More details were collected from the classroom and school files during the application of the research tools in those schools, for instance, the numbers of children in each classroom and their ages.

1.9 Research Summary

This chapter has outlined the main features of this research and provided the reader with a broad introduction.

The following chapters will contain the following:

Chapter 2 demonstrates some definitions and a theoretical account of creativity, styles of learning and thinking, ways of children's learning at primary schools, children's literature, and the use of ICT in education.

Chapter 3 outlines the methodology of this research and discusses its methodological framework. It explains fully its design and the reasons for systematic comparison and a partial case study research. Moreover, it illustrates the methods and the tools of this research, and the purpose of using them. Additionally, it displays and discusses the story and its two modes of presentation and their features, and explains in detail how to collect and analyse the data.

Chapter 4 1 highlights the main features and findings of the pilot studies, and analyses those data. It sets a primary categorisation of children's responses, and displays the strategies and the features of data collection in the main fieldwork.

Chapter 5 describes and analyses the collected data from actual fieldwork and displays the findings.

Finally, Chapter 6 discusses and form conclusions regarding the main findings, the contribution, implications, and any difficulties of this research.

Chapter 2

The Literature Review

2.1 Introduction

This chapter lays out some issues underlying the problem of this research, and looks in depth at different aspects that relate to the present research topic. It attempts to obtain an in-depth understanding of the problem of this research and to provide clear answers to the following research questions:

1 Does an imaginative story stimulate children's creative imagination? If so, then how?

2 Does the mode of presentation (visual/ verbal) contribute to stimulating children's creative imagination? If yes, then which mode is more effective, and why?

3 Do children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

Different literatures are investigated and organised in this chapter to inform the above questions. I demonstrate some definitions, illustrations and discussion of aspects related to these research questions. These include creativity, styles of learning and thinking, the relationship between children's styles of learning and thinking and the mode of presentation, and its effect on their learning. Further, there is discussion and clarification of how children learn and how children organise knowledge in their minds and then how to incorporate old and new knowledge together and the implication of doing so in an educational situation. In this research, the implication would be how to use their previous and new knowledge to solve the problem in the story. In addition, how to teach children with a story, the two modes of presentation, ways of learning and teaching in primary schools, the impact of using ICT in education on children's learning, and the impact of using narrative in different modes of presentation on children's imagination. These sections were to reveal the incorporation of all these aspects in children's education and to build the base where this research starts off, and depends on in collecting and analysing the data. All the

above issues will be illustrated and investigated in depth in the following sections of this chapter.

This following short incident gives an introductory hint of what creativity is. When can we describe a person as a creative? Does creativity ability come out of the air or does it have roots in one's mind? Is it a way of thinking or dealing with actual surrounding objects? For example, the following short story reveals creativity as dealing with familiar things in unfamiliar way or finding a relationship between things when an ordinary person would assume that there is no relationship between them:

A group of children were playing with a ball in the garden. Suddenly, one of the boys kicked the ball; it flew up and stuck in between two branches of a big tree in that garden. Every child was trying his best to bring it down. So, they started throwing their shoes, shaking the tree, and jumping to reach it. Except for one little girl! She stood far off looking at them. All of a sudden an idea struck her mind, and she decided to do something. She walked towards the water hose in the garden, grabbed it, opened the tap to full and directed a strong stream of water up against the ball for a few seconds, and then the ball fell down! The children continued happily playing with it.

The following section will tackle creativity in depth, and argue through some issues about it.

2.2. Creativity

'Creativity is a complex and slippery concept.'

(Prentice, 2000: 145)

According to Weiping (2002), 'the concept of creativity has proven over the years to be an elusive one to define'. However, many researchers combine two or more aspects of the creative process, the creative product, the creative person, and the creative environment in defining creativity. Therefore, creativity is a debatable issue among psychologists and other researchers, and it does not yet have an existing precise and universally accepted definition. However, 'there is broad acceptance that

creativity involves in some way imaginative and inventive ways of thinking and doing, as result of which something new comes into being' (Prentice, 2000: 145-146). It is noticeable that there has been confusion and overlap between definitions of creativity, giftedness and intelligence, and debates among researchers, psychologists, and educationists as they have conducted studies, investigated creativity from different angles, and looked at different circumstances that affect the creative person and the creative process, environmental factors, and the creative production or outcome (Jeffery and Craft, 2001).

Jeffery and Craft (2001) outline how creativity has four development lines as follows:

1. In the 1950s

The focus in creativity was on the creative personality, cognition and how to stimulate creativity. For example, Guilford (1959), defines creativity or creative thinking as 'the ability to produce a maximum number – words or ideas – of fluency, flexibility, originality and association of remote ideas as a response or reaction to a problem or excited situation'.

2. In the 1970s

The creativity focus moved from creative outcomes and was connected to the imagination. There was a philosophical debate to support the focus on personality and stimulation creativity through the stimulation of imagination. For instance, Harrington (1975) and others add to previous definitions, and also considered the type of elaboration and quality of work as creative elements.

3 In the 1980s

The trend and focus was on the effect of environmental conditions on creativity. There was an active move from social psychologists and system theorists.

4. In the 1990s

The focus was on extending theories of social psychology and on comprehending the focus on ordinary people within the education system. In addition, an intensive focus was given to teachers' creativity, their conception of creativity and how to nourish their creativity, and there was more focus on creativity in the early years classroom.

In addition, Loveless (2003) briefly reviews the historical development of different perspectives in describing or defining creativity as follows. From the 1950s to the 1970s the focus was on the areas of personality, cognition and the stimulation

of creativity in individuals. From the 1980s to the 1990s, researchers' focus was on the awareness of the influence of social contexts and environments on the creativity of individuals, groups and organisations. As an example of the definition of creativity in the 1990s, Porter (1999) defines creativity as a novel product or idea(s), whether on the individual level, or valuable or acceptable in a single society or culture, or globally. Moreover, Young and Tyre (1992) wonder what we mean by creativity. In an attempt to answer this question, they explained in detail the notion of creativity in many aspects, and from different points of view. As a result, they reach an interesting conclusion, which is that creativity is not only 'the term we use with some reluctance and we would prefer to limit its use to that supreme act of creation, but the term is bandied about to cover everything from the creation of the universe to flower arranging' (Young and Tyre, 1992: 72).

On the other hand, Gardner (1995) differentiates between creativity, intelligence and giftedness. While he believes that giftedness is a domain and intelligence is a specific ability, he considers that creativity was unrelated to giftedness, as a person may advance very quickly in competence but lack originality: 'Competence is a term used after a person has had the opportunity to be trained or to practice a skill. This competence is also evaluated in terms of the degree of skill, a person possesses at one moment and many changes considerably over time, while, and potential changes very little over time'. Therefore, creativity from Gardner's point of view 'is doing something in a new way', which is why he believes that more often, people are gifted but not very creative. On the other hand, Carr and Borkowski (1987) support the argument that creativity and intelligence are not different because both of them deal with thinking and problem solving. One of the recent interesting studies of extraordinary minds is Gardner's taxonomy of creativity (1997). He develops a new taxonomy of creativity, by classifying it into four types of extraordinary creators, according to the different foci human beings have. These four creators are: masters, makers, introspectors and influencers.

Influencers and introspectors are oriented towards people. They are particularly involved in the world of human beings; the difference between them is that the introspectors focus on their own world, whereas influencers focus on trying to influence other people. In contrast, makers and masters are oriented towards domains. They can be interested in anything, including people; however, they tend to approach things in indirect ways through ideas and symbolic presentation in domains, thus they

tend to be writers and scientists (Craft, 2001).

From 2000 onwards 'the widening of the concept of creativity was also reflected in educators' concerns with the creativity of all individuals, not just an exceptional few'. For instance, the National Advisory Committee on Creative and Cultural Education (NACCCE) in 1999 (in Craft, Jeffery and Leipling, 2001: 6; Loveless, 2003: 7-8 and NACCCE report,1999), defines creativity as: 'imaginative activity fashioned so as to produce outcomes that are both original and of value'. Loveless then expresses five characteristics of creativity based on this definition:

- Using imagination – imagination supposing and generating ideas, which are original, providing an alternative to the expected, the conventional, or the routine.
- A fashioning process – the active and deliberate focus of attention and skills in order to shape, refine and manage an idea.
- Pursuing purpose – the application of imagination to produce tangible outcomes from purposeful goals. Motivation and sustained engagement are important to the solving of the problem.
- Being original – originality of outcome, which can be on different levels of achievement: individual originality in relation to a person's own previous work; for example, 'when a child does a science experiment and discovers the law of gravity, it is not new knowledge to humankind, but it is new and original to that individual child; relative originality in relation to a peer group; and historic originality in relation to works which are completely new and unique' (Craft et al., 1999). Craft, Jeffery and Leipling (2001) insists that all three forms of originality are valid and should be encouraged at school, especially individual originality.
- Judging value – the evaluative mode of thought, which is reciprocal to the generative mode of imaginative activity and provides critical, reflective review from individuals and peers.

The nature and recognition of creativity have been discussed by many groups of researchers, and have been defined in wide-ranging ways. Likewise, in this topic there is a noticeable uncertainty and overlap between definition and assessment. For example, Torrance (1990), Khair Allah (1981) and Harrington (1975) consider fluency, flexibility and original thinking as central features of creativity. Further, there was another overlap between psychological definition and operational definition among educationists and psychologists researchers. Furthermore, as different

definitions lead to one another, it is not clear where one ends and another starts. Although there appear to be different eras for each type of focus on creativity, the domain of each era is not precisely fixed. In other words, some researchers in the 1990s still define creativity with the focus of the 1970s or even before then. For example, Weiping (2002) support Einstein's argument that 'language, as it is written or spoken, did not seem to play a significant role in the creative person's mechanism of thought, he referred rather to physical signs and more or less clear images which seemed to be voluntarily reproduced and combined'. Other psychologists also support this role of imagination, such as Gardner (1983) and Johnson-Laird (1987). Joubert (2001) also defines creativity as applied imagination, since she defined imagination as 'creating a mental image, picture, sound or a feeling in person's mind; it is a thought process that establishes a new idea or image that was not there before....It is the power that enables creative people to offer novel perspectives to ordinary situations' (Joubert, 2001). It is not necessarily appropriate to consider different definitions according to what is current at any one time. Imagination is a main and essential part of creativity and it will appear in most definitions of creativity. Likewise, innovation or originality is present in any form or stage of creative process, as there are different levels of creative achievement, each of which has its time, place and value (Joubert, 2001). Another definition of creativity is by Lucas (2001), in which he argues for Gardner's theory of multiple intelligences, and considered 'creativity as a state of mind in which all of our intelligences are working together. It involves seeing, thinking and innovating. Creativity can be demonstrated in any subject at school or in any aspects of life' (Lucas, 2001). Craft (2001) also argues that something must involve a degree of innovation in order to be considered creative. She argues that innovation is necessary even if the outcome is not observable. Therefore, a creative outcome may be an idea that is not yet in the public domain for scrutiny. For instance, it could be novel for the child, however not necessarily to the wider world (Craft, 2001).

On the other hand, some researchers formulate new concepts of creativity, or new concepts related to creativity. For example, there is the concept of mindfulness by Langer, which means 'the continuous creation of new categories; openness to new information; and an implicit awareness of more than one perspective' (Langer, 1997). Safran (2001) adapts this notion or concept and describes the mindful person as the person who 'takes an active, open, interested approach to life and makes as his/her

'attitude towards life'. Safran as well, argues that mindfulness encompasses creativity as it includes the notion of making something new or putting things together in new ways; and includes being open to new ideas and seeing many points of view. It is not just about making new connections but continually thinking about any part of life, consciously or unconsciously, looking around life from all angles, and asking questions about what one finds' (Safran, 2001).

In contrast, Craft (2001) invents two concepts of creativity, and distinguishes between them. They are, first, Little C Creativity (LCC), which involves innovation and development. She believes that LCC can be fostered and developed especially among children. The other notion is Big C Creativity (BCC), which indicates developed innovation, which is an original and novel outcome and may be worldwide; adult inventors usually do this.

Other researchers explore creativity from different angles, as Runco (2003) illustrates, distinguishing between two theories of creativity: the theory of personal creativity, and many previous theories of creativity. The theory of personal creativity focuses on the creative process and the mechanism that underlies creative behaviour, which can be described as focused on originality in reference to personal norms. On the other hand, previous theories are focused on objective performance and achievements, or in other words, they are product oriented.

Another interpretation of creativity was held by Boden (2001); he considers creativity as the 'ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way...new ideas may be new with respect to the whole of human history, or new with respect to the person's previous ways of thinking' (Boden, 2001). Boden in addition outlines three different types of creativity: all are grounded in previous knowledge, but the way this knowledge is used differs in each case, as follows:

1. Combinational creativity produces new ideas by combining or associating old ideas in unfamiliar ways.

2. Exploratory creativity investigates the possibilities inherent in the conceptual space (or existing possible opportunities): just what do rules enable one to do? Even this can often generate surprises.

3. Transformational creativity involves some significant alteration of one or more of the rules of the current conceptual space. This enables certain ideas to be generated, which simply could not have been generated before the rule change.

From the previous definitions and interpretations of creativity, it is noticeable that some researchers consider creativity as an interaction between individuals and their communities, processes, domains and even wider social and cultural contexts (Loveless, 2003); creativity can also be a challenge to create something tangible out of abstract ideas. However, the majority of researchers regard creativity as a general concept, as novelty and appropriateness, such as Martinsen (2003). From the other side, some researchers deal with creativity as an aptitude or potential, hence Runco (2003) argues that everyone has creative potential, and creativity is something can be found in every child, not only the gifted or highly intelligent child. Subsequently, Runco defines creativity as the construction of personal meaning, and a kind of self-expression and self-actualisation. That is why he uses the term 'the creative effort of the child', and he argues that this effort is original and meaningful for a child, however not in comparison with larger norms, otherwise we will never recognise children's potential. Therefore, Runco (2003) argues that the ideas given by one child should be compared with his/her peers in order to determine originality. The present research has adopted Runco's (2003) and Craft's (2001) definitions, because the creative solutions that children may provide can be unique and original for them on a personal level, or for their peers, and they make an effort to provide this solution, as Runco stated above. Thus, the responses or solutions of each child will be compared to the other children's responses to determine their originality

Another dimension that has an impact on children's creativity is the educational and/or social environment that surrounds them, in enhancing or determining their creativity. The ideal environment to develop creativity must be rich with knowledge, stimulation, motivation, and encouragement. Children's imagination and outcome may be influenced by the home environment – if the child finds it an enriching environment, in the sense of encouragement, understanding and belief in his ability, primarily by his/her parents rather than siblings. Likewise at school, if teachers show the child appreciation and encouragement for his/her academic and non-academic ideas or products, then this attitude may encourage children's creativity. However, this must be followed by acceptance and encouragement from the wider social environment that is the child's society and culture, where the child's creative ideas or inventions would be accepted and valued culturally according to the 'social, economic, and ethical framework of society' (Craft, 2003: 148; Sternberg, 2003; Freeman, 2002). Hence, Hennessey (2003) emphasises the role and the impact of the

environment on the creative person and the creative outcome: 'Whatever an individual's particular talents, skills and creative thinking abilities, the conditions under which he/she works can significantly impact on the level of creative produced'. In addition, 'Intrinsic motivation is a primary driving force behind the creative process, and over 20 years of research evidence, tells us that it is the social environment that, in large part, determines this motivational orientation' (Hennessey, 2003: 266).

There is agreement among researchers that creativity is something novel, appreciable and/or appropriate and acceptable, going beyond the familiarity of thoughts or things. It could also be coming up with a brand new acceptable outcome. Establishing or finding a relationship between things, when there seems to be no way for a relation among them to exist, is an example of creativity. For example, consider the simple situation mentioned above, about the relationship between the ball and the water from the garden hose. None of the children thought that water from the hose would bring down the ball. They went with the familiar and usual solutions in similar situations.

2.2.1 The relationship between creativity and the present research

Different standpoints and arguments regarding creativity reveal that creativity is debatable politically, economically, environmentally and culturally, and that there is no unanimity or consensus on one definition of it. Therefore, in light of these arguments, one issue has been selected for discussion, which is the individual's capacity to be creative, even once in a person's entire life, in one or more aspects of life. However, there are creative people with genuine mental ability, or who are influenced by other factors. For example, such people have intrinsic motivation, which drives them to search for knowledge, to understand this knowledge fully, and to determine to uncover and protect their creative product, and to make this attitude an attitude towards life.

From the demonstration of the controversial issue of creativity definition, creative personality, and creative outcome, and the circumstances that enhance or inhibit creativity, based on the points of view of Runco (2003) and others such as Craft (2001), I attempted to generate an operational definition to be adopted in this research as follows.

A creative person is *'the person who actualises and practises his/her unusual and original thoughts to a recognisable, tangible outcome; and shows his/her fluent and flexible ability to produce ideas (solutions or outcome) no matter if this outcome was acceptable or not in one set of cultures'*. This outcome could be acceptable in different cultures at the same time, or may be accepted in the future by the same culture that rejects it today, since accepting or rejecting outcomes depends on whether people need a certain outcome at that time or not. On the other hand, when a creative outcome is rejected by a certain culture at a certain time, it may be that it was not possible and adequate to apply it in that culture at that time. However, a creative outcome does not lose its privilege of being a novel and original creation through being rejected by one culture. In fact, on the contrary this means that the creative person can visualise the possibilities to apply it better, and s/he has a better vision of the future than others in his/her culture. For example, the person who invented or created the atomic bomb is a creative person. However, in some cultures he is considered as a criminal and his creation is not acceptable. Nonetheless, in other cultures he is a creative person and his outcome is useful and acceptable. The above is a lateral contribution of this research to the aspect of definition of the creative person. The main concern of the present research is more towards the creative outcome of children. This is based on fostering the LCC (Craft, 2001) and is defined in this research as *'the original unusual response(s), solution(s) or idea(s), the child produces to solve the problem in the story, after being exposed and mentally aroused by a suitable stimulus that motivated him to produce this original creative response(s) (outcome) as 'the originality of this response would be determined in comparison to his peers' responses'*.

Therefore, in this research, I intended to explore children's original and/or unique (creative) responses to the problem in the story. They are provided with a convenient tool (the imaginative story), in order to stimulate their imagination and to challenge them to provide unusual and original responses to solve that problem.

This story is not constructed on a specific academic topic in a school book or curriculum. The innovation (the story) took the shape of an imaginative story. This story is related to new trends and attitudes towards outer space and technology in general, and the starting point was children's interest in stories and computers.

I present a story that is not bounded by any particular culture. As it is free from any cultural impact, this formulated story is not subjected to any cultural values or

rules. However, children's responses may reflect certain aspects, values, or beliefs of their culture. From another perspective, the children might not be aware of their thoughts in relation to their culture. Thus, the children may produce genuine, original, and novel ideas or solutions unconscious of their cultural values or limitations. It could be argued here that children should be given freedom to think and express their ideas without restricting them with cultural barriers or limitations. Therefore, they will be given the opportunity to think and express their thoughts freely in this research, depending on their imagination and some of their knowledge.

One of the main aspects of this research is the use of styles of learning and thinking. The following section will demonstrate and discuss this issue.

2.3 Styles of learning and thinking (L&T) (cognitive styles)

A comprehensive review of research in cognitive psychology has indicated that people demonstrate significant differences in the cognitive processing styles that they adopt in problem solving, perceiving, remembering, organising, processing, and thinking (Liu & Ginther, 2007).

There are different opinions among educationists and psychologists researchers about how to define styles of learning and thinking according to their different domains (Liu and Ginther, 2007). Some define them as styles of L&T, or styles of learning, or styles of thinking, or cognitive styles, or modality. These are all diverse names and can describe the same mental processes. Sternberg (1988) emphasises that alternative theories of styles use a common root word, style, and cover almost similar attributes but with different labels (Moallem, 2002; Riding et al., 1993). Therefore, throughout the present research these terms (cognitive styles or styles of L&T) will be used interchangeably.

Some researchers argue that it is difficult to clarify styles of L&T in childhood. Children's modes or styles of learning and thinking are not stable or definite before the stage of adolescence. For example, Entwistle (1990) argues that few consistent interrelationships between cognitive styles have been reported, at least among children, where style, differential ability, and developmental stages are still inextricably interwoven. However, some literatures have discussed children's styles or preferred cognitive styles of learning and thinking (Blake, 2002; Freeman and Josepsson, 2002). In addition, some researchers believe in the importance of knowing

the styles of cognitive or styles of learning and thinking (Armstrong, 2000) that can be applied to children as well as adult. For example, Halstead and Martin (year unknown) emphasise that 'a key to getting and keeping students actively involved in learning, lies in understanding learning style preferences, which can positively or negatively influence a student's performance'. Some researchers argue that there is a link between preferred style of L&T and learning retention (Court, Tung, Shehab, Rhoads, and Ashford, 2003). On the other hand, Moallem (2002) argues that experimental studies show that students' styles of L&T make a difference to their academic achievement. Therefore, she suggests that 'the learners who have styles that match the teaching or instructional style tend to retain information longer, apply it more effectively, and have more positive attitudes towards the subject of the course than those who were subjected to clashes in teaching/learning styles' (Moallem, 2002: 1).

The following sections illustrate styles of L&T step by step in order to clarify this issue and to explore and explain how the styles of L&T might impact on the children's learning and their creative imagination in the present research.

The following section will consider the structure of the frontal part of the brain, which is responsible for the mechanism of cognitive styles. Then, it will briefly explain the meaning of learning and thinking, followed by a demonstration of different definitions and point of views regarding what styles of learning and thinking are. The final section will explain the relationship between styles of L&T and the present research.

2.3.1 Brain structure (specifically the two hemispheres)

'Two personalities in one head, Yin and Yang, hero and villain'.

(McCrone, 2000)

In this section the illustration of the brain structure will enclose the frontal part of the brain, where the cognitive functions that are responsible for the cognitive styles are located. The precise demonstration will be of the cognitive process and functions in this part of the brain, and not the biological functions.

The cerebral cortex of the brain consists of two hemispheres, the left hemisphere and the right hemisphere. They are joined by a large bundle of interconnecting fibres

called the *corpus callosum* (Ornstein, 1977). Mainly, the right side of the cortex controls the physical functions of the left side of the body, and vice versa. However, the two sides of brain differ in cognitive functions, modes, or characteristics (Entwistle, 1990), or styles of L&T.

Style: basically means how the person prefers to act and deal with things or ideas (Sternberg and Zhang, 2001; Armstrong, 2000).

Cognitive style: Tennant (1988) defines cognitive style as 'an individual's characteristic and consistent approach to organising and processing information'

These cognitive styles affect a broad variety of behaviours including learning performance (Riding, Glass and Douglas, 1993). Also, they play a fundamental role in cognition and achievement. Different people process the same information in diverse ways and using different areas of the brain when they are thinking or making decisions (Riding, Glass and Douglas, 1993).

Styles of L&T are a debatable topic, since researchers including neurophysiologists and neurologists tend to identify and classify these cognitive styles according to their philosophies, domains and the purpose of their research. There is some agreement on fundamental principles, such as:

- The left and right hemispheres of the brain are responsible for the features of styles of L&T. For example, Riding, Glass and Douglas (1993: 267) add 'that hemispheric specialisation has been associated with the right hemisphere being the location of visuo-spatial and the left the verbal function'. The right brain concentrates on the broad, background picture. The researchers believed it has a panoramic function; one side of the brain thought and saw in wide-angle while the other zoomed in on the detail (McCrone, 2000).
- The left side or left hemisphere is verbal and logical: 'The left hemisphere has superior language and arithmetic skills' (Rorden & Karnath, 2004:813). Moreover, 'The left hemisphere of the brain is predominant in the perception and production of speech' (Shtyrove et al., 2000). The right hemisphere of the brain is visual and emotional: 'The right hemisphere has better spatial skills' in (Rorden & Karnath, 2004: 813). Further, 'The right one is specialised in processing its prosodic and emotional components' (Shtyrove et al., 2000).

- Some people's cognitive processes are dominated by one hemisphere more than the other. Therefore, people who are dominated by the left side of the brain are usually described as thinking and expressing themselves better verbally and using logic and step-by-step strategy in making decisions or solving a problem. This is unlike those who are dominated by the right hemisphere, who are visual. They think and express themselves in pictures better than words, and use imagination and random thinking in solving a problem or making a decision, for example.
- Usually people use both hemispheres, regardless of which one dominates.
- Some people use the two hemispheres effectively, depending on the situation or the problem they face at that time.
- There is no "good" or "bad" thinking style, and thinking styles are time-, situation- and culture-dependent.

The above points are the main fields of agreement among researchers in general. However, there are some points of controversy.

McCarthy (1981) bases learning style on perception and process dimensions. Thus, she described another type of style of learning and thinking, different from the left/right style of learning as follows:

- **Concrete experience:** the person who involves himself with new ideas and discussion (this person learns by sensing and feeling).
- **Reflective observation**: the person who gathers data then analyses it (this person learns by watching).
- **Abstract conceptualisation**: the person who is able to form new theories from newly acquired concepts (this person learns by thinking).
- **Active experimentation**: the person who uses theories to make decisions and solve problems (this person learns by doing).

Charles (1980) categorises learners into three groups depending on their styles of processing information, as follows:

1. **Adventurers** process information hurriedly and intuitively.
2. **Ponderers** are more reflective and analytic in processing.
3. **Drifters** depend on others and wait for instruction to do a task.

Other researchers such as Riding and Rayner (1998) categorise learners into two main groups, **imagers** and **verbalisers**. While imagers learn, they prefer pictures and

diagrams. Verbalisers prefer written text. On the other side, Entwistle (1990) views learners from a different dimension and described them in two different categories, **impulsive** and **reflective** learners. He interpreted them as follows:

- **Impulsive** people yield rapidly to the need to identify the matching figure, choose quickly, and make more mistakes; they respond to problems rapidly, therefore they excel in tasks or jobs that require broad analysis (Baloche, 1998). Whereas
- **Reflective** individuals treat the task more analytically and cautiously, they are more accurate, but slower, as they respond more deliberately and consider alternative solutions before settling on a response; therefore they excel in tasks or jobs that require detail (Baloche, 1998).

Becker and Dwyer (1998) mention two learning styles in their study on implementing groupware in the classroom. These are the **visual** learning style and the **verbal** learning style, and they found that visual learners were interested in groupware, whereas verbal learners were less enhanced through the use of groupware. Shears (1999) summarises the characteristics of other categorised styles of learning, namely visual, verbal or auditory, and kinaesthetic learners (kinaesthetic is outside the scope of this study), as follows.

Visual learners learn by using pictures, charts, diagrams, and illustrations. They like to see things written down, and they like to organise and decorate their own belongings. It has been noticed as well that they watch rather than talk or act, as they find it difficult to concentrate during verbal activities. Moreover, they are good spellers, they like reading, they are very good observers who notice details, and they recall things and experiences they have looked at.

Auditory learners learn better through verbal lessons and discussion. As these children have a verbal style, they do not like to do their tasks or reading or even talk to themselves quietly, and they do not like silence for long periods, unless they try to concentrate on something, in which case noise can distract them. Further, they recall or memorise things depending on how they sound.

Kinaesthetic learners learn by making and doing things, or by touching (even people when they talk to them) and moving objects in order to learn about them. Furthermore, they often take notes in lessons, as a way not to go back and read them. They depend on body movement as well in order to express or explain something.

They do not like long periods of silence and even lose their interest in activities if they have to be still – not involved – and silent. Moreover, they can be poor spellers, and they memorise better when things and experiences are associated with movement.

Riding and Al-Hajji (2000) mention two cognitive styles, **verbal-imagery** and **wholist-analytic.** In contrast, Armstrong (2000) investigates the influence of individual cognitive style on performance in management education; he divided these styles into two main groups, **wholist/intuitive** and **analytic.** He describes '**analytic** individuals as: compliant, their thinking relies on logic sequences and vertical reasoning, they prefer structured approaches to decision making, apply systematic methods of investigation, and are especially comfortable when handling problems requiring a step-by-step solution. On the other hand, **wholist/intuitive** individuals tend to be nonconformist, their thinking relies on impulsive synthesis, and lateral reasoning, they prefer rapid, open-ended approaches to decision making, they rely on random methods of exploration and work best on problems favouring a wholistic approach' (Armstrong, 2000: 325). According to these characteristics of two different styles, he found that students with **analytic style** attained higher grades for long-term solitary tasks involving careful planning and analysis of information. In contrast, the **wholist/intuitive style** was higher for analytic individuals, as was overall ability as defined by final degree grade. Armstrong demonstrates as well the following cognitive styles in a previous study of his (Armstrong, 1999a; cited in Armstrong, 2000) where he identifies 54 dimensions of different cognitive style including:

- Field dependence – Field independence
- Reflective – Impulsive
- Serialist – Holist
- Converger – Diverger
- Simultaneous – Successive
- Wholist – Analytic (wholists 'organise information into loosely clustered wholes', while analytics 'organise information into a clear cut conceptual groupings' (Douglas & Riding, 1993: 386).
- Leveller – Sharpener

Baloche (1998) provides a full illustration of one of the above cognitive styles, **field-independent style,** in which individuals tend to prefer situations that require analytical or logical approaches to problem-solving, and materials that are less embedded in social context. In contrast, in **field-dependent style** individuals tend to

prefer situations that require global or universal approaches to problem-solving, and materials that are more embedded in social context.

Riding, Glass and Douglas (1993) divide the above-mentioned cognitive styles into two main families:

1. Wholist-Analytic cognitive style family, which includes: Field Dependence-Independence; Impulsivity-Reflectivity; Holist-Serialist; Leveller-Sharpener; Simultaneous-Successive; Diverging-Converging; Wholist-Analytic.

2. Verbaliser-Imager cognitive style family, which includes: Sensory Modality Preferences; Verbaliser-Imager; Verbaliser-Visualiser.

Then they summarise these two families into two basic dimensions of cognitive style as follows:

A The Wholist-Analytic style of whether a person tends to 'process' information in wholes or parts.

B The Verbal-Imagery style of whether a person inclines to 'present' information during thinking verbally or in mental images.

In addition, Riding, Glass and Douglas (1993: 271), categorise the Verbal-Imagery style into three types:

1. Verbalisers: these individuals consider the information they read, see, or listen to in words or verbal associations.

2. Bimodals: these individuals are in the middle, and tend to use either mode of representation.

3. Imagers: these individuals 'read, listen to, or consider information, they experience fluent, spontaneous and frequent mental pictures either of representations of the information itself or of associations with it'.

It is clear from the above illustration of different identifications and categorisations for the styles of L&T that there is a common factor among them. They are all ruled by the two hemispheres of the brain, and they are all an indication and expression of the multi-cognitive functions of these two hemispheres, either individually (one hemisphere dominant over the other) or together (mutually or integrated). In other words, these styles of L&T are manipulated by the two

hemispheres of the brain, and some of them are dominated mainly by left side cognitive functions, while others are dominated mainly by the right side, and some by both of them as a combination of the two hemispheres' cognitive functions. However, in point of fact these styles of L&T usually work by collaboration between both hemispheres and not by just one. For instance, a creative poet, in order to draw an imaginative aesthetic picture in his mind, has to use language to express this pictorial scene or image, and vice versa, in order to describe something he needs to imagine it. Images of that picture are located in the right hemisphere of his brain, whereas the language is located in the left. Consequently, to present the image which is in the right hemisphere of the brain, he has to use language, which is in the left hemisphere of his brain. Riding, Glass and Douglas (1993) argue persuasively that all groups of styles of L&T can use either mode of presentation – the verbal (verbaliser), the visual (imagery) or the bimodal – if they make a conscious choice (like the above example about the poet). For example, verbalisers can form images if they try, but this is not a normal and habitual mode for them.

2.3.2 Characteristics of styles of L&T in this research

This section demonstrates the characteristics of each style of L&T, as in this research I chose to label them basically the **left style** (dominated by the left hemisphere) and the **right style** (dominated by the right hemisphere). In addition, there is the **integrated style** (dominated by co-operation or integration between the two hemispheres, the left and the right). As may be noticed, all the above styles of L&T characterized by different researchers are basically reflections of the cognitive functions of the left and right hemispheres of the brain, or both of them, as will be explained in depth after displaying the characteristics of each of these three styles.

- The **left style** individual tends to be coldly logical, verbal, serialistic and expressive, analytical, a convergent thinker, reflective, and introvert, as well as depending on language to express thoughts or ideas (since the centres of language, writing, speaking, and thinking in the brain are located in the left hemisphere). This individual prefers abstract knowledge, he is organised, arranges tasks and solves problems in a step-by-step strategy, and enjoys maths and numbers. The left hemisphere is also able to recognise words using less attention than the right hemisphere (Nicholls, Wood and Hayes, 2001).

➢ The **right style** individual tends to be holistic, imaginative, emotional, spatially aware, a divergent thinker, impulsive, and extravert, as well as thinking primarily in pictures or images (Sword, 2007). This individual is also good at reading body language and expressing in body language. He likes depth, colours, music, and art. He is disorganised, and prefers to solve a problem or deal with tasks in a random way.

➢ The **integrated style** is a mix of the right and left styles. Therefore, these individuals are able to use the characteristics of each style (left and/or right) equally and efficiently, according to the problem, task, or situation facing or challenging them. These individuals are usually versatile, fast and accurate, reasonable and adventurers.

The above characteristics sum up all the dissimilarly labelled presented styles of L&T. For example, McCarthy (1981) labels the styles as concrete experience and reflective observation, and when we read the characteristics of this style we find it typical of right style individuals, as well as of adventurers in Charles's (1980) categorisation, and similarly with the impulsive style in Baloche (1998) and the imagers in Riding's (1993) categorisation, and so on.

Moreover, the left style's characteristics are shown in McCarthy's (1981) categorisation of abstract conceptualisation, and the ponderers according to Charles (1980), or the reflective according to Baloche (1998), and the verbalisers in Riding's (1993) categorisation. The list could be extended if I continued the comparison. Therefore, in this research we can call these styles with *left, right* and *integrated* styles of L&T.

The issue of categorising the styles of L&T goes beyond this simplicity to controversial debates among researchers in how to define or categorise it. As some studies have revealed, it is not that easy to categorise the styles of L&T into three styles (left, right and integrated). Some studies (Al-Ali, 1995; Ali, 1985; Ebada and Riyadh, 1986) reveal that there was a fourth style of L&T, which was labelled a **mixed style** as it was difficult to distinguish its characteristics according to the basic taxonomy above or the categorisation of left, right and integrated styles of L&T. As mixed-style individuals, they do not seem to have a specific pattern of learning and thinking. They tend to use a mixture of the three styles at the same time in very

convergent percentages; this is according to the results of Torrance's assessment of styles of L&T. Al-Ali (1995) sheds light on this mixed style. She argues in that study that it is not easy to draw a clear cut-off point or boundaries between these styles, as the relationships between these styles are very profound and complicated. Hence, the study showed that there was a new style, which had no category in that assessment, and did not fit any of the three categories of the assessment, which was why she labelled it the mixed style.

There is some ambiguity related to the topic of styles of L&T. According to Riding, Glass and Douglas (1993), hemispheric specialisation is associated with the functions of the right being the location of visuo-spatial functions and the left the location of verbal functions. Nonetheless, the evidence for this issue is sometimes conflicting. Some researchers like Zhang and Huang (2001) find that there was overlapping to a certain degree between thinking styles and personality dimensions. From a medical and neuroscience point of view as well, Rorden and Karnath (2004) argue that individuals' brains differ in shape, size and structure, and it is not easy to make a comparison between individuals unless one has developed a special method to do so.

Overall, there is clear evidence that the subject of styles of L&T is a controversial issue, and it is difficult to find a complete settled definition, categorisation or point of view to be followed or adopted. The difficulty and controversy relate to how the two hemispheres work in the brain. The human brain remains the ultimate complex engine, and researchers from all domains are unable to untie its codes This research focuses on illustrating two styles of learning and thinking, the verbal (auditory or oral) and the visual, since all the above categorisations agreed on dividing individuals into two main categories, the visual and the verbal. The individuals with visual style think in pictures and images more than words, and prefer to learn through visual presentation or seeing or watching pictures and images (Court et al., 2003) either still (pictures, charts and diagrams) or animation (TV, video). On the other hand, individuals with verbal style think in words, and prefer to learn through verbal presentation: talking, reading the written word, or listening to the spoken word.
For this reason, this research aimed to present the story to the children with only two modes of presentation: verbal (listening group) and visual (watching group), and

explore, on the one hand, whether there was any impact of the mode of presentation on the children's creative imagination and on their engagement with the learning situation (story). It also explores whether there is any effect of their styles of L&T visual (right style) and the verbal (left style), and integrated (right+left or visual+verbal) on their creative imagination then their engagement in the learning situation (the story). (the engagement with the learning situation will be a complementary section in the research).

The next section will explain the relationship between the mode of presentation (verbal and/or visual) and styles of L&T.

2.4 The relation between the mode of presentation and styles of L&T

The mode of presenting knowledge to children and children's styles of L&T are fundamental principles in this research. Therefore, investigating and finding a relationship between them in previous literature and studies will provide better guidance for the progress of the research. Most of the literature on this topic deals with a written story, either with or without pictures. The following section illustrates previous research.

How to present knowledge to children tends to be a debatable topic. Some researchers (Garrett-Petts, 2000; Safran, 2001; Lapp, Bender, Ellenwood and John, 1975) argue that children must learn by integrating two modes of presentation, visual and verbal, to support the reader, as in the case of a written story in a book enhanced with pictures to be suitable for children to read. Other researchers argue that children today tend to be visually literate, having grown up with the visual stimulation of computers, graphic novels, and television (Latham, 2000). By contrast, Grainger (2004: 81) argues that 'the visual...seems to permit in many cases much more subtle graded expression than the verbal'. However, some researchers (Garrett-Petts, 2000) agree that the presentation of a story or knowledge should combine or incorporate both modes of presentation, the verbal and the visual, at the same time. Garrett-Petts (2000) argues that depending on the verbal only, for example, will dull the reader's visual imagination, by using a method which is counter to his style. For that reason, it is preferable to use a combination of both modes, the visual and the verbal style, for teaching children, especially in primary grades, as children with a verbal style will learn better with the verbal mode and visual style children will learn better with the visual mode. However, researchers (Garrett-Petts, 2000; Safran, 2001; Lapp, Bender,

Ellenwood and John, 1975) did not explain how children learn better when they are presented by knowledge in a mode that matches their style of L&T. Better learning in what way? Therefore, this research will investigate this issue. Garrett-Petts (2000) insists as well on the importance of, and the need for, finding and considering ways to teach and validate the integration of visual and verbal literacy, rather than depending on the purely verbal. Safran (2001) on the other hand highlights that different people learn in different ways; some learn through activities, some through visual displays, some through aural, written or various combinations. Lapp, Bender, Ellenwood and John (1975) affirm the standpoint of the views discussed above, and focus on the role of teacher in preparing the right materials and best presentation that matches children's strongest learning modality or styles.

Grainger (2004) relates the preference mode to the child's social environment or culture, as some cultures are verbally (spoken language or other than written language) oriented, so a child who came from this culture would prefer a verbal mode of presentation. In contrast, other cultures or societies are oriented towards drawing or bodily modes or forms of expression, thus they tend to use body language in expressing and communicating. Consequently, these children will prefer to learn with visual and kinaesthetic modes of presentation. Grainger also asserts that 'one child might prefer physical three dimensional representation; another child might prefer to express her/himself through the body, in dance or gesture' (Grainger, 2004: 82).

Lapp, Bender, Ellenwood and John (1975) emphasise the different learning needs of different children who have different styles of L&T, and stress that children with visual style – strong sight modality – should be provided with visual aids for their learning. Likewise, auditory or verbal style learners should be provided with auditory aids in order to learn better. On top of that, they insist on using proper technology for each style. For example, using record players, radios, tape recorders as audio aids for auditory learners, and using television, CDs, videos, pictures and still or moving images for visual learners.

In short, from the above different arguments among researchers it appears that there is no best way to present knowledge to people, especially children. Furthermore, there is no conflict or contradiction between the two modes of presentation, the visual and the verbal. Both of them are convenient and they integrate with each other to present or display any kind of knowledge. However, there are certain children who prefer to learn visually, which does not mean that they do not need verbal instructions,

for example. On the other side, there are some children who prefer to learn verbally, and they acquire better understanding if knowledge is presented to them with more aural (verbal) or written illustrations than in diagrams or pictures (Liu and Ginther, 2007). They understand the language of words better than the language of shapes, colours and pictures, unlike visual children who rely more on pictures, shapes, diagrams and colours, with some spoken or written language. As a result, the difference seems to be in the quantity of language or images (pictures, for instance) each style needs, whereas children with a verbal style prefer to learn with more language (aural or verbal mode) and fewer images and shapes. Visual style children prefer to learn with less language and more still or dynamic shapes and images (visual mode). This interpretation is affirmed in Liu and Ginther (2007), as the difference in the cognitive processing between the two hemispheric asymmetries is more quantitative than qualitative in nature. It is mainly a matter of degree rather than complete ability.

A complementary part of this research investigates how children could learn better by being engaged with the learning situation, as they were with the story in this research; the next section will consider how children learn.

2.5 How children learn

How children learn is a complex topic. Despite attempts made by researchers to explore this topic, they still have not provided a full and critical exposition (Bennett and Dunn, 1994). However, Lyle (2000) emphasises the importance of knowing how children learn, in order to provide them with the best methods, pedagogy, and facilities to enhance their learning and thinking styles; and to stimulate their creative imagination as well. In this research, based on the fact that children need a wide range of knowledge to reveal and express their creativity which they gain it through their growing up and learn more through the process of growing older (Wu, et. al., 2005). In this section I demonstrate some theories and arguments that show that the children learn by accumulating knowledge and then reorganise it and classify it in their minds, in order to apply it in any learning situation; for example solving a problem creatively. The children were provided with some new knowledge about planet Mars, after discussing with them and evaluating their previous knowledge, in order to provide them with a wide and strong base –suitable to their age group- of

knowledge to help them solve the problem in the story.

Grainger (2004) argues that children come to the classroom with a large extent of knowledge that they already have, irrespective of their age, as they live nowadays in a rich environment with knowledge coming through the technology of audiovisual text of television, film, video, internet, various computer programmes and books, DVDs and CDs in their homes. Furthermore, they gather knowledge and learn through talking to parents and friends, visiting places, or through previous work at school. All these resources influence the texts they read and write or interpret and the activities they choose to engage themselves in. Mindham (2005) argues, 'If children bring with them a range of experiences, knowledge and understanding. Then, the ways in which they learn and the ways in which they utilise their imaginations will also vary. This suggests that we should provide a range of activities, techniques and materials and, above all, choices if we hope to encourage a creative approach' (Mindham, 2005: 83).

In addition, Piaget described his notion of children's 'egocentrism' as 'it is children's strong tendency to interpret reality only according to the way it is perceived from their own perspective' (Black, 1993: 172-173). Piaget formulated this notion of egocentrism of children through his visits to primary schools and his informal communication with children, and by listening to their responses for a given knowledge in any domain at those schools. Therefore, he formulated this notion of 'egocentrism' to challenge teachers to teach children new knowledge or ideas.

Driver, Guesne and Tiberghien (1989) assert that children obtain their own scientific knowledge, ideas and interpretation about any case or phenomena they study, from different resources. They also learn from their everyday experiences, talking to people or through practical physical activities. Furthermore, Driver, Guesne and Tiberghien (1989) argue that children obtain their ideas even without receiving systematic instruction in these subjects. This means that children come to school with their own personal observations and interpretations that are influenced by their ideas and expectations. However, children's ideas, conceptions and knowledge are likely to be incomplete, unclear or even wrong (Bennett and Dunn, 1994). Further, these ideas might be incoherent or contradictory or different conceptions for a particular type of phenomena, or sometimes they come up with arguments that lead to predictions in an equivalent situation opposite to those coming from a scientific point of view. The difficulty here is that children bring firmly held ideas with them to the classroom. These ideas may remain stable in children's minds and it is not easy to change their

understanding or their ideas, even if their teacher confronts them with a different interpretation or a contradictory explanation for their ideas, or even demonstrates a scientific experiment before them that proves the opposite of their incorrect understanding. Accordingly, what children are capable of learning depends in some ways on what they have in their minds and on the learning context in which they find themselves. This is because their minds are not 'blank slates' or 'empty vessels', to be filled with knowledge and ideas or the information teachers provide them with, as some educators think (Driver, Guesne and Tiberghien, 1989; Grainger, 2004). Children have ideas, which they have obtained from various sources and they have arranged these ideas or concepts and organised them in their minds or their memories in different orders or 'schema'. Indeed, children's learning in this case can be defined as the extension, modification or elaboration of existing cognitive sets of organised knowledge in their minds to make sense of their everyday experiences. Since children are active learners, they may fit this knowledge or these ideas or concepts with old ones already in their minds, or use them to enhance the knowledge they already had, or deal with them as individual pieces of knowledge unlike what they knew or learned before. Otherwise, they consider a new idea as a core and gather a different group of knowledge around it. Teachers should know and consider these ideas and concepts to build on for their strategies and activities for teaching, challenging and provoking children's existing ideas. Teachers should provide knowledge in different forms of telling, demonstrating, and explaining, and allow children to work on different tasks and activities designed to encourage them to experience by practising and developing or generating their wide range of knowledge and understanding. This is in order to link new knowledge to old knowledge stored in their minds, or previous knowledge (Bennett and Dunn, 1994). Referring to Lapp, Bender, Ellenwood and John (1975) and their opinion about the importance of providing different learners with different learning aids that fit with their styles of L&T drives us to consider this in teaching children and considering their need to understand and deal with provided knowledge, and to consider whether the presentation mode of knowledge might impact children's understanding of it, in addition to whether children have sufficient basic knowledge to build on their solutions to any problem.

The above section highlights how children obtain and deal with acquired knowledge. The next section will demonstrate some different strategies for children's

2.6 Ways of learning and teaching at primary school

This section illustrates a few examples of methods of teaching. The selected examples are relevant to the techniques of this research, such as learning through simulations, learning through problem solving, and learning through narrative (story).

2.6.1 Learning through simulations

It is believed that learning experiences are composed of content, process and social climate. Joyce, Calhoun and Hopkins (2000) designed some models of teaching and learning tools. These simultaneously defined the nature of the content, the learning strategies and the arrangements for social interaction that create the learning environments of students. Therefore, the 'real world' was simplified and presented in a modified form for teaching children in primary school, in order to help them to understand and develop concepts and skills, and generate a problem solution that could be transformed to the real world, by dealing with real factors. They (Joyce, Calhoun and Hopkins, 2000) also emphasise the necessity of knowing what kind of knowledge we aim to develop, what age group of people is our target, and what we want them to learn or know about. Moreover, they insisted that we should set up our goals for what we want children to learn and why. In order to create new methods of learning and teaching, Joyce, Calhoun, and Hopkins (2000) argue that almost all simulations depend on software. Additionally, the effective uses of these simulation models depend on how the teacher uses them in the curriculum, to reinforce and highlight the learning inherent in the game.

The following model is an example.

"In a school in Moscow, a primary class is watching a television screen. The programme announcer portrays a countdown as a rocket attempts to break from the gravity of the moon but fails to do so. Class members then take the roles of members of the spaceship crew. Instructions from the Russian Space Administration divide them into teams, and they prepare to work together to conserve their life support systems and to manage their relationships in the rocket ship until repairs can be made."

Joyce, Calhoun, and Hopkins (2000: 120)

This problem sets a challenge for children to resolve and take the responsibility of saving lives on that spaceship. This kind of challenge and open-ended problem may stimulate children's imaginations so that they will come up with creative solutions, especially if they are involved in the problem. Using technology in teaching helps to clarify ideas and give a wider understanding of the problem, since children can see and explore different ways of approaching and solving a problem. In the above example, the background knowledge of the children about the atmosphere and environment of the moon and about essential requirements for human living, such as water, oxygen, gravity and so on, was not clear.

A simulation based on Mars is used in this study to provide the problem-solving challenge to the children in this research.

Since this present research depends mainly on an open-ended story, which presents an unsolved problem that needs to be solved, the following section will explain how children learn through problem-solving techniques.

2.6.2 Learning through problem solving and teamwork

Gatt (2000) asserts that children are able to carry out problem-solving techniques in primary science if they:

- Are presented with a clear problem, or challenge.
- Have identified the scientific concepts in the problem.
- Are given time to think about the problem, to come up with possible solutions.

Children's age, previous experiences and knowledge will influence their solutions. Harlen and Jelly (1997) explain the problem-solving stages as follows:

- Setting up the problem. It is better to choose a situation relevant to experience that children have been exposed to, whether in their real lives or in fiction.
- Preliminary exploration. Children consider the problem and think of different ways of tackling it.
- Investigating. After children have gathered possible solutions, they design their method of investigation to examine their assumptions or solutions. This gives

children a good opportunity to practise manipulating variables, deciding how to make observations and what measurements they require to take (Gatt, 2000).

- Concluding discussion. In this stage the construction of scientific knowledge should be an integral part of activity. Therefore, children should compare their observations with their previous knowledge or ideas. Accordingly, they can discuss their solutions and results and draw their conclusions.

In the argument above, Gatt (2000) discusses procedures for solving a practical problem in the laboratory. The same procedures, more or less, could be used to solve any scientific problem. Hence, it is very similar to the procedures the subjects of this research should use to tackle the problem and solve it. The children are presented verbally with some knowledge, aided by visual elements, such as coloured pictures or posters about Mars's environment, atmosphere, and climate, e.g. the ground and sky colour of the planet, the polar ice of Mars, etc.

Open-ended problems give children freedom, encourage and motivate them to provide a variety of solutions for the problem as well as stimulate their creative ability (Wang & Han, 2008). In contrast, closed-ended problems drive children to only one possible solution. An open-ended problem has been selected in this study, to stimulate the children's creative imagination and to provide the children with the opportunity to apply their previous knowledge to solve the problem. Thus, they may provide more imaginative solutions; colours, animation, three dimensions (3D) and pictures in a funny presentation are used to attract and engage the children with the problem's topic and to encourage them to solve it. The scientific validity of the quality of the children's solutions will not be focused on in this research. The children in this age group (9-11 years old) have very limited knowledge about the planet Mars, if any. However, what is more important is the quantity of their responses, the variety (different) of their imaginative solutions, and, most important, the originality of individuals' responses. Wilslow (2000) proposes three challenges involved in living, and working in space, in which children attempted to solve imaginative problems through teamwork.

1. Water Cycle

The International Space Station carries a limited amount of water. It's now contaminated. The crew will soon run out of usable water unless you can invent a way to purify 500 ml, a little more than a can of soda, at a time.

2. X-Treme Fitness

Crewmembers in space have grown bored with the exercise machines in the space station and are not using them. Their physical fitness is at stake – their muscles will begin losing strength, and their bones may be weakened. It is your challenge to create athletic activities or equipment that will work in microgravity. Remember to keep all equipment light weight and include a complete description of any rules or scoring mechanisms you propose.

3. Space Walk Talk

The crew's space suit communication units have malfunctioned. You are to design a non-verbal way for astronauts outside the space station to communicate with the crew members are from different countries, you must consider how to make the communication understandable to all members of the crew. Keep in mind that space suits are bulky and head covering is essential."

In the above problem-solving challenges, the organisers took into account the importance of providing children with necessary knowledge, and the capacity to obtain the important facilities and information they needed. For example, they enabled them to use technology (computer and internet), discuss together in teams, and refer to an adult, who was present in each group to help and direct them. Therefore, they were under a kind of supervision. In addition, they exposed children to the experience of teamwork and gave them the opportunity to express and clarify their ideas, and to the importance of each individual role in his/her group. It was not clear in the results whether this kind of challenge has any impact on developing or enhancing children's creativity, within or after the programme. Moreover, the structure of each group was not clear either, whether the groups contained boys and girls or they were separated into different groups. Further, it was not clear whether gender played a role in the quality of children's solutions or not. However, the study supported the research idea of using an open-ended problem-solving technique.

Furthermore, the age group in Wilslow's project was similar to the age group (9-11 years old) of the children in this study.

2.6.3 Teaching children through narrative (story form)

'The story is the most powerful means for teaching anything'

(Carter, 2000: 24).

Woods (2001) supports Carter's standpoint that through stories children learn their cultural context and values and expand their knowledge. For instance, according to Woods (2001), in history they expand their knowledge through historical novels, and their scientific knowledge through science fiction. Woods added that a story either read or told to children can offer them a means of personal discovery and exploration of ideas.

According to Woods (2001), stories provide children with excellent opportunities for language development, conceptual development, and social, emotional, and cultural understanding. Claxton (2000) asserts that children in all societies are told stories from an early age, and through stories including fairy tales and myths, children learn their cultural values and patterns. Claxton also argues that the 'struggle and inter-relate' of the inner life of the actors – characters – in the story is what makes the story more interesting and give it its 'educational power'. He also affirms that 'much of the tension of a good story comes from the inference process, and how convincingly inner worlds are conveyed depends on the craft and the culture of the story-teller' (Claxton, 2000: 138).

It has been mentioned previously that this research will explore the effect of two modes of presentation (verbal and visual) of a story on children's creative imagination. These two modes of presentation have been chosen particularly as this research will also explore whether there is any impact of the left and right styles of L&T on children's creative imagination, if the story is presented in a mode that matches their styles of L&T. Therefore, the following sections will illustrate these two modes of presentation in depth.

2.6.3.1 Visual mode of presentation

The visual mode of presentation in this research is where the children will be able

to watch an animated story. This kind of presentation takes different forms such as story with pictures, moving images, diagrams, charts, television, video, CDs, movies or cartoon movies. Latham (2000) and Garrett-Petts (2000) praise the use of photographs in fictional stories. They argue that visual elements such as pictorial and photographic representations give stories coherence. Latham (2000) argues that visual elements bring into dialogue the interplay of reality and illusion, and bridge reality and illusion, fact and fiction by linking verbal text with photographs in a story. On the other hand, the sequence and combination of images in a story – not the photographs themselves – make it possible for the reader to interpret and feel the lived experience in the story. Carter (2000), on the other hand, laments that children are not showing good progress in their reading because they watch television most of the time. However, he considers that television is a 'good source of stories'. Nevertheless, he implores and urges more use of interactive, dynamic, and visual activities with fiction for children in schools. Even though Carter's point of view seem contradictory, he perhaps attempts to present the advantages and disadvantages of technology, television for instance. Probably he would also like children to be active instead of passive learners, as when children only listen or watch television, and receive a one-way construction, rather than sharing the experience in the case of a fictional story, where children can be active learners while they listen and watch with others. Hence, they discuss, share feelings and responses together. In addition, Marsh and Millard (2000) argue that the 'moving image can provide details about characters and setting which cannot be achieved without the interaction of sound and images...and children are more motivated to read those texts which relate to their television, films and video consumption. For example, Thomas the Tank Engine books were around for long before the television series appeared, but their popularity increased because of children's exposure to the narrative on television....Book sales increase whenever their narratives are released on film.' (Marsh and Millard, 2000).

2.6.3.2 The verbal mode of presentation

The verbal mode of presentation in this research is where the children will be able to listen to the story. This type of presentation could be also described as the aural, oral, or auditory mode. It is also takes different forms, as children could listen to, tell or read a story. Nevertheless, the literature in this field discusses the art and impact of telling a story to children, and/or how to encourage children to tell stories, more than

discussing children while they listen to a story. The few resources that have considered children's literacy have not distinguished between children's reactions while they are telling and/or when they are listening to a story. One of the old resources which pays tribute to story telling is Munkers (1959); she wrote a description of story telling, as follows:

'Story telling is magic. It is like rubbing Aladdin's lamp to make things happen; saying the secret word to waken the sleeping princess; or granting wishes dearest to the heart. In imagination, one goes to lands far away or near, to times that are new or old. With the storyteller go his listeners and stay 'til the tale is told.

Storytellers are made – not born – although often the "making" goes in life at the knee of a storytelling nurse or parent that the art seems natural and unlearned. Fortunately, however, learning can begin at any time where there is a person, a child or adult, who believes, who desires, and who is willing to work. (Munkers, 1959: 22)

Both earlier and more recent researchers insist on the importance of the role of story in teaching and learning, regardless of the mode of presentation. Munkers (1959), for example, represents the last century, when the variety of modes of presentation was limited and fewer in number than now. Equally, Carter (2000), for example, is a contemporary researcher in the twenty-first century who supports Munkers's view of story-telling. He asserts the 'value of oral story-telling in both the development of children's oracy and literacy skills' (Carter, 2000: 15). Additionally, researchers such as Munkers (1959) agree with Carter's opinion that in whichever mode stories are presented – telling or listening – it is important to develop children's oracy and literacy, oral communication skills, and self-confidence, and to help children express their thoughts and feelings through the story (Munkers, 1959). On the other hand, Marsh and Millard (2000) criticise the written narrative and affirm that the visual is more suitable for children, as mentioned above in the visual mode section.

On the whole, many researchers such as Marsh and Millard (2000) in education and psychology strongly affirm the positive impact of story on children's learning, social, emotional, moral, and creative imagination development, in all societies and in all different cultures, regardless of the mode of presentation. 'Narratives whatever the medium used to construct them, draw on a set of conventions known and shared by

their audiences' (Marsh and Millard, 2000). Nonetheless, a number of researchers consider different styles of L&T among children, and emphasise enhancing the written story book with pictures, in order to illustrate the sequence of story episodes. For instance, Grainger (2000) argues that 'the different media make different kinds of imagination possible; and impose their limitations on imaginative activity' (Grainger, 2000; cited in Grainger 2004: 81).

It could be argued that in spite of the different opinions of researchers from different domains, all of them agree on the benefit and importance of story in children's lives, and its impact on their education. Additionally, stories encourage the mental development of children, develop their self-confidence and their communication skills, and help them to express their feelings.

Literatures about story and its role in children's lives show cultural sensitivity. However, the impact of imaginative, culture-free story on children's imagination was not clear in those literatures. Therefore, in this research I attempt to create an imaginative story that is not bounded by any particular culture, in order to set aside or eliminate the cultural and background impact (Claxton, 2000) on the children's responses as much as possible. In addition, the research makes this story suitable for all children who have studied or heard about outer space in all societies and different cultural settings.

Some of the studies discussed above used ICT as a tool for teaching children. The next section will discuss the benefit of using ICT in education on children's learning, since the animated story (visual mode) will be presented to the children in the WG through the computer (CD).

2.7 Using ICT in education and its impact on children's learning

The last two decades have witnessed rapid change in computer technology and slow change in its application in education (Newton and Roger, 2001), even though computers have been in the educational field in their simplest form since the 1950s (Lapp, Bender, Ellenwood and John, 1975). Yet researchers such as Reynolds, Treharne and Tripp (2003) believe that using ICT in a very carefully designed way raises standards of pupil achievement. Some researchers argued that ICT supports learning by helping to increase the intensity of pupils' learning (Reynolds, Treharne and Tripp, 2003). In addition, Reynolds, Treharne and Tripp (2003) assert that using

ICT facilitates presenting scientific data in a clear, fast and accurate manner, and helps direct the focus of the lesson to discuss these data and their implications rather than spending a longer time representing them. Another advantage of using ICT in education is allowing students to communicate with research scientists, whether by contacting them via e-mails or on-line discussion groups. Reynolds, Treharne and Tripp (2003) in addition argue that ICT enriches students' understanding and experiences, since ICT can facilitate links between the science which children have learned or been taught and their everyday life experiences (Cohen, 2000). There is also evidence that using ICT can lead children to more commitment towards their tasks, making them more motivated, creative, and resourceful (Reynolds, Treharne and Tripp, 2003). Children were therefore more interested in and enjoyed learning, which enhanced their achievement, self-direction and self-esteem. Cohen (2000) supports this standpoint, as he mentions that ICT makes learning more attractive. Furthermore, researchers found that teachers and students use ICT both at home and at school to assist pupils' learning, by helping them in their homework (McNichol et al., 2003) and their social lives. Furthermore, ICT helps teachers in their professional activities, and facilitates interaction and communication among them and their students (Conlon and Simpson, 2003). However, there is some concern (Conlon and Simpson, 2003) that using ICT at school might face some restrictions and fear from teachers and sometimes a lack of self-confidence, as there is resistance to using a new and challenging tool. Nonetheless, there are some teachers who show interest and confidence in using it in their curriculum. Therefore, to overcome this obstacle, there must be good training, organisation and curriculum development, and funds must be provided by governments to achieve success using ICT in education. Some researchers (Reynolds, Treharne and Tripp, 2003; Conlon and Simpson, 2003) argue that teaching must use ICT within the curriculum and not teach ICT or computer use as a lesson. As 'current technology will be obsolete by the time children enter the world of work', children should learn how to use appropriate and suitable technology skilfully for what they are going to confront it in future.

Different literatures that discussed the use and impact of using ICT in education, particularly in teaching, mostly agreed on the importance of using ICT in teaching children. Furthermore, they demonstrated how ICT enhances the educational process, and the effect of carefully planned and designed programmes on supporting relationships between students and teachers, and motivating children to learn more

and be involved in learning and teaching processes (Cooper and Brna, 2000; McNichol et al., 2002; Lapp, Bender, Ellenwood and John, 1975). Cooper and Brna (2000) mention that children expressed their pleasure in working with others or even alone with computers, and how using ICT may enhance social and academic skills among children in the classroom. In addition, McNichol et al. (2002) reveal that children who were using ICT showed better achievement at school. Some researchers emphasised the use of carefully designed programmes and the need for skilful and well-trained teachers to teach children how to deal with open-ended problems in the future, and how to work on ideas with appropriate use of technology (Law et al., 2002). Additionally, Lapp, Bender, Ellenwood and John (1975) point out that technological materials could be multi-sensory aids, as they involve more than one sense in the learning experience, hence using motion pictures principally involves the hearing and sight senses, and these extend to emotions and other human experiences. Lapp, Bender, Ellenwood and John (1975) encourage teachers to utilise multi-sensory aids technology, especially materials that involve the tangible and visual senses, in a variety of learning experiences, as this encourages children to develop reading and readiness skills. However, I did not find that any of these articles directly mentioned or explained the impact of using computers on children's creative imagination. Nevertheless, most of these studies emphasised the necessity of modernisation in pedagogy and of finding alternative ways of teaching. Therefore, I aimed to contribute in this present research by adding a new stimulating tool for children's creative imagination. This is in order to provide an innovative method of learning or teaching children. Teachers may be able to apply it in any subject, to solve complex open-ended problems, in an imaginative way. Hence, by using it, a teacher might enhance and stimulate children's imagination, and help them to convey the rapid development of knowledge and technology.

2.8 Using imaginative story based on ICT in teaching/learning children

It was difficult to find articles about this particular subject. Reflecting the novelty of my study, the closest I found was a study by Trushell et al. (2003), who studied the impact of using story telling and an ICT-based story on children's memory. This study is only weakly linked to this current research. It is mentioned as an example of using story and interactive programmes in teaching children.

The previous section highlighted the importance of ICT in teaching children. It also emphasised the necessity of a radical preparation and attitude, which might require changes in curriculum, pedagogy, training teachers, etc. (Mioduser, Nachmias, Tubin, and Forkosh-Baruch, 2002; Reynolds, Treharne and Tripp, 2003; Kozma and Anderson, 2002; Baggott La Velle and colleague, 2003; Law, Lee, and Chow, 2002). However, none of these research studies discussed the impact of using the computer as a tool to stimulate children's creative imagination by basing an imaginative, open-ended story on computers and demanding that children solve a problem creatively. Therefore, this research will provide such a story based on a computer, and then ask the children who watch it to solve the problem in it.

2.9 Summary

This chapter highlighted the issues and arguments related to this research. The literature provides a theoretical background to the work in terms of the principles of creativity, children's learning, teaching and styles of L&T.

This chapter reviewed some definitions of creativity, and some theories behind it. There is no consensus among researchers on definitions of creativity, as every researcher has his/her own standpoint and domain. A working definition for this research is based on a considered review of the literature. I explored different styles of L&T, which also impact on the research. All styles of L&T depend on the cognitive or emotional, or sense centres that are located in the two (right and left) hemispheres of the brain. I chose to focus on two styles (right style and left style) as these two styles match the two modes of presentation of the story (the main tool of this study) which is presented to the children in this research, to evaluate their creative imagination through their responses to the problem in this story. I considered ideas about two modes of presentation and discussed different points of view in this regard. In addition, I presented researchers' arguments on the importance of matching the mode of presenting the knowledge to children with their styles of L&T. Moreover, I discussed how children learn, and demonstrated different theories and techniques in children's learning including through narrative and in particular through story in two different modes of presentations (visual and verbal). Finally, I discussed

the use of ICT in education and its impact on children's learning, and the limited research related to this study.

The previous literature presented the meaning of creativity and the characteristics of the creative outcome. Informed by this literature, I built the framework of this research on these literatures of the characteristics of creative outcome and the different definitions of creativity. Creativity consists of different elements, such as fluency, flexibility, originality, elaboration, sensitivity to problems, etc. However, in this research I focused on the three basic elements of creativity, as the children in this research are ordinary, and I aim from this to explore only whether the study tool may or may not stimulate their creative imagination, and not examine whether they are creative or not. These three primary elements of creativity are:

1. Fluency: in which I will explore how many solutions each child can provide in the time given to respond.

2. Flexibility: this means how flexible the child's thinking is, and how he can provide alternative solutions to the problem. In flexibility I will explore how many alternatives and different solutions each child can provide.

3. Originality: how original the child's solution or response is.

Then I will compare the number, quality and originality of each child's response compared to the other children. In contrast, I will evaluate the children's responses in the light of their styles of L&T and whether there is any difference between their responses if they were in the group that matches their style of L&T or not. Furthermore, I will investigate whether there is any impact of being in the matched/mismatched group with their styles of L&T on their responses.

The next chapter on methodology will show in detail the subject, tools, and strategies of the fieldwork, the procedures of data collection, and the assessment strategy.

Chapter 3

Methodology and Methods

3.1 Introduction

This chapter demonstrates the methodology and methods I adopted for conducting the present research. This chapter is divided into two main sections: first, methodology, and second, methods. The methodology section starts with a brief introduction to this chapter, including the research questions, in order to link the methodology with the methods, and to explain how this methodology and these methods will help to answer these questions. Then, I endeavour to give a brief idea about the nature of this study, to display the research paradigm, the research design, and the research participants (children 9-11 years old) from Qatar primary schools. Afterwards, I attempt to explain my effort to make the methods of this research as valid and reliable as possible. Then, I illustrate the importance of using triangulation in this research to confirm and assist the methods used, and end this section with the ethical issues that are considered in collecting the data for the study.

The second section of this chapter deals with methods. It gives a full demonstration of the qualitative and quantitative methods that were used in this research. Qualitative methods are presented through the first classroom task, where I explain, with examples, the story, and the reason for selecting it, its nature, a description of it and its criteria, and provide some pictures from the animation story (the visual presentation). Then, I provide examples of the two modes of presentation of the story, the verbal and the visual modes. Next, I explain the second qualitative method, which is the interview, and provide detailed description and reasoning for selecting this method for conducting the research, its advantages and disadvantages, and the way of applying it. Furthermore, I discuss the quantitative methods that were used in this research. The first quantitative method was the assessment of the styles of L&T, and I give a detailed explanation of it with an example of one of its items, and the way to correct this assessment and identify the children's styles of L&T. Then, I give a complete explanation, with examples, of the second quantitative method, the

questionnaire, with a comprehensive explanation of it and indications of each of its sections, with examples. Finally, I give a summary of this chapter.

Methodology

The methodology section presents an illustration of the exploratory nature of this research. The main design was a qualitative systematic comparison. This enabled an examination of the story as a medium for stimulating the children's creative imagination and the exploration of the impact of the other factors (mode of presentation and styles of L&T) on the children's creative imagination. Further, the qualitative comparison enabled me to answer the following research questions:

1. Does an imaginative story stimulate children's creative imagination? If so, then how?
2. Does the mode of presentation (visual / verbal) contribute to stimulating children's creative imagination? If yes, then which mode is more effective, and why?
3. Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

I selected a qualitative design to compare the two main groups of this study, the listening group (LG) and the watching group (WG). This design enabled me to gain an understanding and analysis of the children's responses to the problem in the presented story, and the effect of the story as a medium of stimulating the creative imagination. Moreover, this design enabled an exploration of the impact of the mode of presentation of the story on the children's creative imagination, and the impact of their styles of learning and thinking (L&T).

3.1.1 The nature of the study

It is evident that there is no clear-cut distinction between different types of educational research and between various levels within the same single type, as they are often built on one another in an interactive way (Anderson, 1993). For example, it will not be possible to explain the situation without describing it, just as it will not be possible to generalise the situation without explaining and understanding it. This

study is a complex of different levels of qualitative research, which is supported with quantitative data to verify its validity and reliability.

This study is an exploratory and interpretive study. It is concerned with understanding and immersion in the educational situation and responses of children. I have also attempted to explain the causes of how and why children respond. In addition, the study attempts to establish a theoretical background for the impact of children's styles of learning and thinking and the mode of presentation on their creative imagination, through their responses to the problem in the story. The study can be described as a systematic comparison, since it compared the responses of two different groups of children with two different modes of presenting the story (the visual and the verbal mode). There was some additional qualitative comparison of children's responses to the stimulus of the story through responses in interviews.

3.1.2 Research paradigm

According to Cohen and Manion (1994), most psychology and sociology research has been allocated around normative and interpretative research paradigms; the interpretative paradigm is qualitative research, which depends on observing people in their own setting and dealing or interacting with them in their own language (Kirk and Miller, 1986). This research adopted a qualitative comparison paradigm, as it used a comparative design with non-equivalent groups (WG & LG) to establish internal validity, to investigate and interpret relationships, and to outline possible causal inferences (West, Biesanz, and Pitts, 2000).

3.1.3 Research design

I selected a systematic comparison design to conduct my study of non-equivalent groups (Cook and Campbell, 1979), because this design allowed me to compare the responses of the children from the two groups in this research, and to explore whether there was a correlation between the children's responses and their styles of L&T, or between their responses and the mode of presentation. Furthermore, according to Beiger and Gerlach's (1996) argument about the fundamental purposes of research design, this design enabled me to develop a set of methods and procedures that would answer the research questions with a high degree of confidence. The methods of data collection in this research were qualitative methods such as the story and the

interview, and quantitative methods such as the assessment of styles of L&T and the questionnaire.

The advantage of using this design with non-equivalent groups (WG and LG) was that it allowed me to understand the effectiveness of each of the modes of story presentation for the children, and to assess their responses according to their creative imagination and their auditory and visual styles of L&T. Therefore, the comparison between the children's responses from both groups allowed the exploration of the effectiveness of using such an approach. However, this research did not use a completely traditional experimental approach (using two groups, one an experimental group and the other a control group). I tried to control some factors while conducting this research. The LG just listened to the story episodes without any visual aids during the display of the story; the WG just watched soundless animation story episodes. In addition, the children from the two groups were selected randomly. Two classrooms were selected, one from each school, in order to apply the research tool (the story) to them. One was randomly assigned as the WG, the other as the LG. Nevertheless, these classes are considered to match each other in all relevant factors and other characteristics that might have influenced the outcome variables, such as the children's age group (9-11), the same school environment, studying the same subjects, and being often taught by the same teachers.

Research participants

The research participants consisted of male and female children; their ages were nine to eleven years old. They were from independent Qatari primary schools, in Doha city, the capital of the State of Qatar. To control for other effects, it would be ideal if the children came from the same school and were taught by the same teacher. However, this was not the case as the participants were opportunity sample for the difficulties of applying the field work within a realistic timescale, and the limitation of other schools co-operation with me before the fieldwork been applied. Therefore, I attempted to create circumstances as close as possible to the ideal situation of stratified random sample, by considering some aspects such as, these children begun this year to study in the independent schools, before that they used to study at the governmental mainstream schools. They share the same governmental curriculum of all subjects; i.e. their teachers have to teach them only the content of their school books and in the same method of teaching, as they are under supervision of ministry

of education. Therefore, although they came from different schools they studied all subjects in the same way. This means that there was nothing to suggest that their experiences in each school and class are not similar to each other. Therefore, if there were any differences among the children it would rather been individual differences, in a sense of their different styles of L&T for example. This added a strong point to the results of this research, as the background of the subject was nearly identical. This age group was deliberately chosen in this research because some researchers have argued that children at age 9-11 years are able to verbalise and clearly write their thoughts and express their feelings and opinions (Parkash and Mathur, 2001). Likewise, Riley and Prentice (1999) state that children between the ages of seven and eleven become aware of different subjects and are ready to explain some scientific concepts in their own words. They are able to use practical experiments to help themselves develop their understanding of some main scientific ideas. In addition, they can develop their thinking skills depending on appropriate explanations they have learnt before, move from focussing on observing to formulating abstract notions, and make independent decisions.

In my previous research for a master's degree in 1995, I selected adolescents at high school, because some studies indicated that styles of L&T are clearer and more easily measured in adolescence than at a younger age. Nevertheless, studies have since been done on children's styles of L&T (see Chapter 2, pp. 22-29), and knowledge has developed; therefore, I selected younger children (9-11 years old) for the present research. The children from this particular age group (9-11 years old) were chosen to be the subject of this research as they have more knowledge than younger children, and are easier to communicate with. Moreover, conducting educational research on primary school children, or younger children, especially if the research explores or examines the impact of using a new method or theory in education, might provide teachers with effective methods to teach, and with more effective ways for children to learn. As a result, all children would benefit from this intervention, in other stages of education.

Both genders were selected for this research. Nonetheless, it would have been helpful if all the children in this study were at the same school, and were taught by same teachers, in order to obtain absolute accurate results from this research. However, that was not possible because the Qatari educational system, according to

Islamic principles and social traditions, separates boys from girls through all education stages, from primary to university. Therefore, the selected sample for this research was the best option, as all the children studied same curriculum, with same methods of teaching, and they all just begun to study in the independent schools. However, in any case this study does not focus on gender differences.

3.1.5 Validity and reliability

Objectivity in scientific research can be obtained by describing the experiment step by step and reporting its results clearly and logically. Then one can apply the same experiment or examine its findings. However, objectivity in social science qualitative research is more ambiguous, and is not easily obtained. Yet the validity and reliability of research are crucial to obtaining objectivity in qualitative research (Kirk and Miller, 1986). Kumar (1999: 137) defines validity as 'the ability of an instrument to measure what it is designed to measure'. Validity also 'refers' to the degree to which an 'empirical measure' is adequate to 'reflect the real meaning' of a considered concept (Babbie, 1999). Kirk and Miller (1986: 20) define validity as 'the degree to which the finding is interpreted in a correct way'. To establish the validity of a research instrument there are two approaches; the first is a logical approach in which a researcher must justify each question in relation to the study objective. Yet the researcher's justification may lack 'the backing of experts, and the statistical evidence' to reassure others (Kumar, 1999: 138). Nevertheless, establishing a logical link between a question and an objective is easier if the question relates to a tangible issue. For instance, exploring people's attitudes as an objective is not highly tangible. Thus, if a researcher wants to explore attitudes, s/he has to ask several questions to cover different aspects, and demonstrate a strong argument that these questions measure that concept. The second approach to establishing validity is statistical, through which research can provide 'hard evidence' by using statistics and calculations to strongly display the correlation between the questions and the outcome variables (Kumar, 1999: 138). This study predominantly takes the first approach to validity in providing a logical link in justification of the approach, analysis and findings.

External validity is more related to the ability to generalise the findings of the research, Given the sample size, the intention is not to generalise to the population of young people, but to attempt to generate theoretical propositions.

Reliability, according to Kirk and Miller (1986: 20), 'is the degree to which the research finding is independent of accidental circumstances of the research'. In other words, reliability is a measure of the consistency and stability of the research instrument, and of whether this instrument is predictable and accurate (Kumar, 1999) as this tool or instrument is reliable if the research gives the same result when repeated under the same circumstances.

To ensure reliability, and to attempt to eliminate the factors that might affect the instrument's reliability, I tried to formulate the story episodes in the same way for both the verbal and the visual methods of presentation. This tool was piloted for reliability.

3.1.6 Triangulation

'Triangulated measurement tries to pinpoint the values of a phenomenon more accurately by sighting in on it from different methodological viewpoints'.

(Brewer and Hunter, 1989: 17)

As mentioned previously, in this research I used multiple methods from both quantitative and qualitative approaches to enable manipulation and analysis of the collected data from different perspectives, and to understand in depth the creative imagination and styles of L&T of the children. The combination of these methods is intended to increase the reliability of the research. The children's results from their answers in the interviews, their written responses to the problem and the questionnaire along with their styles of L&T in measuring and evaluating their creative ability, their engagement especially their empathy through analysing each method in relation to other methods and in relation to the research problem (more details in the analysis chapter). To obtain useful results from triangulation means combining valid methods or measuring instruments to explore or study a phenomenon. These methods should give consistent results or findings, and measure the phenomenon that they claim to measure (Brewer and Hunter, 1989). However, this is not always the case, since often a contradiction occurs among results from different methods or measuring instruments; each method is a different line of view focused toward the same point (Mercer, Littleton, and Wegerif, 2004; Brewer and Hunter, 1989; Berg, 2004). Yet, the contradiction that arises from using a multi-method approach should be accepted, as in fact there is no perfect measurement or method in qualitative research.

Therefore, this contradiction could be useful, in the sense that implying multiple measurements or methods helps in assessing the validity of each one (Brewer and Hunter, 1989) in the same research. In other words, a researcher can use one method to asses the validity of another method, in the same research. Berg (2004) argues that 'by combining several lines of sight, researchers obtain a better, more substantive picture of reality; a richer, a more complete array of symbols and theoretical concepts; and a means of verifying many of these elements' (Berg, 2004: 5). In addition, as triangulation includes multiple data collection procedures, multiple theoretical perspectives, and multiple analysis techniques, this helps researchers to increase the depth of understanding an investigation can yield (Berg, 2004: 6). Brewer and Hunter (1989) affirm that successful triangulation requires careful analysis of each method in relation to other methods, and also in relation to the demands of the research problem. Thus I aimed to analyse the data from a combination of research instruments in order to ascertain findings that can be determined with confidence, where outcomes from multiple sources reinforce each other, and other findings that may be more tentative.

3.1.7 Ethical issues

'We presently witness: a rapidly increasing concern about the protection of the rights and welfare of human subjects in biomedical, behavioural, and social science research'.

(Bower, R. and de Gasparis, 1978: 3)

Ethical issues arise at a variety of stages in social research (Bryman, 2004). One of the important requirements of ethical issues is obtaining informed consent (Bower & de Gasparis, 1978; Berg, 2004), since this informed consent is agreement by the subject or by his authorised representative to the subject's participation in any research or activity. This informed consent must include certain aspects, such as a clear explanation of the procedures to be followed in the research and a description of the benefit to be expected from the research. In addition, this informed consent has to offer an answer to any enquiries concerning the procedures, etc. These informed consent procedures have to be fully documented (Bower and de Gasparis, 1978).

To assure informed consent procedures, I informed the children's parents (Appendix 8), the headmistresses having been addressed through the use of the

School of Education Research Ethics' policy, during my negotiations with headmistresses (Appendix 7) over accessing schools. Furthermore, I explained the research procedures to the participants' parents in a letter, and provided my details, e-mail address and contact number at the end of the letter, in case they might want to clarify something about the research procedures, since the participants were children. Moreover, I contacted the headmistresses before sending the formal letter to them, in order to build a stronger friendly relationship with them, and to express my respect and appreciation of their authority at their schools.

Additionally, I obtained permission for use of the styles of L&T assessment instrument. I contacted Professor Anwar Riad in Egypt by phone, first to obtain his permission to use his assessment and ask him to send his assessment to me, and then I sent him a letter to thank him and D. Ebada for their co-operation (Appendix 9).

Methods

Data collection methods

The following sections illustrate the methods I adopted to collect and gather the important data to answer the research questions, and which allowed me to understand and analyse the children's responses, and to answer the research questions.

3.2.1. Qualitative methods

> *'Qualitative research requires a highly active engagement'.*
>
> (Mason, 2002: 4)

I attempted to immerse myself in two situations with the children. The first was in their classrooms, by attending language classes (Arabic and English), science classes and art classes with them. The second was by analysing their responses to understand in depth their creative imagination. This was during the process of collecting the data qualitatively, through different methods.

The planet Mars

I presented a science lesson on Mars to the children, as a precursor to the story, on the day before presenting them with the story. This was done in order to provide them with fundamental knowledge about the planet Mars, and to broaden their imagination and choices for solving the problem in the story the next day. Therefore, the children in each classroom were provided with this science lesson about the planet Mars in forty-five minutes, the normal time of a lesson in Qatari schools. This lesson was presented with visual aids (coloured pictures of the planet Mars) to provide knowledge about Mars and help the children understand the story when it was presented. This was important, especially for the children in the WG, as they would not hear any comment on the story as it is soundless, so showing them some clear pictures in this lesson would make it easier for them to understand and follow up with the story and its episodes. For example, I presented them with pictures about the planet Mars that demonstrated the colour of the land and sky of the planet. When they watched a red planet in the story, the children would recognise that the team had left planet Earth and were close to planet Mars. Furthermore, when they saw the red land and the pink sky, they would realise that the space-craft had landed and the rest of the episodes were happening on planet Mars.

This lesson showed the location of Mars among the other planets of the solar system, as it is the fourth planet in distance from the sun, and the planet Mars's characteristics.

The lesson began with some questions, and continued the dialogue with the children according to the following scenario:

- Who can tell me how many planets in our solar system? The answer is: nine planets.
- Who can name these planets? What do we call these planets? The answer is: (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus, Pluto).
- Which planet do we live on? Answer: Earth.
- Can we live on other planet? Why? The answer is no, because we need oxygen, water and food to live, which exist on Earth. Here, I expected some children to mention the importance of Earth's gravity; if they did not, then I would remind them of it.
- Maybe you hear these days about a lot of research and attempts to send humans to the planet Mars. There is a volunteer team who will travel to Mars, and

they may face some problems there, and need our help. To help them we need to learn some knowledge about planet Mars, to view how they would live and how we might help them if they need our help (this section was a preparation for the children's story and its problem in the next day's lesson). To understand and imagine the planet Mars, let us compare it with our planet, Earth. Mars's size is nearly similar to the size of Earth. How about the colour of Mars? Is it the same colour as our planet Earth? Then, how about its sky? Is it blue like ours? I expected that most of the children have difficulty in answering this question. If they answered it correctly, I would confirm it; otherwise I would say, 'I will show you a picture of its sky and its land, and you find out and tell me'. Then I presented them with pictures.

- Do you think Mars has oxygen and water as well? From the experience of the pilot work they were likely to answer no. I would then tell them that Mars has a very small quantity of oxygen but not enough for humans to breathe and live there, because it has a high percentage of carbon dioxide. Then I ask them, 'Who knows about carbon dioxide?' I carried on with the same system and taught them the following knowledge:

- Mars's gravity is one-third (1/3) of Earth's gravity. In addition,
- Mars has two moons whereas Earth has one moon.
- Mars has traces of primitive life, and some valleys used to be full of water.
- Mars's day is 24 hours like Earth's day.
- The difference in temperatures between day and night is very great on Mars, since it is very high during day (very hot), and very low at night (very cold) (picture).
- Dangerous storms on Mars may happen at any time of the day.
- Mars has polar ice like Earth, not frozen water but frozen carbon dioxide (picture).

This knowledge was kept as easy as possible, avoiding any complexity that might confuse the children. Following Watt's (1998) about ways or methods of helping children to develop their ideas, according to 'Constructivist Science', which is characterised by the view that learners actively construct their own understanding (of science) from their previous experiences of the world, one of those methods is building on children's previous ideas or knowledge through investigation, posing questions for children to consider, and providing opportunities for them to test their ideas. Considering the above reasons, I discussed and investigated the children's

previous ideas about Mars during the pilot studies, and also did so at the beginning of this traditional lesson, as stated above, in order to construct the best approach for presenting this lesson to the children (Appendix 2).

3.2.1.1 The story (watching/ listening)

This story has been specifically written for the children for the purposes of this present research. Also, it is an open-ended, problem-solving story, based on scientific content about the planet Mars. This story is a scientific fiction, and it will be the basis for assessing the children's creative imagination.

The assessment for the children is based on:

- Their ability to learn and grasp new scientific facts through the given lesson before the story and from the story episodes, and then fit this new knowledge with their old knowledge.
- The level of their engagement with the story, through their understanding of it, recalling some events from the story, their liking and enjoyment of the story, their identification of the problem, and their empathy with the story.
- Their creative imagination, through their responses to the story, and the fulfilment of elements of creativity (fluency, flexibility and originality) in their responses or solutions to the problem.

The following section will present detailed information about the story.

Selection of the story as a research tool

In our old house, when I was a child, my brothers and I used to be very happy and excited when our great grandmother (Umi Muneera) – when she was alive – came to visit us. We ran to wash and change and came together to lie down around her every night, because this meant that she would tell us a story before we went to sleep! She would tell us one of her amazing imaginative folk stories, those stories that used to make us fly with smiles or open, surprised eyes, far away with our imagination. We were imagining that stunning princess, who was looking at the garden from the balcony of her room in the high tower of her father's palace, while she was not aware of the horse that fell crazily in love with her, who would kill anyone who went near her! ... And so on to the end of this story, or any other story.

I have included the introduction above as these sweet memories of childhood were one of the reasons that led me to choose the story as a main tool for this study.

On the basis of selecting children as the subjects of this research, it was crucial to choose a research tool that matched their age and made them feel familiar with and interested in it. Consequently, I reflected on my childhood as above, and recalled the degree of our eagerness and enthusiasm to listen to a story, especially if this story was imaginative, and how we used to utilize most of our senses while listening to it, asking questions to clarify and understand it, learn from it, imagine it, analyse it and discuss it afterward. Many studies have revealed the importance of stories in learning and teaching children (see Chapter 2, pp.40). For example, Prakash and Mathur's (2001) study about developing an animation story for children aged 7-11 years old revealed a clear indication of the importance of using the story in getting children's reactions towards certain issues, and stimulating their imagination. In addition, their study showed the impact of animated media such as television on children's thoughts and reactions.

I decided to select a story to be presented in two forms, verbal (listening) and visual animation (watching), as a main tool for this research (Appendix 1), in order to match the children's cognitive styles in this research (left, the verbal, and right, the visual), and to make the research tool more interesting and child-orientated (Prakash and Mathur, 2001). Prakash and Mathur's story supports my hypothesis of using a well-prepared animation story as an effective tool in the children's learning. Furthermore, I selected an open-ended story to stimulate the children's imagination, and to allow them to explore, imagine, be involved and participate through using different possibilities for solving the problem. The story was designed to stimulate their creativity, and to enable them to fly with their imaginations, to employ and combine their own previous knowledge and the newly provided knowledge in this research.

Description of the story

The story concerns a team of scientists and researchers and two children, a boy (X) of ten years and a girl (Y) of nine years. Their mother is a medical doctor, and their father is one of the team of scientists. They travel to the planet Mars to conduct some experiments and explore life there. They are shocked and challenged by a hazardous life-threatening fault in the spacecraft.

This story is presented to the children in two modes of presentation (verbal and visual). In the verbal mode, the children listen to the narrative story without any visual aids, since the story is told by me in the classroom. In the visual mode, the story is presented in three-dimensional (3D) animation. In this situation, I show the story and stress some parts of it that might attract the children's attention.

The nature of the story

There are two main criteria for the story, narrative and scientific.

1. Narrative criteria

- The content of the story is mainly science.
- The story presents a linear sequence of events for the children to follow.
- The story has no 'ending', that is, it is 'open-ended' to allow the children to imagine.
- The story presents a problem at the end, which is 'problem-solving', to make the children imagine the solution.

I attempt to set up the sequences of the story, either as listened to or watched by the children, as a trip to Mars starting from Earth. The sequences show the preparation for this trip, the team, then the trip itself, the location from where the trip started, the way to Mars as seen from the space-craft, the difference in colours between Earth's sky and land and Mars's sky and land, and the storms on Mars. The spacecraft seen from inside is suitable for human life, and from outside it looks like what NASA intended to send in the year 2010. Also, it shows gravity on Mars, the start of experiments on Mars inside and outside the spacecraft, facial expressions, and signs of the insufficiency of water, oxygen, and food (for the visual mode), whereas the same sequence will be told to the listeners verbally (verbal mode of presentation).

2. Scientific criteria

I selected a scientific context to build the story upon, to assess the children's creative imagination.

The story combines scientific facts and imagination in an interesting presentation which the children can enjoy watching or listening to and learn from at the same time. I chose the planet Mars among the other planets of the solar system because there is ongoing research to examine the possibility of human life on Mars, and I would like

to bring wider scientific research to the classroom to engage the children in it, so they can share in what is going on among scientists in their laboratories outside the classroom. Moreover, I tried to develop the children's problem-solving skills, and test their ability to grasp new knowledge (scientific concepts in this case), through using narrative as a stimulus for their creative imagination.

- In this study I explore the quantity and quality of the knowledge the children already have and the new knowledge that they may learn and absorb, according to their age group (9-11 years old). I realised there would be individual differences among the children, and an impact of environmental enrichment at each individual's home. I therefore provided all the children with a summary of scientific knowledge about the planet Mars, which they might utilise in solving the problem in the story (as it will be explained later in this chapter). Additionally, I planned to present all the children with a traditional lesson (lecture type) about Mars with some visual aids, such as coloured pictures about Mars illustrating different times of the day and the topography of the planet.
- The story highlighted developed and advanced technology, and the importance of technology in making our lives and communication much easier. Hence, the children in the story on the space-craft were sending electronic mail to their friends on Earth and reporting to them the latest news of their daily life on the planet Mars.
- I decided on this particular problem in the story in order to stimulate the children's imagination and trigger their feelings and empathy with the people on the spacecraft (the team). The problem is that the team is running out of water, oxygen, and food, as a fault has occurred in the spacecraft. They can only survive for two months, while the fastest rescue takes six months to arrive. How can they cope for four months until the rescue spacecraft comes to help them? As there were two children in the story from the same age group as the research participants, a girl and a boy (9 and 10 years old), the children might engage more with the problem, and be determined to solve it. For this reason, I put one girl and one boy among the team; the children may engage more with the story episodes. They may try to solve the problem to help the two children in the story, who ask for their help at the end of the story, by sending an e-mail to all children on Earth, urging them to help save their lives along with the rest of the team, as soon as possible.

Verbal and visual modes

The same story is presented to the two groups of the children in two forms, the verbal form and the visual form. One group listens to the story in the traditional way of telling a story, without any visual aids; the other group watches an animated three-dimensional (3D), soundless story, which was based on the computer. The full story is presented in Appendix 1.

Listening story (traditional story telling)

In this presentation, I attempted to copy all the scenes that were presented in the visual presentation for the WG, to be sure that the children in both groups were exposed equally to the story episodes. In this presentation, the children listened to the story without any visual aids. I attempted to draw a picture in children's minds to replace the visual aids of the story, and to help them imagine the story episodes. This was achieved by using different tones of sound, pausing during telling the story, facial expressions, and a detailed description of the story episodes. I also depended on the visual aids about Mars that the children had been presented with one day before they listened to the story, and also some facts about the planet Mars (Appendix 2). The children were provided with this information during an ordinary lesson about the planet Mars planet.

The following section provides some examples of using different expressions to engage with and draw a picture of this story in the children's minds, while they were listening to it.

Example 1

From the section "At home", when the boy said to his mother and sister: *'let us watch the video film, the one dad brought, about Mars to learn more about the nature and the climate on the planet, and to explore if there is any kind of life, water, or oxygen'.*

I tried to imitate the boy in the story, by moving my hand passionately while I was smiling, and moving on the chair as if I intended to stand up and run to watch the film, as if I was the boy asking the children to come and join him and his sister and mother to watch that film and view those pictures before the trip to Mars.

Example 2

From the same part of the story, "At home", when the mother told the children

that they had to go to hospital tomorrow for blood and other tests. The children reply: *'Hmmm, ok mum, but we do not like needles though'.*

I made some expressions in my face which showed that the children were unhappy with the blood test, thus I frowned my eyebrows, as if I might cry. And with the reply of the mother (*Mum said: 'I am afraid you have to, in order to go with us, we all going to do so')*, I slightly smiled and raised my eyebrows, showing the authority of the mother in a friendly way.

Example 3

From the second part of the story, "At the symposium location", after they finished the meeting and were on their way back home in their car, when the children said: *'We couldn't wait to travel to the planet Mars, and see the planet Earth from space'*, I smiled a big smile and clapped softly with my hands and jumped a bit to express the children's happiness in the story.

Example 4

In the part "After four months", when the boy heard what the adults were talking about and saw the signs on the monitor, I opened my eyes and mouth widely, as if I was frightened (as the boy did in the story). Moreover, when he was waking up his sister, I was moving my hand nervously, putting myself in the boy's position. Additionally, when they (the boy and his sister) were thinking of a solution, I was moving my head, looking in different directions, and supporting my head with my palm as if I was thinking deeply.

The children were asked after they had finished listening to the story to answer some questions to assess their understanding of and their engagement with the story, and to write down their solutions for the problem in the story on a provided paper, titled "Story Listening Group" (Appendix 3).

Watching the animation story

This story is animation, computer-based, as there is increasing demand for the computer as an interesting tool for children, as a teaching and/or learning method. In addition, it is an exciting method to present an idea or teach children a new concept.

Furthermore, it is important to link children's small environment, the school or the house, with the wider world (Reynolds, Treharne, and Tripp, 2003).

To present this story I set up some features as follows.

The setting

As mentioned previously in the listening story, the team included children from the same age group (9 and 10 years old) as the subjects, and it has a boy and a girl, as the subjects included both boys and girls. This might help to engage the children more with the story, and encourage them to try to find solutions to help the team in the story, especially the boy and the girl, as they might imagine themselves in the same situation as the children in the story one day in the future. I used classical music as part of this visual mode to accompany the story episodes, in order to indicate the smooth and tough moments during the trip to Mars. For instance, I selected soft music for travelling from Earth to Mars. Then I chose a strong high tone towards the end, to indicate the danger of the decrease of water, oxygen and food.

The scenes of the visual story were presented as follows.

- **First scenic presentation**

Preparation for the journey to Mars was presented in four images:

Image 1: The place and arrangements for travel: at home the children watch the film and prepare their belongings. For example, the boy and the girl in their room prepare their suitcases and put their dolls and notebooks in their suitcases.

Image 2: Shows the children at the hospital having x-rays.

Image 3: Shows the children with one of the scientists while they watch a film about the planet Mars.

Image 4: Shows the children measuring their space suits.

- **Second scenic presentation**

This shows the children going to the spacecraft, and shows them inside the spacecraft. In this scene I employed soft classic music to indicate the calmness and smoothness of the trip at the beginning.

Image 1: This image shows all the team together on their way to the spacecraft.

Image 2: Presents the take-off of the spacecraft, and how it detached from its base.

Image 3: Shows the blue sky of Earth while they travel from Earth into space.

Image 4: Shows Earth from space as a blue planet.

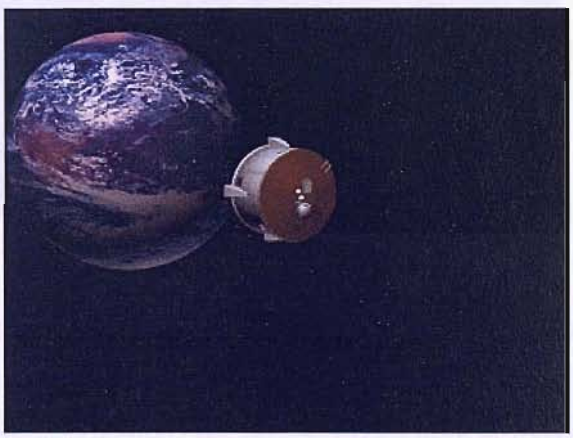


Image 5: Shows Mars from space as a red planet.

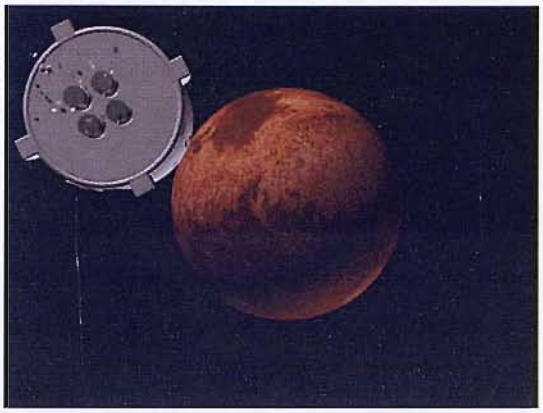


Image 6: Presents Mars's sky as a pink colour, also indicating their arrival at Mars, and demonstrates the topography of Mars, for instance, empty valleys and polar icecaps.

- **Third scenic presentation: landing on Mars**

Image 1: Presents the actual arrival on Mars, and shows the red land and pink sky of Mars, while the craft is landing. In addition it presents the outer shape of the craft itself.

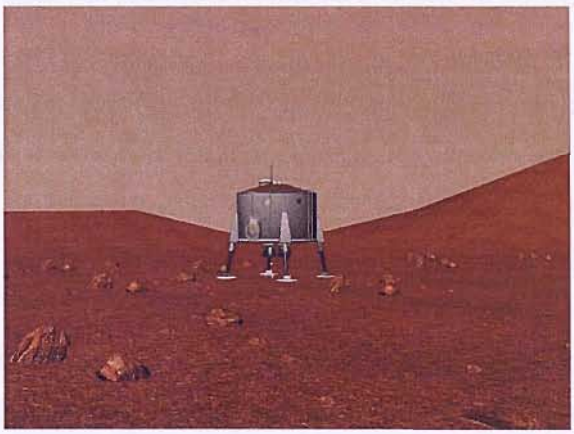


Image 2: Inside the space-craft, it shows high technology, as all the team are wearing their ordinary clothes, and moving freely as if they were on Earth. This is because this spacecraft is very high tech and there is no need to wear special suits to live inside it, as it is full of oxygen.

Image 3: From the window of the spacecraft, the children watch the storm, which was presented with fast motion and as if different objects were flying and moving fast in the air, while excitement was shown in their eye movements and their facial expressions.

On the other hand, to identify gender, I attempted to denote gender differences by the colours of their suits, and selected a traditional blue suit for the boy and a pink suit for the girl.

Image 4: Shows the team (except the mother and children) outside the spacecraft doing their fieldwork and experiments. For example, they were building a greenhouse similar to the one at the Eden Project in Cornwall, England, as an indication of modernity and the high technological facilities they have. It also shows the scientist watering plants inside the greenhouse.

Image 5: Illustrates the mother and children while they are leaving the craft, and then riding a small vehicle (buggy) to explore and wander on the planet Mars. In this image, I attempted to denote the happiness and excitement of the children with some movements, such as them acting funny to the camera while taking pictures.

The following picture shows one of the e-mails the children in the story used to send to their friends on the Earth to update them with what was happening on Mars. This picture also shows the children and their mother outside the craft, while taking the picture.

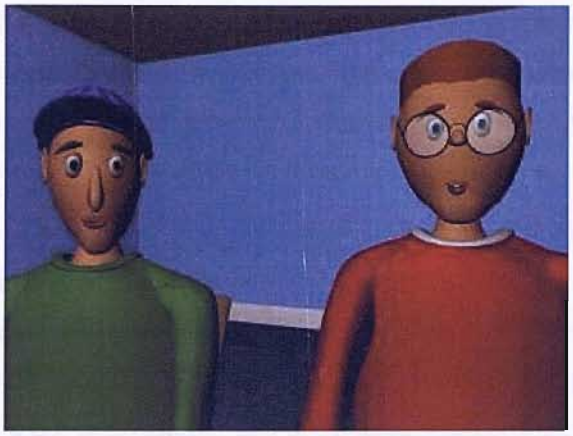
Two members of the team in the spacecraft

- **Fourth scenic presentation: after four months**

In this scene, there was some indication of the passage of time. Also, the children were told verbally that a problem threatened the team's lives, after four months of the trip. Therefore, the children might concentrate on spotting the problem and try to solve it to help the team to survive.

Image 1: This image indicates the passage of time, since it shows the growth of plants, by showing the difference in a plant's size compared with its size at the beginning of the landing, as explained in image 4 above.

Image 2: Inside the spacecraft again, this image illustrates the waking up of the boy after a bad dream and him waking up his sister. This image also demonstrates the horror in the boy's eyes while he listens to what the adults are saying about the deadly problem they face. This indicates his fear after he had heard adults talking about the fatal challenge they were facing. The aim was to attract the attention of the children (in the WG) to what would come later, and show them that there was something wrong. The following picture shows the surprised look of two members of the team when they discovered the fault.



Two members of the team while discovering the fault in the spacecraft

Image 3: Presents the core problem of the story. To identify the problem I attempted to indicate the running out of food with few food boxes remaining in the cabinet. Additionally, the picture of a tap with a red danger sign indicated that they were running out of water. The exclamation mark and question mark with the picture of the oxygen cylinder both indicated the running out of oxygen. Moreover, the levels of oxygen and water indicated the small remaining quantity for use during the period they would stay in the craft.

After they had finished watching the story, the children were asked to answer some questions to assess their understanding and engagement with the story, and to write down their solutions for the problem in the story on a provided paper, titled "Story Watching Group" (Appendix 4). The data collection methods were thus identical for the WG and the LG.

3.2.1.2 Interview

Interviews can be an important method in qualitative research. An interview is where a researcher asks questions carefully about issues relevant to his/her study in order to explore what one thinks or feels towards something (Fraenkel and Wallen, 2000). Fraenkel and Wallen also indicate that the researcher is unable to directly observe feelings, thoughts and intentions. Thus, this is why I conducted an interview alongside the questionnaire, to support the reliability of the qualitative data of the

present research. The interview was designed to explore the children's views of the story and their understanding of it, their empathy, and their engagement with it. The children orally expressed their thoughts and feelings towards the story and explained their solutions and why they responded with these specific solutions.

In this study I adopted the structured interview to collect information, which enabled me later to compare the responses among the children in both groups (Fraenkel and Wallen, 2000; Cohen, Manion, and Morrison, 2000; Mertens 1997). For example, I was able to study the differences among the children's responses from the two groups (LG & WG), to investigate and understand whether their responses were affected by the mode of presentation or their styles of learning and thinking.

Patton's (1980) table of strengths and weaknesses of different types of interview (and Patton (1990) in Fraenkel and Wallen, 2000; Cohen, Manion, and Morrison, 2000) highlights the advantages and disadvantages of using interview as a tool to collect data in educational research as follows.

The advantages

'Respondents answer the same questions, thus increasing comparability of responses.

a. Data are complete for each person on the topics addressed in the interview.

b. Reduces interviewer effects and bias when several interviewers are used.

c. Permits evaluation users to see and review the instrumentation used in the evaluation.

d. Facilitates organisation and analysis of the data'.

(Patton 1980) and Patton, (1990) Fraenkel and Wallen, 2000: 511; Cohen, Manion, and Morrison, 2000: 271).

The disadvantages

'Little flexibility in relating the interview to particular individuals and circumstances, standardised wording of questions may constrain and limit naturalness and relevance of questions and answers'. (Patton, 1980) and

Patton (1990) in Fraenkel and Wallen, 2000: 511; Cohen, Manion, and Morrison, 2000: 271).

Despite the disadvantages of using the interview, it could be argued that all the interview questions were formulated clearly and articulated carefully to the level of the children's age group. Additionally, by using these questions the children would be able to express their feelings and opinions freely about the story and its sequences and characters, which would reveal their understanding and reflect their styles of L&T.

Five children were appointed randomly from each classroom to participate in the interview.

To obtain accurate and reliable data; all interviewees were asked the same fundamental questions in the same order, which were formalised in a completely open-ended format (Fraenkel and Wallen, 2000; Cohen, Manion, and Morrison, 2000; Mertens 1997). The interview attempts to discover what children thought about the story, the extent to which they were engaged, and their preference for style of L&T (Appendix 5).

The interview was organised, originated and formulated on the following basis:

Questions 1, 6, 7, 8, 9, and 10 try to shed light on children's styles of L&T. Responses to the interview allow comparison with their written responses to the story.

Questions 2-5 indicate the children's understanding of the story, and whether they grasped the knowledge that was provided before and during the story, and employed this knowledge to solve the problem in the story. These questions also indicate the level of their engagement with the story.

3.2.2 Quantitative methods

Quantitative methods, when used in combination with qualitative data, can be an indicator of comparison and triangulation, and through numbers and graphic representations can present visual tendencies and patterns among the data (Ioannidou,

2002). In the present study, two quantitative techniques were used, assessment of the styles of L&T for the children, and a questionnaire.

3.2.2.1 Styles of learning and thinking assessment for children

This assessment is the Arabic version of the American assessment of styles of L&T by Torrance, Reynolds, and Ball (1978). This assessment was adapted to Arab culture by Riad and Ebadah (1986) in Egypt, and by Riad and Al-Khulaifi (1995) in Qatar. This assessment was applied in the present study as a valid and reliable instrument with extensive use in Arabic countries. The assessment consists of 40 questions. Each question is divided into three alternatives or multiple choices (a, b, and c), in dissimilar sequences. In other words (a), for example, will not always describe the same style in all questions throughout the assessment. The child must select one of the three choices (a, b or c), for each question of the 40. Each alternative describes a different style of L&T. The conclusion shows the style of L&T that the child uses. Does s/he depend mostly on his/her left hemisphere (the verbal) or his/her right hemisphere (the visual) of the brain when s/he learns or attempts to solve a problem, or the integrated style, which means s/he uses both hemispheres effectively according to the problem or the situation he/she faces? The calculation of this assessment depends on the majority of the child's selections on each question; therefore, s/he might be left, right or integrated.

An example from this assessment:

Question 1

a. I am clever at remembering faces ( )

b. I am clever at remembering names ( )

c. I am clever at remembering both ( )

Answer (a) is visual (right hemisphere). Answer (b) is verbal (left hemisphere); and answer (c) is integrated style. The full assessment and its translation are shown in (Appendix 6).

Adoptation of the assessment in Arab world:

Riad and Ebada (1986) adopted this assessment in the Arab world through applying this assessment on two hundreds children of fifth to ninth grades from Egypt schools, as well as other four assessments in order to calculate the validity and reliability of

this assessment. This assessment has two forms, A and B.The adaptation procedures done on the form (A) –which has been used in my study- while form (B) used as an equivalent form to it to calculate the reliability of this assessment. They discovered that the children succeeded on answering the assessment; nonetheless some children experienced some difficulties on understanding some of the sentences.

To calculate the **validity** of this assessment:

Riad and Ebada (1986) attempted to find relationships between this assessment and some other assessments in order to measure its validity. The assessments were such as: characteristics of the creative personality, creative thinking ability, general intelligence, and styles of L&T for adults. The following section will illustrate the aforementioned measurement:

1. The relationship between general intelligence (visual) assessment -by Salih (1974)- and styles of L&T assessment:

The researchers found out that their results matched Aliotti's (1981) results where there was positive and significant correlation between the right style and the visual intelligence, whilst the correlation between the left style and the visual intelligence was negative and insignificant, whereas with the integrated style the correlations were negative and significant for grades five and six, and positive but insignificant for grades seven, eight and nine. Depending on the positive and significant results of correlations between the intelligence test and the styles of L&T assessment the researchers considered that the styles assessments were valid.

2. Styles of L&T for adults (Torrance, 1978).

The two researchers used another assessment of styles of L&T by Torrance et al (1978) which has been translated and adopted in Arab world by Murad & Mustafa (1982) as the validity and reliability of this latter has been calculated already. Riad and Ebada have calculated the correlations between left, right and integrated styles into the two children and adults styles of L&T assessments and they found out that they were significant at 0.01.

Therefore, the researchers according to their results above demonstrated conducting to the assessment they believed that the assessment of styles of L&T for children was valid.

To calculate the **reliability** of the Arabic form of styles of L&T assessment: the researchers utilised two methods, the repeat of applying the assessment and the equivalent forms, as follows:

1. Repeat of applying the assessment method:

The assessment has been re-applied after two weeks of first application on a subject of one hundred and fifty three (153) students. As a result, all the reliability factors were significant at 0.01.

2. Equivalent (comparable) pictures or forms method:

The researchers applied the two forms (A & B) of the children's styles of L&T assessment onto two hundred and fifty three students (253) of fifth to ninth grades. They then calculated the correlations factors between the three styles (right, left and integrated) into both forms (A&B). They detected a high level of correlations among the three styles, and they were all significant at 0.01. Therefore, the researchers trusted that this assessment has a reasonable degree of reliability. As they took into account, that this assessment was one of self evaluation assessments which are usually less reliable than other assessments of mental abilities.

3.2.2.2 Questionnaire

After presenting the story, the children were provided with an assessment (questionnaire) in the form of short questions as follows.

Narrative assessment

Narrative assessment focuses on recall of facts from the story and tests the effect of the mode of presentation in helping the children in recalling the new knowledge. Moreover, these questions test the level of their engagement with the story. The full questionnaire is shown in (Appendicies3 & 4).

- This first section of the questionnaire examines the ability of the children in the two groups to recall the story's events and sequences, indicates the effect of the mode of presentation, and also assesses their engagement.

- The second section of the questionnaire (questions 1-4) investigates the previous knowledge of the children and their engagement with the story through their

understanding and identification of the problems in the story (what do humans need to live? And, what was the problem in the story?).

- The third section of this questionnaire is a problem-solving exercise based on the open-ended problem of the story. This section requests solution(s) for the problem from the children, in order to assess their creative imagination and their engagement, especially their empathy, with the story.

Questions 1-4 highlight the children's attention and their understanding of the story's episodes, which will impact their responses to the problem in the story, as well as question 2 (What was the problem they faced on Mars?). Question 1 (What do humans need to live?) indicates their previous knowledge and their understanding and absorption of the new knowledge they learned from both the traditional lesson and the story.

The questions in section three examine the children's engagement with the story, as well as exploring their styles of L&T. Questions 1, 3, 5 and 6-9 of their answers are related to the children's styles of L&T, while questions 2 and 4 are more general and explore their engagement with the story and their empathy (question 4) with the characters of the story in their problem.

The problem-solving question is the main question by which the creative imagination of the children was mainly evaluated. All previous questions informed the questions of the present research, and enhanced the children's responses by helping them concentrate on the main aspects of the story. This might help them to solve the problem, and gave me a clear insight into and a deep understanding of their responses. It also helped me in analysing the results and cross checking the findings, and gave me a strong base for the triangulation and final argument regarding the in-depth and multi-method exploration of the children's creative imagination. The categorisation of the responses is considered in Chapters 4 and 5.

Summary

This chapter demonstrated in detail the methodology and methods that were used in this study, and the techniques of analysis.

The following diagram summarises the methodology and methods in this research.

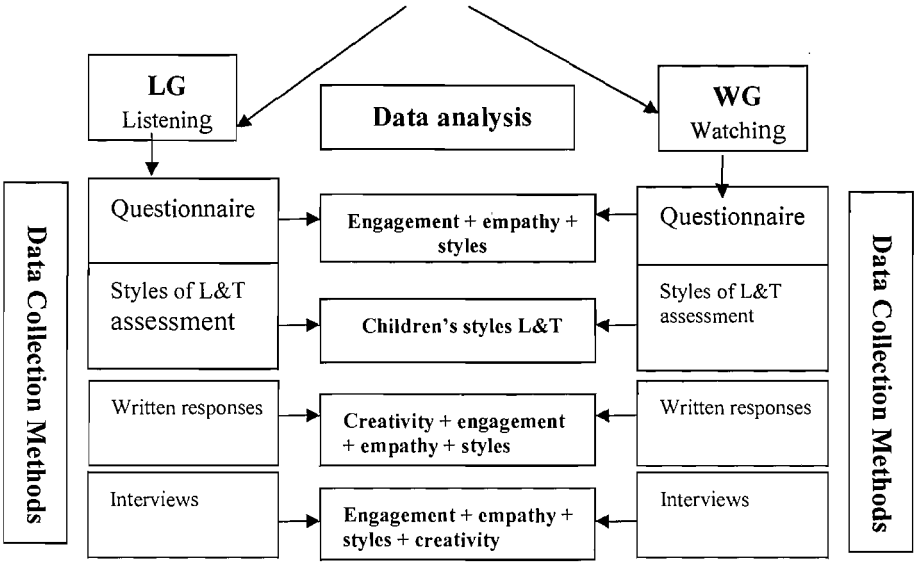


Fig. 3.1: Data collection methods for both groups and what each method measures

The above diagram shows the data collection methods and analysis that were applied to the children from both groups, the WG and the LG. It summarises this chapter, showing the combination of the qualitative and quantitative data and how their results were used to support each other in triangulations to determine the reliability of both sets of methods in this research. For example, the questionnaire, written responses and interviews were used to calculate children's creativity and engagement with the story, and to reconfirm their preference styles of L&T.

The data is analysed according to the conceptual framework of this research. From the children's responses to the problem of the story, I attempt to explore their creative abilities through counting each child's responses to calculate the fluency, diversity, flexibility and finally the originality of these responses, for each child in the two groups, the WG and the LG. Also, from their answers to the questionnaire items I attempted to explore their engagement with the story, especially their understanding and their empathy. The answers and responses of each child were evaluated in comparison with the rest of the children from the two groups, in light of the children's styles of L&T and the mode of presentation. The answers of each child were evaluated according to the style of L&T and group (the group indicating the mode of presentation, the WG the visual mode and the LG the verbal mode), in a sense whether his/her style matched the mode of presentation or not, and then compared this

child's responses to others'. Then, the results of all these assessments were used for triangulation as mentioned above. The techniques of analysis and the triangulation were intended to answer the research questions confidently. The children's responses in term of engagement with the story, together with their efforts to solve the problem, show that the story stimulated their imagination creatively. Moreover, comparing the children's responses in a match/mismatch mode of presentation with their styles of L&T helped to answer the second and third questions of this research. For example, question two asks whether the mode of presentation played a role in stimulating the children's creative imagination, and by exploring this aspect from different angles, I was enabled to answer this question.

The next chapter will display in detail the pilot studies conducted, their findings, and the reflection of those findings in the conduct of the actual fieldwork.

Chapter 4

Pilot Studies and Main Study

This chapter is a link between the previous chapter on methodology and methods and the next chapter on the data analysis and the findings from the main study. This chapter consists of two main sections. The first section contains and discusses the three pilot studies, and the second section is about the procedures of the main study.

4.1 Pilot Studies

4.1.1 Introduction

This section presents and discusses the three pilot studies that were conducted to examine the main tool of the study (the story) as a preparation for the main fieldwork. The first pilot study explored the children's knowledge and capacity to deal with new knowledge about the planet Mars, and their imagination in solving an open-ended, imaginative problem. The second pilot study collected the children's responses to the verbal mode of presenting the story, as the children were requested to write down their responses after listening to the story. The third pilot study obtained the children's written responses to watching (visual) the same story but in 3D animation form. These three different pilot studies were conducted in two different countries and in different periods of time, as will be explained later in this chapter. The following sections of this chapter will demonstrate the detail of the preparation and conduct of each pilot study, and the findings of each study.

4.1.2 First pilot study in 2001

Before this visit the idea of the story was vague in my mind; after this visit I was inspired by the children's responses and determined to write the story!

This pilot study was conducted in a primary school in Southampton, before writing the story.

I visited this school to investigate the level of scientific knowledge that children in this age group, 9-11 years old, might have, as well as investigating their capacity for tolerating new advanced ideas of scientific concepts, and exploring their ability to imagine intangible and complex situations in the shape of an imaginative and open-ended story, and to solve an imaginative, advanced and complicated problem. The children and their teacher were very supportive through their reaction to the problem and their engagement in finding ways to help humans to live on the planet Mars. As a result, I was inspired and encouraged to write the story as the main tool of this present research.

During this visit, it was clear that most of the children knew some scientific facts about the planet Mars, as I noticed that most of them said, 'yes we know the planet Mars, or we have heard about it'. The idea of the story was vague in my mind; however, I casually mentioned that a group of scientists were trying to explore the chances of living on Mars. These scientists wanted to travel to do some experiments there, such as growing some plants and building houses on the planet that would be suitable for human living.

4.1.3 Second pilot study in 2002

This pilot study was conducted in two private English-speaking schools for foreigners in Doha, the capital of the State of Qatar. This pilot study took place was after I wrote the story "Mission on Mars".

Access to the school was negotiated by the ethical principles described earlier.

I spoke to the children and told them that I would like to tell them a story, and I wanted them to imagine it while they listened to it, and also that I would like to film them in their classroom. Afterwards, I mentioned that the story would be about the planet Mars and asked them, 'Have you ever heard about this planet? Who would like to tell me about it?' Once more, their answers showed some knowledge about this planet, exactly as had happened in the Southampton school. Their answers also indicated their individual differences. After discussion about planets and Mars in particular, I started telling them the story, and while at first they were excited to be filmed, waving to the camera, they then seemed to forget about the camera, and it was put in a corner of their classroom to film them while they were involved in listening to

the story. After I finished telling them the story, which took nearly 15 minutes, I asked them to write down their solution(s) to the problem in the story. After I collected the papers with their responses, I asked them what they thought of the story. Did they like it or not? How would they like it to be presented, and did they prefer listening to it or watching it? These procedures applied in both schools. The children's responses again indicated their preferred styles of L&T, as the majority of the children preferred to watch it (I would interpret this as them being used to watching stories on television, DVDs and videos, as some studies said that children prefer to deal with visual stories rather than other modes of presentation – see Chapter 2, p. 41). Only one girl among all the children from the two schools said, 'I prefer to listen to it' (I was not sure whether her reply was according to her preferred style of L&T or whether she was trying to be different from the rest of the children in her classroom, since I did not apply any assessment to measure their styles of L&T at that time; later I found it important to apply such an assessment in order to confirm the indication of the children's responses). From the children's results, I decided to present the story in a visual mode as well as a verbal mode to explore the impact of the mode of presentation and associate it with the children's styles of L&T.

4.1.4 Third pilot study: 13th January 2004

This study was conducted in a state boys schools taught by female teachers (children from age 6 to just before 11 years old in Qatari schools are taught by female teachers, then they transfer to boys schools where the teaching and administration staff are all males). The purpose of this pilot was to trial the visual form of the story.

The above three pilot studies provided me with information, and gave me a clear awareness of the circumstances of how and when to meet the children. Furthermore, their responses assisted the development of a categorisation framework for the children's responses.

4.1.5 Data analysis of the pilot studies and the characteristics of the children's responses

The categorisation of the children's responses was in the light of the conceptual framework for this study, which comprises only the three basic elements of creativity fluency, flexibility and originality.

From the children's responses in the above pilot studies, I noticed that some children produced unique and imaginative responses. According to Beetlestone (1998), imagination is a driving force behind creativity, and the use of imagination can lead children to make unusual connections, whereas Gardner (1995) argues that the product has to be useful or acceptable in one or more cultural settings to be accepted as a creative product. In fact, it could be argued here that the children's responses appeared reasonable for their age group (9-11 years old), as they managed to make unusual connections between things by using their imagination, and showed that some of them had the aptitude to produce imaginative solutions or responses, whether these responses were useful or not. The children in this age group (9-11 years old) may lack the scientific knowledge and life experiences from which they could have developed a richer imagination, as knowledge and experience will create or form a solid base for a person to build creative solutions or creative ideas to be accepted in a cultural setting, according to Gardner's standpoint. Moreover, obliging the children to provide acceptable solutions in certain cultural settings will prevent and limit their imagination and creativity (Craft, 2001). Therefore, the children's creative responses or ideas (outcome) must not be evaluated in comparison with adults' creative outcomes; however, this does not mean that the children's responses cannot sometimes be accepted as creative outcomes in some cultural settings. It is more appropriate to compare their creative outcomes with their peers' outcomes or responses in the same age group, and with a similar level of knowledge and experience. Consequently, the children's responses should be evaluated and considered as unusual, original, or creative within their small community of peers.

In regard to the children's responses in the previous pilot studies, some responses were considered as common responses, according to the number of repetitions of those responses among the majority of the children. For instance, 'Report or contact the space station on Earth or ask for NASA's help' (6), 'Obtain ice from Mars's polar ice and melt it to use it as water' (11), 'Cut their consumption of oxygen (by holding their breath!), water and food' (8), whereas imaginative responses were fewer. Some of those imaginative responses were mentioned only once by an individual child, for example, 'Put electricity in the ice to make a battery that would work the spacecraft' (1), or as another example, 'Mixing water, rocks, and sand from Mars to produce a gas that can fuel the spacecraft's return to Earth' (1). Some responses were repeated a few times by a few children, such as, 'Use the continuous storms on Mars to get air

(oxygen) and water' (2), 'Fly to another planet to find Oxygen' (3), and some of these responses indicated the presence of creative imaginative thinking, or at least, the aptitude for a creative solution. On the other hand, some of these responses clearly indicated the lack of scientific knowledge among this age group.

There was kind of similarity among some responses between ordinary responses and practical imaginative responses. For instance, 'Get ice from Mars and melt it to be water' (11), and 'Dig a hole on Mars to find water' (4). Apart from the different repetition numbers of each response, a response like 'Getting ice from Mars and melt it to be water' was easy and direct for most of the children. On the other hand, a response like 'Dig a hole in Mars to find water' might indicate deeper thinking and the ability to adjust and relate this issue to what happens on Earth. In other words, these children have more scientific knowledge, and they were more able to find a relationship between unlike issues or circumstances, which indicated a kind of creative thinking.

4.1.6 Reflections from the pilot studies and consideration for the actual fieldwork

In the pilot studies, it was difficult to judge these children's responses as creative or not for the following reasons:

1. The children did not have enough time to think of solutions, since they were given only 10-15 minutes to think and respond individually, and because of their age (9-11 years old) they might need more time to think, at least 25-30 minutes. The time they were given to respond was outside my control; I was not able to give them more than that, since the schools gave me a very short and limited time to finish my work with the children, and usually during the last three lessons at the end of the academic day, which have a shorter time than the first three or four lessons at the beginning of the academic day. The issue of time was discussed with schools during school access negotiations for the actual fieldwork.

2. The limitations of the children's scientific knowledge at this age or this learning stage. This informed me of the importance of providing them with some scientific knowledge before allowing them to listen to or watch the story in the actual fieldwork.

3. The children had not previously experienced this type of imaginative and open-ended story or problem-solving story in their lessons or curriculum. As, I

mentioned earlier in chapter 1 the teaching system in Qatar primary schools is traditional. It depends on recitation and feeding knowledge to the children by the teacher without challenging them or/and stimulating their creative abilities.

4. The children had not seen any pictures or films about the planet Mars (in pilot study 2) and they told me that they would have preferred to see what the planet looked like. Also, they would have preferred to watch the story presented on a television or a computer rather than only listening to it, to see what Mars looked like. Therefore, I decided to show the children pictures in the other pilot study and in the actual fieldwork.

5. Some of the children demonstrated a lack of imagination plus a lack of scientific knowledge, as they found it difficult to view or imagine or sense the distance between Mars and Earth. This was clear in this response, 'Push the space craft to the Earth'! Another response was, 'Extend a pipe full of oxygen from Earth to Mars'.

6. There were no big differences among the children's responses from the two groups (the LG and the WG) in pilot studies 2 and 3, which indicated that the story's episodes and the problem were well illustrated, to the level of the children's understanding, since they managed to identify the problem.

7. The most common responses among the children were 'Melt the ice on Mars's poles to get water' – they will be informed in the main fieldwork that ice is frozen carbon dioxide and not frozen water – and 'Use plants to obtain oxygen and water'. The states of water and photosynthesis were common knowledge among most of the children, as it was part of their curriculum.

8. Some of the children showed a higher level of empathy towards the characters and their struggle with the problem in the story than others. For example, one child from the third pilot study (visual mode) wrote a letter to the children on Mars: 'My dear friends' children, I know something about you that you don't have water or oxygen. I will send you a tank full of 3400 tons of oxygen, and 450 tons of water, and food in a spacecraft, which will be enough until you come back to Earth. Also, every

day I will send you a letter to be sure that you are all right, and to ask you if there is something in Mars to build a house [I think he meant e-mail when he said a letter, as the children on the spacecraft sent e-mail to all the children on Earth] and I will send you what is enough for you. Thanks'. Some children believed that the story was real, as I had told them this so as to encourage them to be more involved in and engaged with the story.

9. It might have not been clear enough in the story that the team was running out of time and that they had only two months to survive, and that there was no way to rescue them with another spacecraft in these two months, which was clear in the verbal presentation. Nonetheless, it was clear in the visual presentation that the plants had already grown, and also that the levels of water, oxygen and food had decreased. However, some of the children did not notice this.

10. This meant I had to find a way to make these events clear for the children who were presented with the visual mode, as the children in both groups (WG & LG) had to obtain equal information and be presented with similar events in the story. Therefore, I provided them (each child from the two groups WG & LG) with similar information about Mars, after I had finished giving the above-mentioned lesson about this planet. Additionally, I mentioned to the children in the WG that the team included a ten-year-old boy and a nine-year-old girl, that they would all face a deadly problem on Mars, and that they had only two months to survive. Thus, the children on Mars would contact them to ask for their help in solving their problem. Then, I would ask them to pay attention to the story to work out what the problem was, and how they would help the team to solve it.

4.1.7 Categorisation of the children's responses

If I take a general view of the children's responses, this view or observation reveals that:

- It was not easy to classify and categorise their responses, since they reflected the complex of feeling and thoughts and the ambiguous nature of human beings in actual life.
- The dominance of science in all responses was very clear, due to the scientific nature or context of the story. E.g. 'Grow plants to get oxygen'.

- The dominance of imagination in the children's responses, as the nature of story is itself imaginative. E.g. 'Extend a tube full of oxygen from Earth to the planet Mars'.
- The strong effect of the media on the children's way of thinking and imagination was clear in some of the children's responses, since they seemed confused between what was real and what was imaginative. For example, a response like 'I shall call the new boy to help them' (I assume this new boy was a cartoon character) shows that this child thinks that what he watches on television, videotape, or DVD movie is real, and that there really is somebody strong who has the ability to fly and adapt to living in all atmospheres and environments. This example also indicated the impact of imaginative stories and films on children's imagination, which supports my argument on the importance of providing the children with useful types of imaginative story to stimulate their creativity and enhance their ability to solve problems creatively.
- It was premature at the pilot stage to draw a final shape of categorisation for the children's responses, as there were some circumstances and faults in the pilot studies that may have influenced the children's responses.
- The children's responses were categorised according to the conceptual framework of this study, the three aspects of creativity: fluency, flexibility and originality. The children's responses in the pilot studies fitted into this framework, since they expressed these three elements of creativity in their responses, as well as their individual differences. The same categorisation is applied to the children's responses in the main fieldwork.

The above factors informed the main fieldwork, and are considered in the categorisation and analysis of the data in the next chapter.

The second part of this chapter will discuss the main fieldwork and the procedures for collecting the data for the main study.

4.2 The main fieldwork

This section of the chapter presents the procedures for accessing the schools and the data collection for this present study.

4.2.1 Negotiation for accessing the schools

Access to schools was conducted according to the ethical principles described earlier.

4.2.1.1 Developing rapport with the teachers and children

After the weekend, I started attending classes (Arabic language, English language, Science and Arts lessons). Selecting these classes specifically was part of a plan to observe the children's interaction with their teachers and with each other, and to obtain a rich base of knowledge about their performance in these particular subjects. This is because I was attempting to explore and understand how the children performed in verbal and visual subjects, and how they dealt with scientific knowledge and solved scientific problems. In addition, I investigated whether they expressed their activities and reactions verbally or visually, in order to relate their performance on the styles of L&T assessment, the questionnaire results, and their responses, to enrich my knowledge of them. However, the loss of some data redirected me to ignore the observations (see limitation of the research, ch6, p. 182). This was additional to my main aim, which was building a rapport with the children, and making myself familiar to them. Therefore, I spent three days (4-6/12) with each class in their classrooms, moving with the children to different subject rooms or classes. Therefore, I attended two lessons in each selected subject. I introduced myself to them at our first meeting, gave them a brief idea about myself and my visit, and told them that I would tell them (or show them, depending on which classroom I was in) a story which had in it children of their age, and that afterwards I would do an assessment to see how they thought. Moreover, I assured them that the assessment was for my research only and was not an examination, and that no-one would look at their responses, as I was going to take their papers with me to the UK.

Two pictures showing the girls in one of the classrooms answering the questionnaires during the fieldwork

4.2.1.2 Applying the styles of L&T assessment

On the fourth day, 5/12, I applied the styles of L&T assessment to the children in the school library, as planned by the school administration. I explained to them what the assessment was about: 'to know which side of your brain you use when you are thinking'; the children were excited about this, and were given 30 minutes to reply to it. Afterwards, I collected the papers, thanked the children, and said to them, 'I will see you tomorrow to teach a science lesson; it will be an interesting lesson'. I aimed to stimulate their curiosity, and that was achieved. They started to ask what the lesson would be about. The same thing happened with the other class, as I was applying the same tool twice a day, in following lessons, leaving one classroom to go to the other.

4.2.1.3 Explaining the science lesson about the planet Mars

Next day in the science laboratory, I explained the science lesson about the planet Mars as described in Chapter 3 (see Chapter 3, p. 57). I started by asking them what humans need to live. I listened to their answers and discussed them with them. Then I told them, 'Tomorrow I'm going to tell you a story about the planet Mars, and I want you to learn some knowledge about it before I present you with the story'. Next, I asked them, 'Have you heard about this planet before?' Most of the children said, 'Yes'. I asked, 'What do you know about it, can you tell me?' Some children had very little knowledge, and some had heard about the planet but did not know any details about it, as this topic is taught at a higher level of education. So I explained and told them about Mars, and showed them some pictures – taken by NASA's Viking – showing the red colour of the planet's land and the pink colour of its sky, and the topography of the planet: the dry valleys (assumed to have contained water), the mountains, the old volcano hole, the polar ice, the early morning fog, evening on the red planet, and more. Afterwards, I asked them to compare the planet Earth on which we live and Mars. The children became aware of the differences between the two planets and that Mars is an unsuitable planet for human beings to live on. I ended the lesson by telling them, 'Now you have learned about the planet Mars, so prepare yourselves to listen – or watch – the story when we meet tomorrow'. Then I gave each child a sheet of paper with important information about the planet Mars, and told them that they could bring it with them the next day to read from it before or while listening to or watching the story. That paper (see Appendix 2) had information about the planet that might help them to solve the problem, such as the level of oxygen (O_2) on the planet, that the major gas on the planet was carbon dioxide (CO_2), and that there was no water (H_2O) on the planet, and I provided them with the chemical symbols (as the children who were going to watch the story should realise or detect the problem by reading those symbols), which I had already written for them on the whiteboard while explaining the lesson to them. In the second classroom, I did the same work with the children with same scenario.

4.2.1.4 Presenting the story

On day six, 7/12, I presented the two modes of the story to the children, while one of the teachers video-recorded them while they were listening to it, and I filmed the children who were watching the story. One of the classes listened to the story (the verbal mode) and the other watched the story (the visual mode). To present the story, the school administration prepared the teachers' meeting room to be the place for the story presentation.

1. Visual mode of presentation

I met the children who watched the story first at the second lesson time (8.15am Qatar time); I gave them a short introduction to the story, whilst one of their teachers filmed them until I had finished talking to them. Then, I continued the video recording, saying, 'We are going to watch the story that I promised you yesterday, this story has no sound; that is why you need to concentrate'. I added, 'In the story there are two children; they are the same age as you, a 10-year-old boy and his nine-year-old sister. They travel to Mars with others, and they all will face a problem, and the children will send to all children on Earth asking their help to solve their problem. Therefore, watch carefully, and try to spot the problem, so you can help them in solving it'. Then I started the story, which took nearly 12 minutes. After they had finished watching the story, I gave them the questionnaire, and said, 'Write down your answers please, and write as much as you can for solution(s) for the problem in the last page. You have 30 minutes to write your responses'. After they had finished writing and submitted their papers, I thanked them. They left the meeting room, and the children from the other class came in to listen to the story as follows.

2. Verbal mode of presentation

After the children had entered the room, I greeted them and asked them to sit on the chairs and listen to me. They did so, and I asked them, 'Do you remember I told you yesterday, that I'm going to tell you a story today?' They said, 'Are you going to tell us now? Have you told it to the children in class 5/3 as well?' I told them, 'Yes. I will tell you now. I want you to listen to me carefully, as the story will end up with a problem, and I will ask you to solve this problem to help the children in the story to stay alive'. I started telling them the story in detail, changing my tone of voice and using different facial expressions and hand movements. They listened carefully and

passionately. After I had finished telling them the story, I provided them with the questionnaire and asked them to answer it, following the same procedures that I had followed earlier with the children who watched the story.

3. The interview

I was not able to interview the children directly after they had been presented with the story, as it was the break period, so the children went to eat and play. However, later in the day, one of the teachers collected five children from each class and sent them to me, to interview them. At this stage, I finished my work with the children at this school. I thanked the children and sent them back to their classes, then thanked all of the teaching and administration staff, and left the school.

Next day I sent a card, flowers and chocolate to thank the administration staff and the teachers.

4.2.2 Accessing School B (the girls' school) 18/12 - 19/12/2005

Access to the school was negotiated by the ethical principles described earlier; and exact procedures as in school A have been applied in school B

The interview

I randomly selected some girls from each classroom to interview after the presentation of the story. The interview lasted for two days at this school, on 18/12/05 and 19/12/05. The headmistress provided me with an office to interview the girls in, and arranged with the teachers of the three classrooms to co-operate with me, and send me the girls one by one. I had previously selected the girls randomly from each classroom. I prepared the video camera, a notebook and a pen to write down the girls' responses, before I began the interview with them. The teachers sent the girls in order, one by one. Each girl went back to the office after she finished her interview, and then the teacher sent the next girl, until I had finished interviewing all of them. The interviews took place during the last lesson of the day, as the lesson would be Art, Sport or revision of old lessons, and not in the early classes, as the girls studied or revised the main core lessons (Science or Maths, for example).

After finishing my work at this school, I thanked the owner, the headmistress, and the teachers, and on the next day I sent a thank-you card, chocolate and flowers to the headmistress's office.

Summary

This chapter has explained the outcomes of the pilot studies and the conduct of the main fieldwork.

Chapter 5

Data Analysis and Findings

5.1 Introduction

This chapter presents the analysed data and the results of the main study, to answer the following research questions:

1. Does an imaginative story stimulate children's creative imagination? If so, then how?
2. Does the mode of presentation (visual/verbal) contribute in stimulating children's creative imagination? If yes, then which mode is more effective, and why?
3. Do children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

The analysis of the data was influenced by the conceptual framework of this study. The three elements of creativity (fluency, flexibility and originality) were investigated in the children's written responses, and in relation to their styles of L&T and the mode of presentation. To analyse the data, I calculated the percentage of the children's responses to each question in the questionnaire for each group, then I compared the responses of each group, and drew diagrams to clarify the children's performance on each question (more details in sections 5.3, 5.3.1, 5.3.2. and 5.3.3, p. 119).

In order to answer the first question, **'Does an imaginative story stimulate children's creative imagination? If so, then how?'** I explored the children's engagement and empathy with the story; engagement was explored through the children's understanding, enjoyment, and identification of the problem in the story. I assumed that if the children were engaged with and enjoyed the story, and empathised with its characters, this would probably stimulate their imagination to come up with or present unusual and imaginative solutions to help the team in the story.

Afterwards, I investigated the stimulation of the children's basic creative abilities (fluency, flexibility, and originality) with the consideration that they were ordinary (not gifted) children. Then, I attempted to obtain their styles of learning and thinking (L&T)

from the assessment of styles of L&T. Through these procedures I compared the results of the two groups, the watching group (WG) and the listening group (LG). I present an overview of children's performance on all the tools and assessments of this research, in order to answer the second research question: **'Does the mode of presentation (visual/verbal) contribute in stimulating children's creative imagination? If yes, then which mode is more effective, and why?'**, and the third research question,

'Do children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?'

Then, I present a brief primary discussion of these aspects, after a chain of comparisons in the form of tables, charts, and figures from the actual children's performances on the tools of the study, through the two modes of presentations, the visual in the WG, and the verbal in the LG. Following that, I scrutinise the results by adding another dimension to the analysis process, triangulation, adding a semi case study through randomly selecting some children with right and left styles of L&T from the two groups. In addition, I show their results on the styles of L&T assessment, engagement, empathy, and creative abilities, and then I compare these newly specified results to the main results from the children's performances on the questionnaire and the interview questions. Finally, I draw conclusions about the above research enquiries, to be discussed fully and in depth in the next chapter.

The following section demonstrates the results of the children in the two groups – which were obtained from the questionnaire and the interview – concerning how their engagement was calculated and interpreted, as well as their empathy with the story.

5.2. The children's engagement with the story

This section illustrates the findings of the comparisons between the two groups, and reveals whether the children were engaged with the story, and the level of their engagement, through demonstrating their results on the following queries:

- Did the children recall events from the story correctly?
- Did they understand the story?
- Did they enjoy listening to / watching the story, or like the story?

- Did they manage to identify the problem within the story?

All these data will be exhibited in the following subsections.

5.2.1. Children's recall of story episodes

This subsection presents the data on the children's correct recall of some episodes from the story through the following questions from the questionnaire. (Recall was not in the sense of involving the memory in this research, it just arises from the assumption which claims that the human recalls the experiences that he liked and enjoyed in his life; therefore, I presumed that if the children were interested in, liked, and enjoyed the story, along with understanding it, they would be able to recall some of its episodes correctly.)

Q 1: How many children were in the story?

Table 5.1 and Figure 5.1 explain the difference between the children's answers from both groups on question 1 section 1 of the questionnaire:

Table 5.1 Q1: A comparison between W/L groups

Answers	WG	LG
Correct	48	13
Wrong	35	1
	N= 62	N= 36

Fig. 5.1 Comparison between L/W Groups

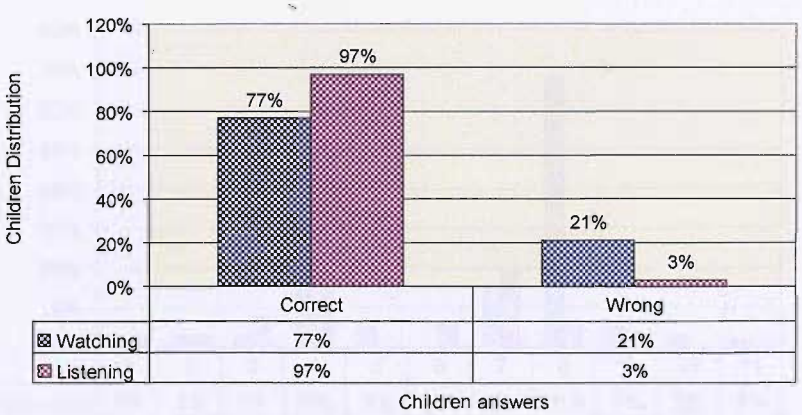


Figure 5.1 A comparison between the (WG & LG) answers on Q1, sec. 1

Table 5.1 and Figure 5.1 show that the majority of the children from the two groups (97% of the LG and 77% of the WG) answered this question correctly. Children with

correct answers from the WG were fewer than those in the LG; this is probably because the children from the WG took the mother for a third child, since she was not wearing anything distinguishable like other members of the team.

Q 2: What did the children do before they travelled to the planet Mars?

The following Table 5.2 and Figure 5.2 will show more details about the differences between the two groups on this question.

Table 5.2 Q2 Sec. 1: A comparison between W/L groups

Answers	WG	LG
1 Read about Mars	-	1
2 View pics (Mars)	2	1
3 Watch a film	2	3
4 Hosp check up	11	19
5 Ask questions	1	-
6 Tell their friends	-	2
7 Measure spacesuits	9	7
8 Suitcases prep	42	3
9 Attend lecture	3	-
10 Practice for travel	2	-
11 Attend meeting	1	-
	N= 36	N= 62

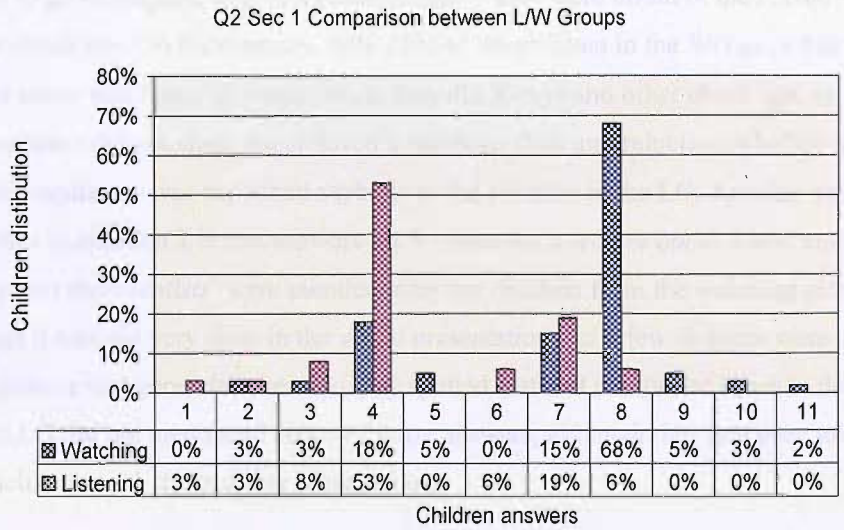


Figure 5.2 A comparison between WG and LG on Q2, sec. 1

Table 5.2 and Figure 5.2 above show a clear difference between the children's answers to the question. Most children (68%) in the WG answered, '*They prepared their suitcases*' (no. 8), while only 6% of listening group children gave this answer. On the other hand, 53% of the LG answered, '*They went to hospital for checking up*' (no.4), whereas (18%) of the WG gave this answer. The other notable thing was that the children in the WG were more elaborate and fluent than the children in the LG. Some answers, such as no.8, '*They prepared their suitcases*', were mentioned by the vast majority of the children in the WG, as it was the first scene in the animation story. In contrast, only two children from the LG gave this answer. Probably, the scene seemed more exciting and interesting for the children in the WG, and therefore the children remembered it. On the contrary, it was an ordinary action for the children who listened to the story, since this action was not mentioned in the listening story, how the children were excited about travelling to Mars, from this perspective, because there were other episodes in the listening story that showed the children's excitement, such as watching a movie, asking many questions, clapping their hands, or making sounds, since all these were absent from the watching story.

Therefore, the answer '*They went to hospital to check up*' was more popular among the children in the LG (53%), as it was probably more easily memorised for them, as through telling the story it was mentioned, and they expressed their fear and reluctance to go to hospital in the beginning, once their mother told them that tomorrow they had to be ready to go to hospital, to give a blood sample – they were afraid of the needle – and have other check ups. On the contrary, only 18% of the children in the WG gave this answer, as the scene was funny to watch, while they did X-rays and other check ups, so the visual presentation did not show the children's reactions (fear and reluctance) before they went to the hospital, as was explained verbally to the children in the LG. Another impressive incident in question 2 is that answers no. 9 '*Attended a lecture about Mars*' and no.11 '*They met the scientists*' were mentioned by the children from the watching group. Even though it was not very clear in the visual presentation, yet a few children were imaginative and good observers, so they spotted that and mentioned it, while the children in the LG did not mentioned either of those answers, although they had been told explicitly through the auditory presentation.

Q 3: What did the children do after they arrived at the planet Mars?

Table 5.3 and Figure 5.3 demonstrate the answers to this question and show the children's distribution on it.

Table 5.3 Q3 Sec 1: A comparison between WG/LG on Q3

Answers	WG	LG
1 Look from window	3	4
2 Stay inside the craft	3	6
3 Eat	7	5
4 Sleep	4	3
5 Ask question	-	3
6 Play together	-	4
7 Wear spacesuit	29	2
8 Leave space craft	19	1
9 Tour on Mars	5	1
10 Take photos	9	4
11 Send e-mails	2	5
12 Write observations	-	5
13 Write memories	-	4
14 Study	3	-
	N= 36	N= 62

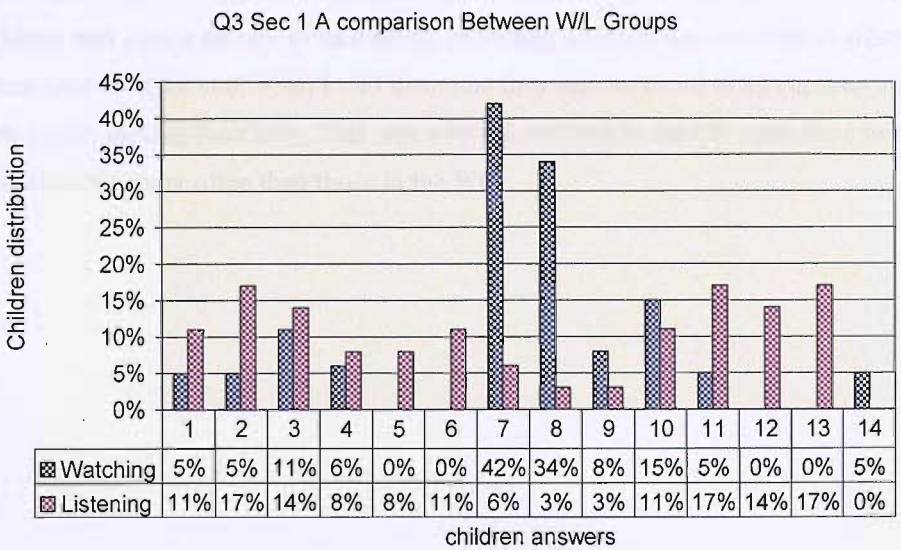


Figure 5.3 A comparison between LG and WG on Q3 sec. 1

The above Table 5.3 and Figure 5.3 show that the most of the children in WG (42%) mentioned no.7, '*They wore their space suite*' and 34% mentioned no. 8, '*They left the spacecraft*', whereas few children from the LG gave these answers. Since, the children in the WG were not exposed to an expressive explicit mode of presentation like the children

in LG, that left gaps in their following up with the story. Nevertheless, the children in the WG showed a reasonable degree of understanding the story, just like the children in the LG or even better. As shown in the above table, there were some answers that were = 0 in either group; the reason for this is the lack of clarity of those aspects in either mode of presentation. For example, answers no. 6, '*They played together*', 12, '*They wrote their observations*', 13, '*They wrote their memories*' and 14, '*They studied*': these actions were not presented in the visual mode, therefore the children from the WG did not mention them at all.

On the other hand, answers like no.1, '*They looked from the spacecraft's window*', and no. 10, '*They took photos*', were given by children from both groups, as they were mentioned to both groups.

In addition, answers like no.2 ,'*They stayed inside the space craft the first and the second day*', and no. 11, '*They sent emails to their friends*', were mentioned by the children in the LG more than the children in the WG, as they were mentioned clearly to the children in the LG, while they were listening to the story, whereas the children in the WG had to guess from seeing the adults leaving the craft, except for the mother and the two children, and from a picture of sent email, regarding which it was not clear to whom it has been sent until the end, when I told them that they sent an email to all children on the Earth planet seeking their help. This was why the children in the LG gave these two answers relatively more often than those in the WG.

Q4: What did the adults do after they arrived on the planet Mars?

Table 5.4 and Figure 5.4 will explain the answers to this question.

Table 5.4: Q4 sec. 1: A comparison between W/L Groups

Answers	WG	LG
1 Prepare for next day	2	1
2 Leave the space craft	13	8
3 Collect samples	2	1
4 Explore the planet	18	14
5 Measure CO2 on Mars	1	1
6 Eat	3	1
7 Sleep	3	3
8 Build the green house	14	5
9 Planting	12	7
10 Conduct experiments	0	2
11 Take picture of Mars	1	0
12 Health check up	-	4
13 Wear the spacesuit	15	3
14 Contact earth base	-	1
15 Measure the gravity	1	0
	N= 62	N= 36

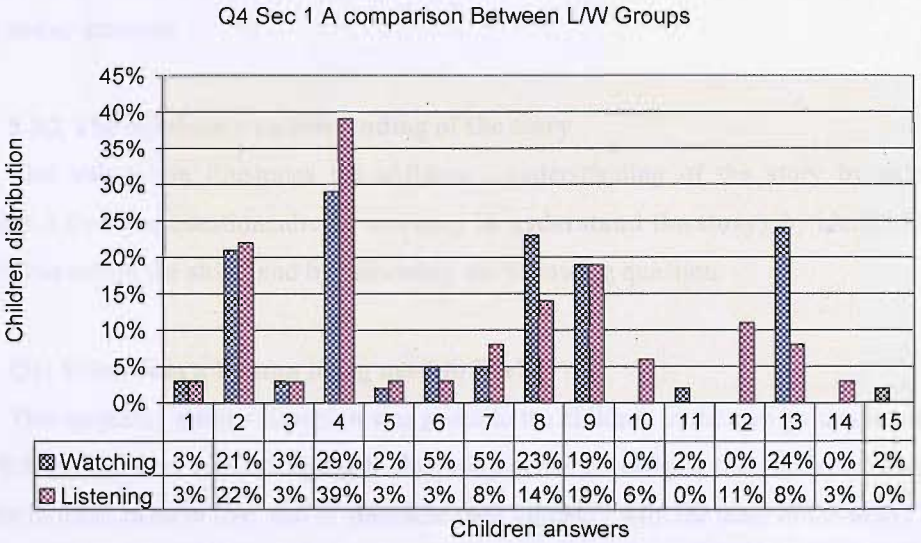


Figure 5.4 A comparison between WG & LG on Q4 sec. 1

The above Table 5.4 and Figure 5.4 show that there were some answers that the children from each group gave more than others, such as answer 4. Twenty-nine per cent of the children in the WG and 38% of the children in the LG gave this answer: '*They explored the planet, and made some measurements and analyses*'.

In the WG the next most popular answer was, '*They wore the space suits*' (24%), whereas this was less popular among the children from the LG (8%).

The third most popular answer in the WG was *'They built the green house'* (23%), while only 14% of the children from the LG gave this.

The fourth most popular answer in the WG was *'They left the spacecraft'* (21%), whereas this answer was the second most popular answer in the LG (22%).

The least popular answer among the children in the WG was, *'They planted the plants they brought with them from Earth'* (19%); in contrast, in the LG this answer was the third most popular answer (19%).

From the above demonstration of some examples of the children's answers from the two groups, it appears that most children answered all four questions, and each child gave between 0-4 answers for each question. Furthermore, from the children's answers, it can be said that most children remembered the details of the sequence and the episodes of the story reasonably well.

The following subsection will present children's understanding of the story, alongside the above answers.

5.2.2 The children's understanding of the story

This subsection illustrates the children's understanding of the story by selecting option 3 from the questionnaire (**it was easy to understand the story**), by identifying the problem within the story, and by answering the following question:

Q1: What does a human being need to live?

This question in this subsection was given to the children in the two groups in order to link the children's knowledge with the problem and investigate their understanding of what humans need to live, and to stimulate their empathy with the team in the story.

I presented the children with this question after I had explored and discussed with them their own knowledge about what humans need to live, and explained to them the nature of the planet Mars and the deficiency and lack of necessary elements for human life on that planet, on the day before presenting them with the story.

The following Table 5.5 and Figure 5.5 show the children's performance in each group, and provide a comparison between the two groups.

Table 5.5 A comparison between W/L Groups on Q1 Sec. 2

Answers	WG	LG
1 Water	55	31
2 Oxygen	53	29
3 Food	49	28
4 Gravity	13	2
5 Plants	5	1
6 Clothes	1	2
7 House	1	1
8 Safety	-	1
9 Sun (temperature)	4	-
10 Animal	2	-
	N=62	N= 36

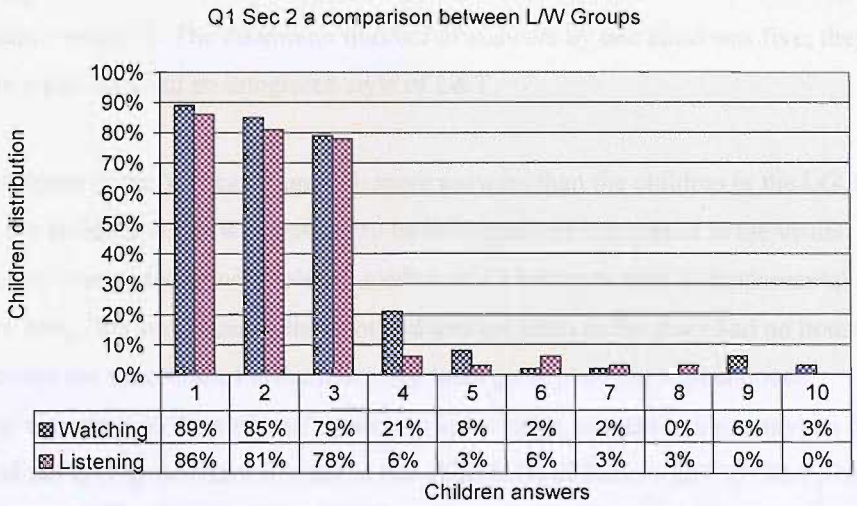


Figure 5.5 A comparison between WG and LG on Q1 sec. 2

The above Table 5.5 and Figure 5.5 show that the most of the children in the two groups answered similarly, as the majority of the children from both groups mentioned the first three options in the table (Water, Oxygen and Food). There was also an equal value of mean nearly = 3 answers per child, yet the mean was slightly higher in the WG (2.9) than in the LG (2.6).

On the other hand, the WG came up with different sorts of answers (such as clothes, house, safety, animal, plants and sun, which some children called temperature) depending on their own previous knowledge – as I found out from their curriculum – and the lesson

on the planet Mars that I gave them the day before I presented them with the story. Other reasons for giving many responses to this question might be their observations and/or their imagination, and even their instinct. As is notable from both Table 5.5 and Figure 5.5, the most popular answers were 'Water' (1) since 89% of the children mentioned it as a first option; then 85% of them mentioned 'Oxygen' – which some children called air – (2); 79% provided option (3) 'Food'; and finally 21% mentioned 'Gravity'(4). Those were the major answers in this group. The number of answers were between 0-6 for each individual, and the mean for the children's answers was = 3, since the minimum answer was 0, and the maximum was 6 by each individual. Only two children gave six answers; both were girls, one of them has an integrated style of L&T, the other a right style.

Similarly, in the LG the most popular answers were no. 1, 'Water' (86% of children), no. 2 'Oxygen' (81%), and no. 3 'Food' (78%). The children's answers were between 0-5 with a mean = nearly 3. The maximum number of answers by one child was five; they were from a girl who had an integrated style of L&T.

The children in the WG came up with more answers than the children in the LG. In addition, the children in the WG seemed to be influenced by the scenes in the visual mode, as they mentioned gravity, plants, clothes and a house as vital or fundamental for humans to live. That was because they noticed that the team in the story had no house to live in, except the spacecraft. Furthermore, the team grew plants in a greenhouse. Therefore, according to the children's previous knowledge, humans can get oxygen from plants, and the gravity on Mars is equal to one-third (1/3) of Earth's gravity. Moreover, the team cannot live without wearing their space suits; accordingly, they have no extra clothes to wear there. In contrast, most of the children from the LG did not mention gravity and plants as essential elements for human existence. The above demonstration means that most of the children in both groups had a basic grasp of the essential needs for human existence, and the mode of presentation had an impact on their answers to this question.

The next question (**What was the problem they faced on planet Mars?**) explores children's identification of the problem in the story, which is another confirmation of their understanding of the story.

Q2: What was the problem they faced on planet Mars?

This question as well as the previous questions in section one of the questionnaire was given to children in order to assess their understanding of the story.

Table 5.6 A comparison between W/L Groups on Q2 Sec. 2

Answer	WG	LG
1 Fault	11	10
2 Water	38	26
3 Oxygen	32	26
4 Food	32	20
5 Fuel	15	0
	N=62	N= 36

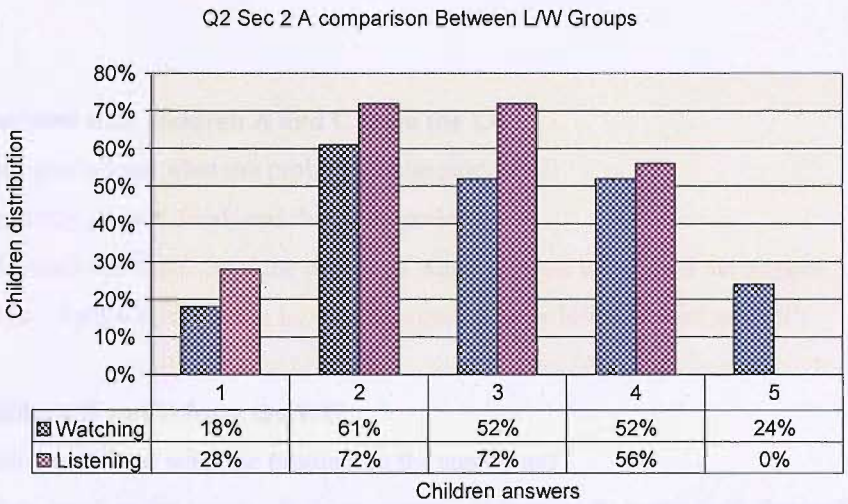


Figure 5.6 A comparison between WG and LG on Q2 sec. 2

The cause of the problem within the story was the fault that occurred in the spacecraft. However, only a small number of the children from both groups mentioned it as the main cause of the problem. Nonetheless, the majority of them considered the consequences of this fault, such as the decrease of water, oxygen and food, as the major important problems.

From Table 5.6 and Figure 5.6 above, more than half of the children (61%) from the WG considered the deficiency of water as the main problem, whereas oxygen and the food came equally (52%) and later. Moreover, some of them mentioned fuel as a problem, as they might have been confused when they saw the oxygen cylinder. On the other hand, the majority of children (72%) from the LG mentioned water and oxygen first

and then food, and no one mentioned fuel. This shows the impact of the mode of presentation on the children's responses.

From the children's results on the questions from section 1 and 2, I can conclude that the vast majority of the children from both groups (WG & LG) fully understood the story and identified the problem. The results also showed that the children's understanding and answers were influenced by the mode of presentation, as this appeared in their answers to the questions in section one of the questionnaire.

Furthermore, the following interview extracts from the children's interviews, from both groups, confirmed their understanding of the story and their identification of the problem:

1. Interview with children A and C from the LG

- Can you tell me what the problem in the story was?

A: 'Less oxygen and food, and the craft spoiled'.

C: 'The craft had fault...and the degree of water became minus and the oxygen became less...a a a water became less and oxygen became less and food as well'.

2. Children B and D from the WG

- Can you tell me what the problem in the story was?

B: 'They stuck in the space...in Mars planet...if they try to come back they will die. – Why? 'Because from Mars planet to Earth planet they need six months, as you said'.

– But what was the problem? Why they stuck in space? 'Because they don't have air or water'.

D: 'That they don't have water or oxygen or food'.

The following option 3 was a complementary option for assessing the children's understanding, besides their responses to the problem and their answers in the interviews, and in addition to their answers on sections 1 and 2 of the questionnaire.

Option 3: It was easy to understand the story.

Table 5.7

	WG	LG
Agree	28	25
Not sure	30	9
Disagree	4	2
	N= 62	N=36

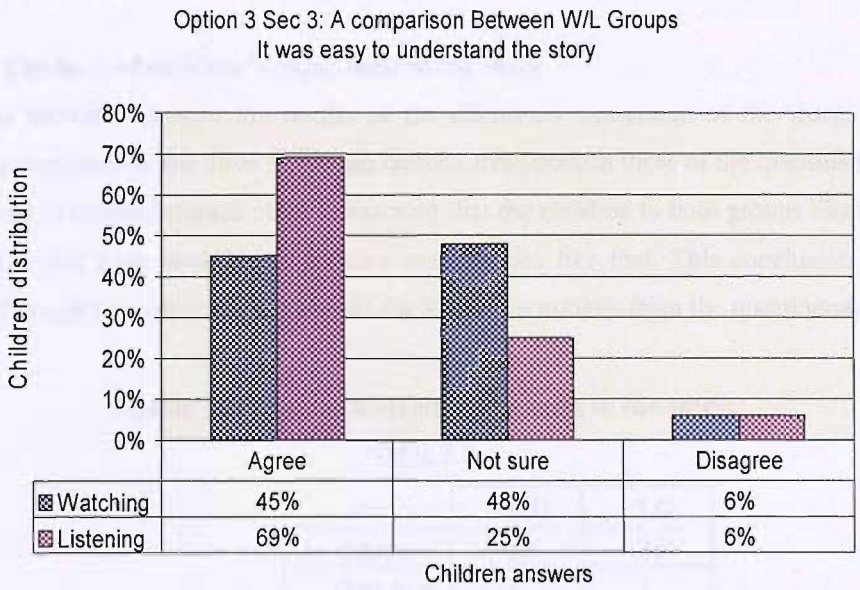


Figure 5.7 A comparison between WG and LG on option 3

The above Table 5.7 and Figure 5.7 show that the majority of the children in the LG (69%) understood the story, and also a large portion of the children in the WG (45%). The percentage of the children's agreement on the ease of understanding the story in the WG was less than it was in the LG, and was not the answer of the majority of the children in the WG, possibly because the verbal presentation was more comprehensive and clear in the LG, while it was in some ways not comprehensive and ambiguous in the WG, due to the absence of sound and missing scenes in the visual presentation of the story. Nonetheless, the percentage of the children who found it easy in the WG group was considerable, and the majority in the LG agreed on the ease of understanding the story. This was in addition to the ability of the children from both groups to identify the problem and their responses to the interview questions. Therefore, I shall ignore the small differences (Table and Figure 5.7) between the children's responses (agree 45% and not

sure 48%) in the WG. Additionally, I consider that the children from both groups understood the story. Also, besides the above questions, their answers in sections one and two of the questionnaire (see Tables and Figures 5.1-5.4) reflected their understanding of the story.

The second subsection (the children's enjoyment and liking of the story) is another aspect of exploring and evaluating the degree of the children's engagement with the story.

5.2.3 The level of children's enjoyment of the story

In this section I present the results of the children's enjoyment of the story. The children's responses to the three following options from section three of the questionnaire (1, 2, 5, and 6) reinforced each other in showing that the children in both groups liked the story and would have been happy to have more stories like that. This conclusion was revealed through the children's answers to the following options from the questionnaire.

Option 1: I enjoyed watching / listening to the story.

Table 5.8

	WG	LG
Agree	52	33
Not sure	5	1
Disagree	5	2
	N= 62	N= 36

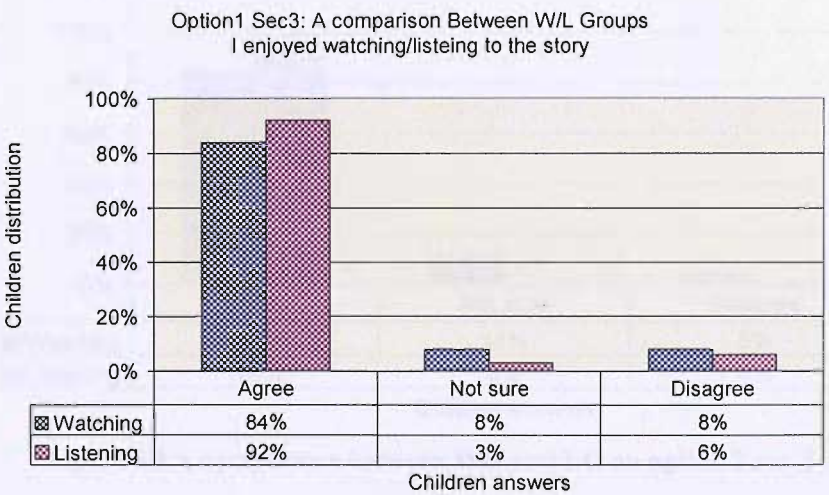


Figure 5.8 A comparison between WG and LG on option 1 sec. 3

From the above Table 5.8 and Figure 5.8, it appears that the majority of the children from the two groups enjoyed listening to or watching the story. Nonetheless, the children in the LG showed a slightly higher percentage (92%) than the children in the WG (84%) in their interest. This might be because they had more details, and the telling was accompanied with facial and eye expressions, various levels of the storyteller's voice, hand movements and postures, according to the episode, and even within the story weave. However, the children in the WG lacked all those techniques and did not see scenes that would have helped them to link the story's episodes and enjoy the story more. Nonetheless, there were some children that did not enjoy much the story within the two groups, and this was probably due to the presentation of the story which did not match their styles of L&T, or there was some misunderstanding to some aspects in the story or basically those children were not interested in stories or in this particular story at all.

Option 2: I liked the story.

Table 5.9

	WG	LG
Agree	52	36
Not sure	7	0
Disagree	3	0
	N= 62	N= 36

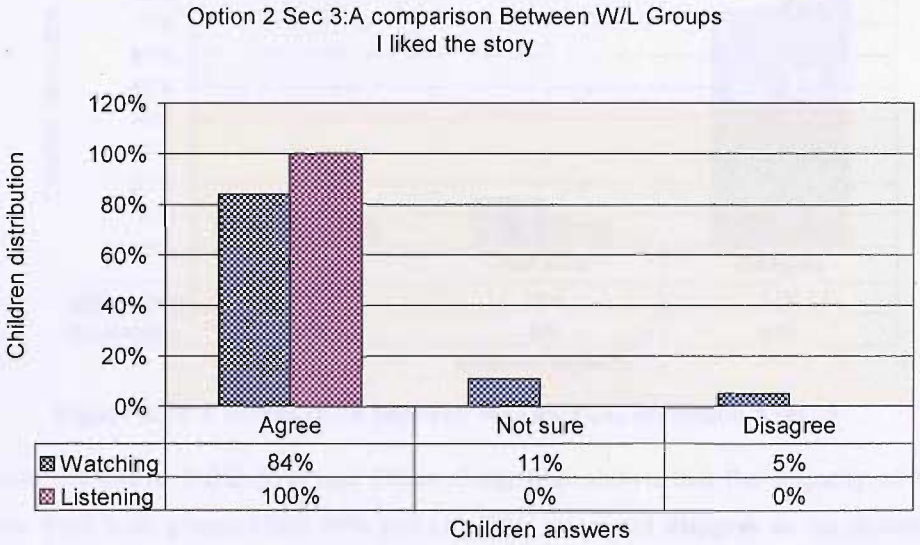


Figure 5.9 A comparison between WG and LG on option 2 sec. 3

The above Table 5.9 and Figure 5.9 show that there was no big difference between the two groups on this option, since the vast majority of the children in the WG (84%) and all the children (100%) of the LG answered with (**agree**), to the above option ***(I liked the story)***. On the other hand, the children's responses to this option, from both groups, were similar to their responses to the previous option 1 ***(I Enjoyed watching / listening to the story).***

This option was number 5 in the sequence of options in section 3 of the questionnaire, and I added it as a complementary option to examine the validity and reliability of the children's other answers (option 2).

Option 5: I did not like the story.

Table 5.10

	WG	LG
Agree	6	3
Not sure	9	3
Disagree	46	30

N= 62 N= 36

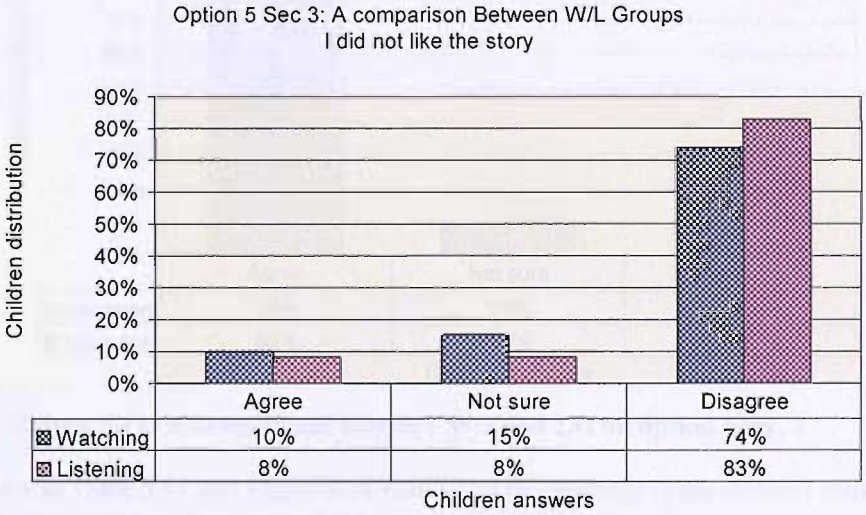


Figure 5.10 A comparison between WG and LG on option 5 sec. 3

From the above Table 5.10 and Figure 5.10, it is shown that the majority of the children from both groups (WG 74% and LG 83%) answered **disagree** to the option (***I did not like the story***). This result confirmed the results of the previous option two.

The following option 6 is intended to examine the credibility of the above option 1 about the children's enjoyment of this kind of story.

Option 6: I would like to listen to/watch more stories like this.

Table 5.11

	WG	LG
Agree	49	31
Not sure	6	4
Disagree	7	1
	N= 62	N= 36

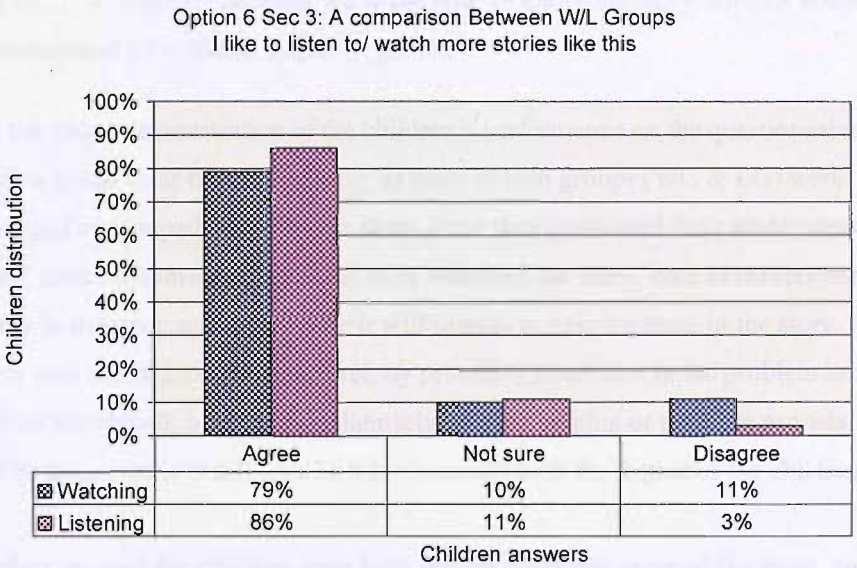


Figure 5.11: A comparison between WG and LG on option 6 sec. 3

The above Table 5.11 and Figure 5.11 reveal that the majority of the children showed a clear interest and enjoyment in watching or listening to the story, since 79% of the children in the WG and 86% of the children in the LG answered (**agree**) to watching or listening to more of this type of imaginative story.

As a conclusion from the above four demonstrated options (1, 2, 5 and 6), it was clear that the most of the children in both groups enjoyed and liked the story. This is also

supported by the children's responses in their interviews. These children were typical in their responses, as follows.

Children A and C from listening group: their answers to the following question were:

– What do you think of the story you just listened to?

A: (he looked in different directions, shook his head, then said) 'Good...I liked it'.

C: 'Nice...Attracted me' – How? In what way? – 'ehh...' – he is thinking – '...when I listened to it I thought of things like how to help those children'.

Children B and D from watching group:

– What do you think of the story you just watched?

B: 'Very nice. I like silent acting...Pantomime acting'.

D: 'Nice...' – Why? – 'because we learn how to know the story without sound'. – Did you understand it? – 'Eehm... Eeh (= yeah)'.

From the above demonstration of the children's performance on the questionnaire and the interview it was clear that the majority of them in both groups (WG & LG) were highly engaged and empathised with the story, since they confirmed their **understanding** of the story, their **enjoyment** of listening to or watching the story, their **identification** of the problem in the story, and, finally, their **willingness** to help the team in the story. This willingness was twofold: on the first level, by providing a solution to the problem in the story, and on the second, by involving themselves in the helping or rescuing process. This issue will be discussed in detail later as it is connected with the degree of the children's empathy.

Therefore, overall the children from both groups liked and enjoyed the story, and both modes of presentation of the story seemed to capture the children's interest.

In conclusion, regarding the children's degree of engagement with the story, referring to the questionnaire sections, it was noticeable that the children's responses revealed that the majority of the children in both groups (WG and LG) declared their apparent enjoyment of the story, since 84% of the WG and 92% of the LG responded **agree** to the option: **I enjoyed watching/listening to the story**. In addition, 84% of the children in the WG and 100% of the children in the LG replied with **agree** to the

option: **I liked the story**; in contrast, the majority (74% of the WG and 83% of the LG) of the children responded with disagree to this option: **I did not like the story**.

On the other hand, regarding the children's understanding of and identification of the problem in the story, they showed evidence of understanding, especially the children from the LG, since 69% of them **agreed** that the story was easy to understand, and most of the children answered the questions in sections 1 and 2 correctly (e.g. **How many children were in the story?** 77% of the WG, and 97% of the LG answered this question correctly). The children also managed to identify the problem in the story, although there was variation between them in the two groups, yet the majority of the children managed to identify the elements of the problem, and offered solutions for it. Therefore, it was possible to place the children's responses into three categories, which were understand, enjoy, and identify the problem in the story; the fourth category, that is the will to help and provide solutions to the problem in the story, will be discussed after the empathy section, later in this chapter.

The following Table 5.12 is a reminder of what the children's engagement with story meant, and how the degree of engagement was categorised earlier in this chapter, when the children's results were classified as high, medium and low engagement.

Table 5.12 The elements and levels of engagement

Degree of Engagement	Enjoy	Understand	Identify	
High	Yes= 1	Yes= 1	Yes= 1	all 3
Med	No= 0	Yes= 1	Yes=1	any 2 out of 3
Low	Yes= 1	No= 0	No= 0	any1 out of 3

High = 3 yes, Medium = 2 yes, Low = 1 yes.

This section shed a light on the children's engagement with the story in the sense of understanding the story, identifying the problem, and showing interest in the story, as a child who understood the story, identified the problem in it, and enjoyed listening to or watching it could be more committed and tempted to solve the problem, and respond to the story's main question: **How to help the team to save their lives?**

In contrast, if the child was not interested in and engaged with the story, his answer(s) may show carelessness and neglect and less empathy with the problem. For instance, one careless answer was: 'let them die'; another answer, which showed blaming, was: 'they deserve what happened to them, why they went to Mars' or 'why did not they take enough food and water with them'. Analysis of this variable revealed that the majority of the children from both groups were highly engaged with the story. Their engagement was categorised as high when the child's answers to the questionnaire given to him after watching or listening to the story disclosed his understanding of the story, following its episodes, identifying the problem in the story, and agreement that he enjoyed the story. Each one of these sections of the questionnaire was given one score; if the child managed to obtain three out of three, then he was highly engaged, or medium or low as mentioned above in the categorisation section. The following Table 5.13 shows the children's degree of engagement:

Table 5.13 A comparison between W/L groups on the degree of engagement with the story

Degree of Engagement	WG	LG
High	41	26
Medium	14	4
Low	7	6
	N= 62	**N=36**

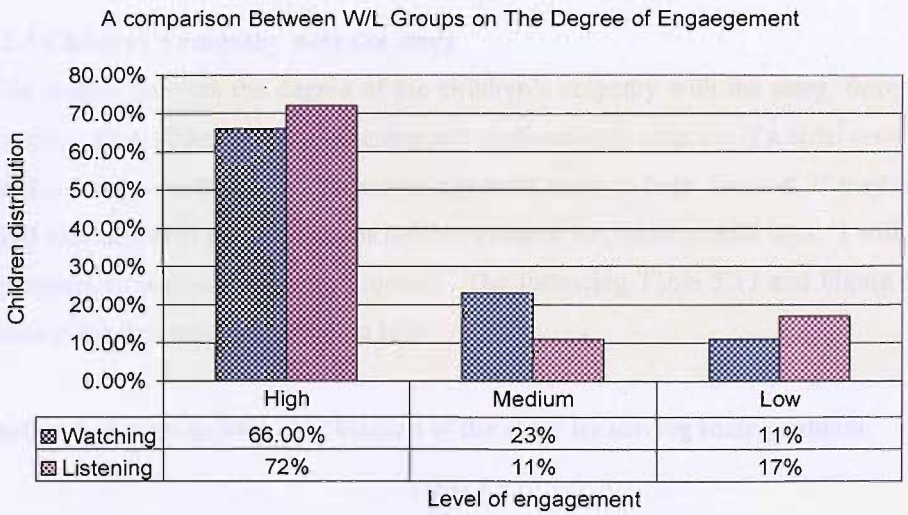


Figure 5.12 Children's degrees of engagement with the story in the WG and the LG

Table 5.12 and Figure 5.12 above show that the children from both groups were highly engaged with the story; however, the LG recorded a slightly higher degree of engagement (72%) than the WG (66%), which could be referred to the full detail that the LG obtained compared to the WG, which was less detailed due to technical and financial difficulties and obstacles while processing the animation story.

The above result could also be interpreted as due to the story episodes being told gradually and clearly with a fluctuating tone of voice and facial expressions in the LG via the verbal presentation, and therefore the children either liked and were interested in the story or not. On the other hand, due to some missing scenes and links among the story's episodes and the absence of sound in the visual presentation in the WG, the children depended on their individual abilities and imaginations to link the story's episodes with each other, and understand it accordingly. Therefore, the children's engagement in this group varied according to their abilities and understanding of the soundless form of the story, this understanding having an effect on their interest and their engagement.

The next section explains the children's empathy through their willingness to help and self-involvement in the rescue process, and although empathy is another aspect, I intended to use its results to add another dimension to support the children's engagement with the story, by exploring their willingness to help the team in the story, and to involve themselves in the helping or rescuing process.

5.2.4 Children's empathy with the story

This section presents the degree of the children's empathy with the story, from two perspectives: first, if they have willingness and motivation to help, i.e. if a child provided solution(s) for the problem, and answered **agree** to want to help. Second, if they have involved themselves in the rescuing or helping process, i.e. when a child says, 'I will (the help process), or we will (the help process)'. The following Table 5.13 and Figure 5.13 will answer the first aspect (the will to help.

Option 4: I want to help the children of the story by solving their problem

Table 5.13

	WG	LG
Agree	48	28
Not sure	9	3
Disagree	5	5
	N= 62	N= 36

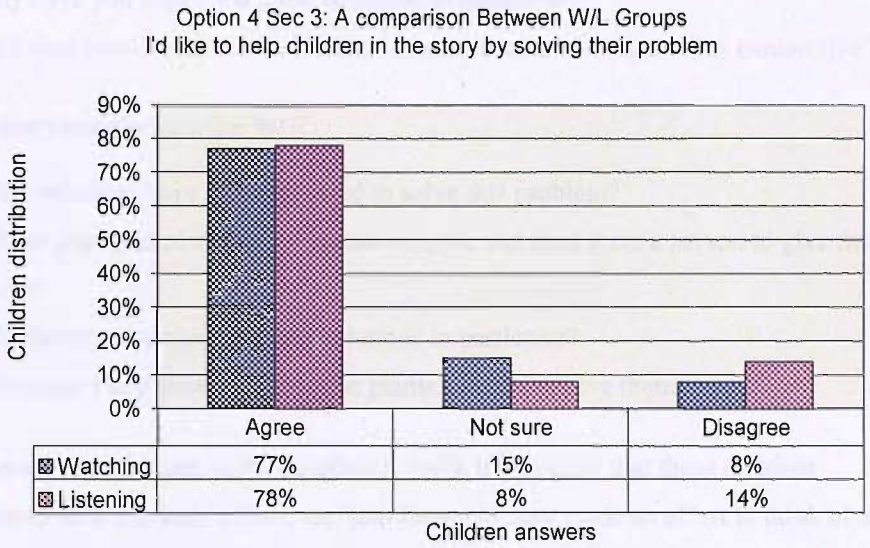


Figure 5.13 A comparison between WG and LG on option 4 sec. 3

This option aimed to evaluate the children's empathy, beside their interviews and their responses or solutions to the problem.

From the above Table 5.13 and Figure 5.13, the children from both groups (77% of the WG and 78% of the LG) illustrated high percentages of willingness to help. This result supported the result obtained from their responses to the problem, coming later in this chapter. Therefore, both these results indicated high empathy with the story's characters and their problem, alongside their answers in the interview. For example (A child from the LG): 'when I listened to it I thought of things like how to help those children?'

The children's empathy appeared in their willingness to help as well as the level of their will; in other words, if the child was willing to help and involved him/herself in rescuing process, then this child empathised highly with the story. There is a more explicit explanation below, as well as these extracts from the interviews with the children from both groups:

Child A, from the LG:

– What solutions have you suggested to solve this problem?

A: 'They eat from plants that they planted in the greenhouse, and breathe the oxygen which comes out from those plants'.

– Why have you suggested these solutions in particular?

A: 'So they can live…because if there were no food and oxygen, they cannot live'.

Another example from the WG:

– What solutions have you suggested to solve this problem?

D: 'Plant plenty of plants to give them oxygen, and send them a person to give them food to live'.

– Why have you suggested these solutions in particular?

D: 'Because I saw them watering the plants…so it can give them oxygen'.

In the above responses to the question (why?), it was clear that these children were keen to save the team's lives, and that these children made an effort to think of a solution and empathised with the team within the story.

Another example is a solution by a child, who was not among the interviewees; she wrote: 'I have to help them no matter what will happen to me, I have to help them even if it cost me my life'! This child empathised highly and was emotionally engaged with the story to the extent that she did not mind losing her life in order to help them. Another example of high empathy was: 'I do anything to keep them alive'.

Therefore, the children's levels or degrees of empathy have been considered as follows:

1. High level of empathy: if the child answered with (agree) to help the team, and involved him/herself in the helping process.
2. Medium level of empathy: if the child either answered with (not sure) to help but involved him/herself in the helping process. Otherwise, if s/he answered with (agree) to help, but did not involve him/herself in the helping process.
3. Low level of empathy: if the child answered with (disagree) to help, and s/he did not offer any solution to the problem, or if s/he answered (disagree) to help, and offered a solution without involving him/herself in the helping process.

4. The following Figure 5.13 summarises the three levels of empathy.

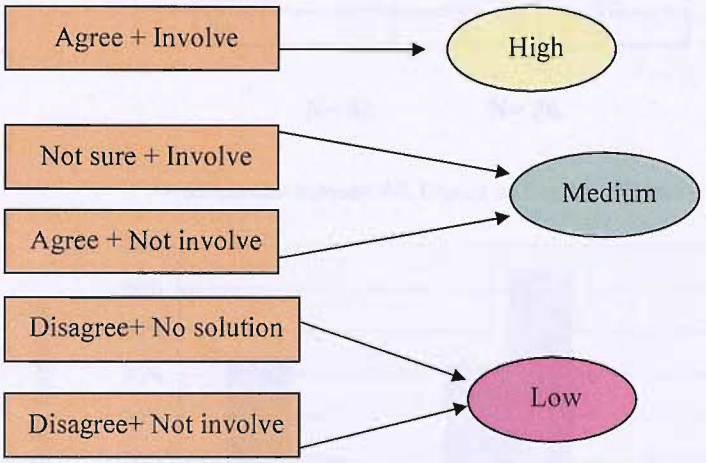


Figure 5.14: **The levels of empathy**

Categorisation of levels of empathy

The children's empathy was calculated through their answers to the questionnaire, as well as from their responses to the problem in the story, and their answers in the interviews. Most of the children (77% of the WG and 78% of the LG) answered (**agree**) to this option (4): ***'I would like to help the children in the story by solving their problem'***, as is shown in the above Table 5.12 and Figure 5.12. However, the degree of empathy appeared in the children's self-involvement in the rescuing or helping process. Hence, the children were considered to be self-involved in the rescue process if they responded to the final question of the questionnaire ***(How are you going to help the team in the story to save their lives?)*** with: 'I will…' or 'we will...' to solve the problem.

Table 5.14 below demonstrates the differences between WG and LG children

Table 5.14 A comparison between WG & LG Groups on the degree of empathy

Degree of Empathy	WG	LG
High	27	5
Medium	27	23
Low	9	8

N= 62 **N= 36**

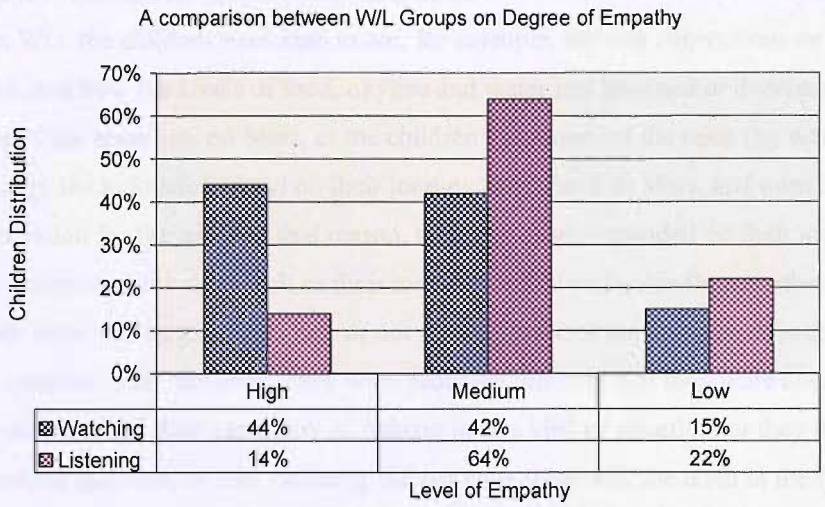


Figure 5.15 A comparison between WG and LG on the degree of empathy

The above Table 5.14 and Figure 5.15 show that however the children from both groups were distributed on the three levels or degrees of empathy, the children from the WG showed higher empathy (44%) than those children in the LG (14%), while the majority of the children in the LG (64%) showed medium empathy with the team in the story.

The children were considered to be more empathetic with the problem, or with the team in the story, if they began their response(s) with '**I**' or '**We**', as mentioned previously, as this expression indicates their enthusiasm and willingness to help. For example, 'I will contact more children to help them, as they might have a scientist father who can help them, and I will say to them we must not leave them to die on Mars', or, 'I will send them more food and water', or, 'we will send them a new spacecraft full of food, water and oxygen'.

However, if the children responded with solutions or gave instructions to help the team and removed or withdrew themselves from the helping process, they were considered less empathetic, regardless of the quality of the solution. For instance, 'let

them use the plants to get the oxygen from', or, 'send them a faster spacecraft or scientist to rescue them'.

Although in both types of responses above, the children's intention to help existed, their responses revealed their types of personality, either social (we) or individual (I), which I do not deal with in this research. Moreover, it shows the degree of their empathy.

The above results can be interpreted as follows.

In the WG: the children were able to see, for example, the fear expressions on the boy's face, and how the levels of food, oxygen and water had lessened or decreased, and how isolated the team was on Mars, as the children accompanied the team (by watching them through the animation story) on their journey from Earth to Mars, and even during their preparation for the trip. For that reason, their responses depended on their individual ability to understand the story well or their medium or low understanding. Furthermore, and if they were willing to help or not, or not sure, as some of the children answered the previous question with 'not sure', they were probably thinking that they were not sure or not quite confident of their capability of helping in this kind of situation, or they did not understand the question, or they basically did not empathise with the team in the story.

In the LG: the children only listened to the story, without any visual aids; this means that it was left to them to use their imagination to imagine the story episodes and characters. This assumption is supported by the children's answers to this question in the questionnaire after presenting the story to the two groups: (***I prefer to watch this kind of story rather than listen to it)***. Nearly all the children from both groups answered with 'agree' to this option 8, WG (53%) and LG (64%), as they preferred to watch the story whatever their styles of L&T. Furthermore, the new generation of children are trained to be visual, regardless of their cognitive style, by the media (Grainger, 2004; Latham, 2000), which hook children with visual displays on TV, videos, DVDs, CDs, etc. Therefore, visual presentation had a strong effect on children's empathy in both groups.

Therefore, it seems that the mode of presentation played a role in impacting the children's empathy, as the children from the WG showed higher (44%) empathy than those in the LG (14%), and most of the children in the two groups preferred to watch the story rather than listen to it.

Moreover, the children's results on this option ***(I prefer to watch this kind of story rather than listen to it)*** were 53% in the WG and 64% in the LG, as most of the children from both groups preferred to watch, and this revealed their preference for the visual

mode rather than the verbal mode, this result confirming to some extent Garrett-Petts's (2000) argument that depending on verbal presentation only will dull the visual imagination of the recipient, and it is better to present knowledge to children with both modes, especially if they are children in the primary grades. Using both modes of presentation (verbal and visual) was also supported by Safran (2001) and Lapp, Bender, Ellenwood and John (1975).

In conclusion, from all the previous demonstrations and discussion of the children's performances and results on recalling the story's episodes, understanding and enjoying the story, identifying the problem within it, and finally their empathy with the story, it was clear they were highly engaged with the story. In addition, it appeared that the mode of presentation shaped the children's understanding of the problem, which was clear from the differences between the two groups (WG & LG) in the children's responses indicated the impact of the mode of presentation on the children's understanding, enjoying and considering different aspects of the story according to the mode they were presented with. For instance, in Q1 the children of watching story thought that the mother was a third child, as she wasn't wearing a lab coat like others. In Q2 majority of the children in the WG mentioned the preparation of the suitcase, since this was the first scene in the visual form. Whereas, the majority of children of the LG mentioned going to hospital to check up, as they were interested and involved in the short argument between the children in the story and their mother when she told them about going to hospital, as well as the face expressions of the story's teller –when I imitated the children's face expressions (see more details in pages 108-114, Questions 1, 2, 3 and 4 in Section 1 and Questions 1 and 2 in Section 2), and impacted their empathy (see the children's results in Figures 5.12 and 5.15), as the children's responses were bonded with what they watched or what they heard.

On the other hand, the children's understanding of the story possibly had a reverse relationship with and impact on their liking, enjoyment, and willingness to help with the story, as the children who indicated that they understood the story showed more liking and enjoyment. However, this understanding did not impact the children's degree of empathy; this was clear in their responses to the story. The degree of understanding seems to have an impact on the children's willingness to help; however, it seems to have had no impact on the degree of empathy. In other words, from the children's results, it seems that understanding has a partial impact or relationship with empathy.

In contrast, the mode of presentation may have an impact on the children's empathy.

The next section explores the children's creative abilities, through analysing their solutions to the problem in the story.

5.3 Creativity

Creativity is the core of this study, and the variables examined earlier rotate around it. I demonstrated the children's degree of engagement and empathy with the story before dealing with creativity, as their engagement and empathy might be reflected in their responses to the problem. In this study I detected the children's creative ability to imagine through their responses to the problem in the story; this is why it is a creative imagination.

At this stage, I should clarify that I did not aim to identify the creative children among the others. The aim was to stimulate the children's minds and to challenge them to think differently – or in a different way than the way they were usually used to think – by using an unusual stimulus, which is the imaginative story. Nonetheless, nearly all researchers and psychologists agreed on imagination and originality as essential elements in any creative process; furthermore, they also considered fluency, flexibility and originality as definite elements in measuring creativity (see discussion in section 2.2.1, pp. 27, Chapter 2). For these reasons, and as I did not intend to identify gifted or creative children, I selected particularly these three primary and fundamental elements of creativity, fluency, flexibility, and originality, in measuring the abilities of the children in this study, and disregarded other advanced elements of creativity measurement.

From the children's responses, I perceived their fluency, flexibility, and originality as follows.

To calculate fluency, I counted the **number of responses** of each child; for flexibility, I counted the **numbers of ideas** in each child's responses; and for originality, I **compared** each child's responses with the rest of the children's responses in his/her group, and **counted** the numbers of repetitions or uniqueness of response(s). This is clarified in the following section.

5.3.1 Fluency

Fluency in this study means verbal fluency, which is represented by the number of responses written by each child as a solution for the problem within the story, and fluency

in this study was calculated according to the number of responses each child produced as a solution to the problem. It did not matter if those responses showed different ideas or not, at this stage. Hence, the low level was 0-3, medium was 4-6 and high was 7-9 responses, since the range of the children's responses was from 0 to 9 response(s), accordingly I divided them into three groups, low, medium, and high, as each group consisted of the same range of responses. In addition, fluency was calculated in this way after scrutinizing the children's responses, and according to the traditional and usual way of estimating fluency in creativity tests. Table 5.15 demonstrates the children's fluency in both groups.

Table 5.15 A comparison between W/L groups on fluency

Fluency Level	WG	LG
High= 7-9 esponses	21	2
Med= 4-6 responses	17	10
Low= 0-3 responses	24	24
	N= 62	N= 36

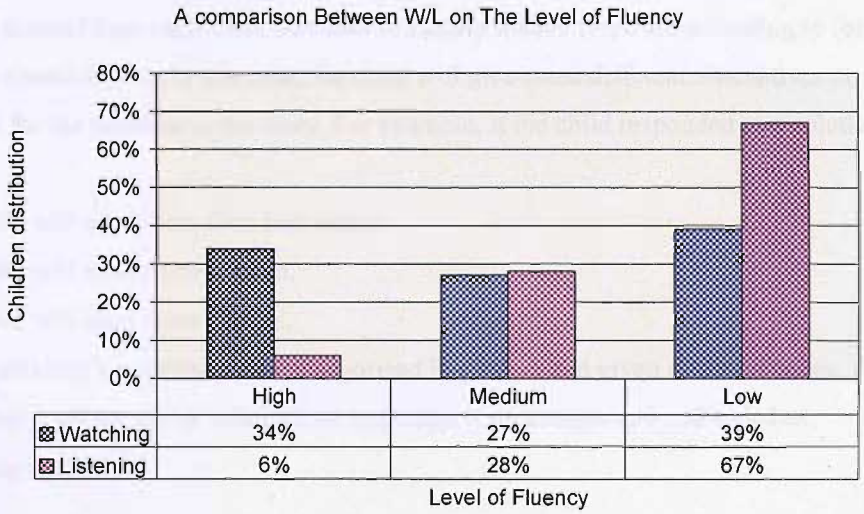


Figure 5.16 A comparison between WG and LG on the level of fluency

Table 5.15 and Figure 5.16 above show that the children were distributed on three levels of fluency. However, the children in the WG were higher in fluency (34%) than the children in the LG (6%), and the majority of the LG were low in fluency (67%).

In fluency, the difference among the children from both groups was clear. Poor fluency in the LG might be because those children were not in the right group to match

their styles of L&T, which might be why they were not interested in or did not understand the story properly, affecting their responses. Another possibility is that the responses were written, and some children might have had a lack of writing ability as they were more visual, or might not have had enough vocabulary to express their ideas or solutions, besides their poor linguistic ability in general, which was clear in their written responses. In contrast, the children in the WG were relatively higher in fluency, which might be because the mode of presentation was suitable to their styles of L&T, or they were able to express their ideas better than the children in the LG. Nonetheless, the children in the two groups had the same poor linguistic and writing abilities.

5.3.2 Flexibility

Flexibility means the ability to adapt in or deal with different situations. However, in this study it meant to think flexibly. In other words, and more explicitly, flexibility in this study was identified with the following: 1) how many different ideas each child was able to produce, and 2) how many different solutions the child presented, as different solutions with different ideas in this research were equivalent to a different situation, since this research showed how each child was able to modify his/her response according to (or in) different situations – as in this case, the child will give some different alternatives or solutions for the problem in the story. For example, if the child responded as a solution with:

1. We will send them food and water.
2. We will send them oxygen.
3. We will send them clothes.

The children's responses were categorised in groups, and given different codes. Accordingly, all the above solutions or responses were categorised and coded as 'providing resources'.

In contrast, the next example shows different alternatives as follows:

1. We will send them water, food and oxygen (providing resources).
2. Let them eat the plants they planted in the greenhouse (another alternative, coded as surviving alternatives).
3. Let them dig Mars's surface to get water (another alternative, coded as searching for resources on Mars).

The above example provided three solutions like the example before it; however, the latter has three different ideas or alternatives. This indicated that the child who provided those responses was more flexible than the previous child, who gave similar responses, since the second child tried to provide and experiment with different alternatives, because if one solution did not work and solved the problem, then he moved to another alternative or solution that might solve the problem, and so on. Therefore, the second child is more mentally flexible than the first. Although they both mentioned three responses, yet the quality of those responses was different between the two children. As a consequence, flexibility was calculated in this study – like fluency – through the children's responses being given numbers according to the number of ideas they produced, hence the most solutions were nine and the least was none. Consequently, the low level was 0-2, the medium level was 3-5 and the high level was 6-9 different ideas. This was the easiest and most direct way to calculate the children's flexibility in this study. It will be noted that I categorised the scores in flexibility in a different sequence from in fluency. This is because flexibility is a higher and more complicated level than fluency, and besides these children (the subject of this study) have ordinary abilities, unlike gifted children, so I decided to make it easier to obtain different levels of their flexibility in correcting their responses in this order. The following table reveals the children's flexibility in both groups.

Table 5.16 A comparison between W/L Groups on flexibility

Level of Flexibility	WG	LG
High =6-9 responses	12	6
Med =3-5 responses	15	11
Low = 0-2 responses	35	19
	N= 62	N=36

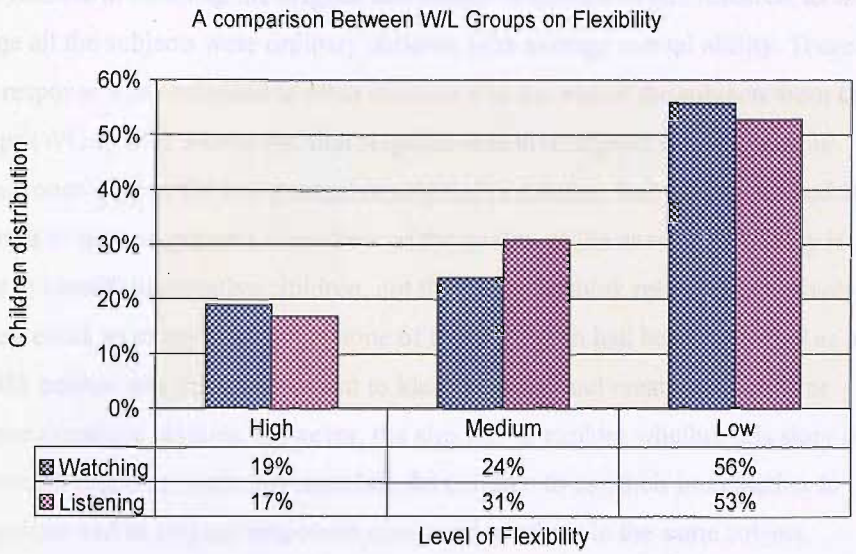


Figure 5.17 A comparison between WG and LG on levels of flexibility

Table 5.16 and Figure 5.17 above show that the children from the two groups (WG and LG) were similar in their flexibility. Hence they registered high percentages on the low level (more than 50% of each group). This result was understandable, due to the following: 1) flexibility is a more advanced and complicated mental ability than fluency; 2) the limitation of the children's scientific knowledge according to their young age (9-11 years old); and 3) the individual differences and different levels of mental abilities probably played a strong role in the children's levels of flexibility.

5.3.3 Originality

Originality in this study means how original the response was. The response was considered as less original to the degree that it was repeated by many children from each group. Therefore, the children's responses were separated into three categories for the purposes of this research, as follows:

- Original response: a response that was mentioned from 1-3 times maximum by the children from both groups.
- Rare response: a response that was repeated from 4-6 times by the children from both groups.
- Common response: a response that was repeated seven times or more by the vast majority of the children from both groups.

I was flexible in counting the original and unique responses in this research, as to my knowledge all the subjects were ordinary children with average mental ability. Therefore, a child's response was compared to other children's in the rest of the subjects from the two groups (WG & LG). Moreover, that response was investigated if it was unique (mentioned once only in the two groups) or original (a solution that was mentioned at most 3 times in the two groups), regardless of the quality of the answer, as quality is important in identifying creative children, not the ability to think relatively creatively, as an ordinary child, as to my knowledge none of these children had been identified as a gifted child, neither was this study meant to identify gifted and creative children or measure their creative abilities. However, the aim was to explore whether this story and its presentation might or might not stimulate the children to use their imagination to produce unique and/or original responses compared to others in the same subject. Referring to the children's results on originality, the results of the children were as expected from them, according to their normal ability, because originality is a high complicated level of creativity, more so than fluency and flexibility, and is used to distinguish between creative and ordinary children (according to different criteria, which this study is not an appropriate place to discuss). The following table illustrates the comparison between the two groups' results in originality.

Table 5.17: A comparison between W/L groups on originality

Level of Originality	WG	LG
High = 7 + responses	13	14
Med = 4-6 responses	8	7
Low = 1-3 responses	41	15
	N= 62	N= 36

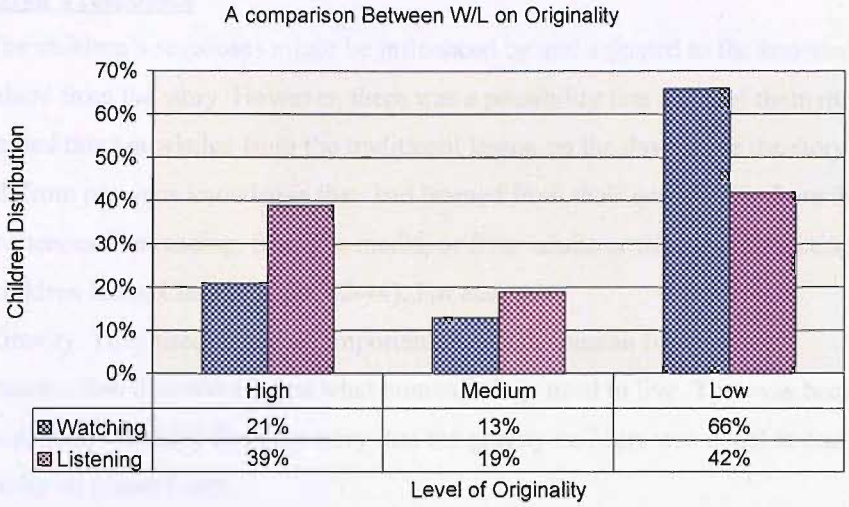


Figure 5.18 A comparison between WG and LG on the levels of originality

Table 5.17 and Figure 5.18 above show that all the children from the two groups (WG & LG) were distributed on the three different levels of originality. In addition, the originality level was low in both groups. However, the children from LG were higher (39%) in originality than those in the WG (21%).

These differences between the two groups could be interpreted as the children in the listening group hearing more detail and moving smoothly and gradually from one episode to the next within the story. Therefore, the auditory presentation might be more easily understood by the children in the LG, regardless of their styles of learning and thinking, as this is the way they were used to learning at their schools. In contrast the children in the WG were limited by what they were watching and seeing in the animation story, as there was no auditory aid and the children had to depend on their imagination and speculation to guess the links among the different scenes. That might have been difficult for some children according to their styles of learning and thinking.

On the other hand, another possible interpretation of this result is that the auditory presentation might have stimulated the children's imaginations to produce more original responses.

Summary of the previous results of children's responses and creativity

This section summarises the previous results derived from the questionnaire and interviews, as follows.

Children's responses

➢ The children's responses might be influenced by and adjusted to the knowledge they obtained from the story. However, there was a possibility that some of them might have obtained this knowledge from the traditional lesson on the day before the story was presented, from previous knowledge they had learned from their curriculum, from their other experiences like reading, from the media, or from adults or friends (see section 2.5 on how children learn, Chapter 2, pp. 42-44). For example:

1. Gravity. They used this as an important aspect for human life in the questionnaire, when they were asked what human beings need to live. That was because they learned (and watched) from the story that the gravity on Mars was equal to one-third of the gravity on planet Earth.

2. Plants. Some children considered plants as an important element in human life as well as gravity, as they considered that the deficiency of plants could be a cause of human death, since they knew from the story that the team had built a greenhouse and grown some plants in it.

➢ The children revealed a high percentage of understanding, enjoyment and identification with the problem within the story, as well as willingness to help and solve this problem, by providing solutions. This was an indication of their high level of engagement and empathy with the story. This was in addition to the fact that some of the children had involved themselves in the rescue process, and attempted to present unusual or imaginative solutions to solve the problem. This was related to the influence they received from watching or listening to the story.

➢ In the elements of creativity they showed low performance on fluency, flexibility and originality; however, fluency (higher in the WG) and originality (higher in the LG) revealed some differences between the two groups as presented above. An interpretation of those results has been made in the light of mode of presentation, and/or styles of L&T, as mentioned previously.

The next section will investigate the children's styles of learning and thinking (L&T) in depth, and compare the two groups according to their results.

5.4 Styles of learning and thinking assessment

The following table shows a comparison between WG and LG results on styles of L&T assessment:

Table 5.18 A comparison between W/L groups on styles of L&T

Styles	WG	LG
Integrated	14	6
Left	8	7
Right	12	4
Mixed	29	19
	N= 36	N= 62

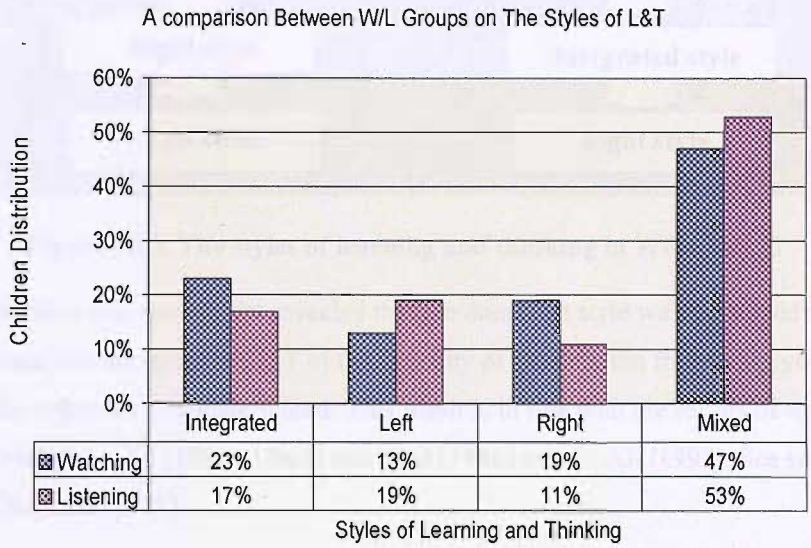


Figure 5.19 A comparison between WG and LG on styles of L&T

The above Table 5.18 and Figure 5.19 show that the dominant style of L&T of the majority of children in both groups was the **mixed style**. In addition, there was no difference between children's styles of L&T in both groups (WG & LG).

The following figure illustrates children's styles of L&T distribution in both groups:Figure 5.20 shows the result of comparison between the two groups on styles

of learning and thinking:

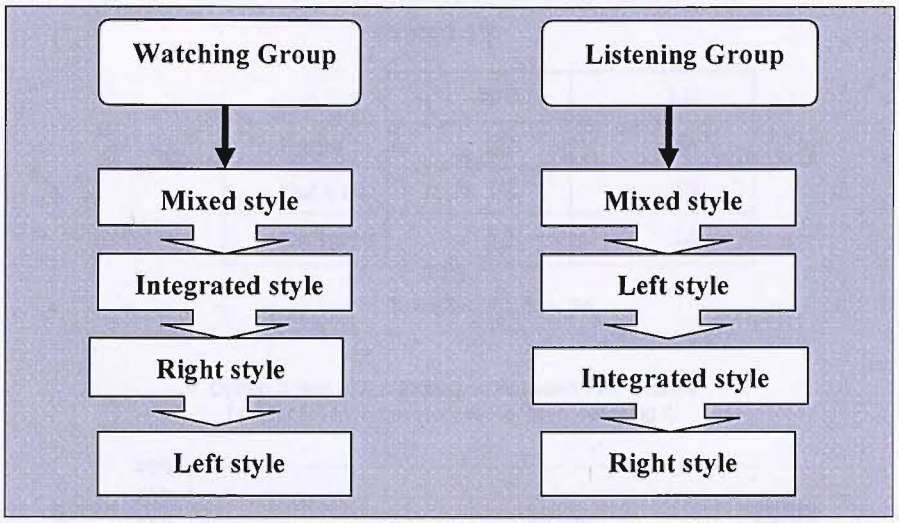


Figure 5.20: The styles of learning and thinking in WG and LG

Results from this assessment revealed that the dominant style was the mixed style, which means that the styles of L&T of the majority of the children from both groups were specifically unknown or undetermined. This result is in line with the results of some previous studies by Ali (1985), Ebada and Riad (1986) and Al-Ali (1995). See section 2.3.1 in Chapter 2, p. 31).

However, it was fortuitous that the children with the right style were 19% of the total population of the WG, since the visual mode of presentation matched their visual style of L&T, and the children with the left style were (19%) of the total population of children of the LG, which matched their verbal style of L&T. More investigation will address the results of this matching between the styles of L&T and the matching mode of presentation for some of the children within the two groups, after demonstration and discussion of the results of the following two options, 7 and 8.

Options 7 and 8 were designed to explore to what extent the mode of presentation matched the children's preferences and their learning and thinking styles.

Option 7: I prefer to listen to the story rather than watching it.

Table 5.19

	WG	LG
Agree	22	9
Not sure	18	13
Disagree	22	14

N= 62 N= 36

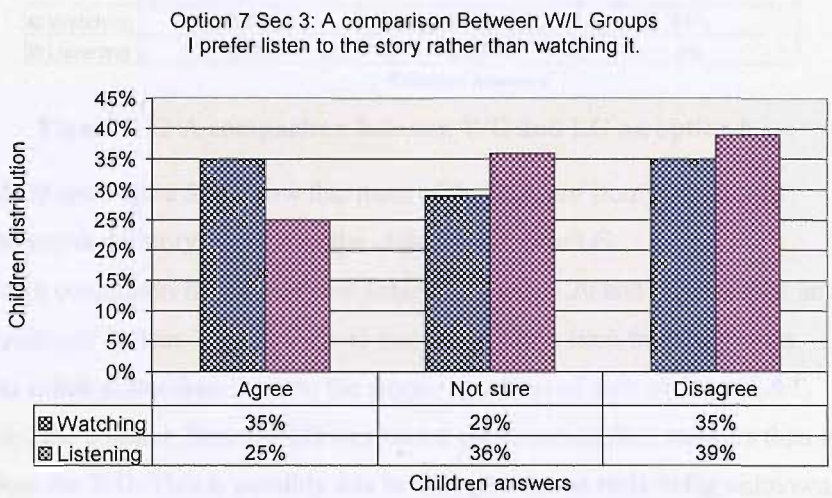


Figure 5.21 A comparison between WG and LG on option 7

The above Table 5.19 and Figure 5.21 show that the children from both groups were distributed in the categories agree, not sure, and disagree. In addition, the children in both groups were interested in the presentation they did not experience in this research; this was clear in the LG although the children in the WG were indecisive.

Option 8: I prefer to watch the story rather listening to it.

Table 5.20

	WG	LG
Agree	33	23
Not sure	16	10
Disagree	13	3

N= 62 N= 36

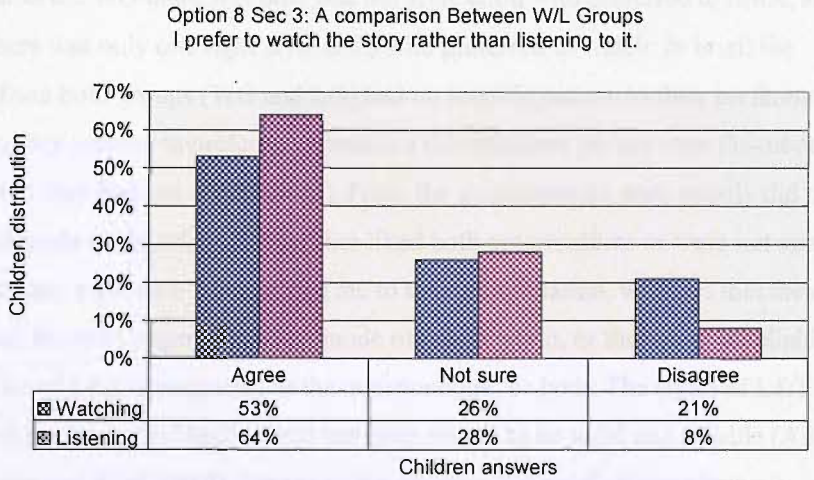


Figure 5.22 A comparison between WG and LG on option 8

Table 5.20 and Figure 5.22 show that most of the children from both groups preferred to watch the story, especially the children from the LG.

Drawing a conclusion from the above Tables 5.19 and 5.20 and Figures 5.21 and 5.22, the results of options 7 and 8 showed that the children from the two groups preferred to watch rather than listen to the story, regardless of their styles of L&T. Additionally, the children from the LG were more consistent in their answers than the children from the WG. This is possibly due to their preference style being unknown, or because the mode of presentation (visual) matched the styles of L&T of the majority of them, or because they really preferred to watch than listen, or because of the influence of the media on their styles of L&T. These results confirmed Latham's (2000) and Grainger's (2004) points of view on the impact of the media on children, as children nowadays tend to be visually literate, having grown up with the visual stimulation of computers, television and other devices for visual presentation (see Chapter 2, section 2.4, p. 39 for more details).

Furthermore, by comparing the children's results on options 7 and 8 and their styles of L&T, and selecting just the children with the left style from the LG (verbal presentation group) there were only two children out of seven with the left style who preferred to listen to the story. Likewise, I selected the children with the right style from the WG (visual presentation) and explored their preferences (to watch or listen to the story), and only four out of 12 preferred to watch the story. Moreover, I investigated the preferences of the right and left style children from both groups and

found that in the WG there was only one left style child who preferred to listen, and in the LG there was only one right style child who preferred to watch. In brief, the children from both groups (WG and LG) had no specific pattern to their preferences. However, they seemed to prefer to experience the unknown (in this case the mode of presentation they had not experienced). From the questionnaire, they mainly did not prefer one mode to the other. They either liked both presentations or were not sure which one they preferred. That guided me to this interpretation, which is that they either liked the story regardless of its mode of presentation, or there was unreliability in the styles of L&T assessment, or the questionnaire, or both. The styles of L&T instrument has been used before, and has been shown to be valid and reliable (Ali, 1985; Ebada and Riad, 1986). However, the children did not find completing it straightforward. It is possible that the children's L&T styles have been miscategorised. Nonetheless, the interpretation of no pattern to preference is still highly likely to stand. On the other hand, the questionnaire was tailored for the purposes of this current research, and has not been fully tested with other samples. To some extent its reliability is more open to contest. However, there was internal triangulation of questions, which gives some confidence in the overall findings.

5.5 Overview of the children's total performance

This section will investigate if there was any relationship between the children's styles of L&T and engagement, and between the styles and each element of creativity, in order to answer the second question of the research.

5.5.1 The styles of L&T, the mode of presentation and engagement

Although high engagement was more prevalent among the mixed style group, due to their large population among all style groups, I shall concentrate on investigating and comparing the children's performances on the left and right styles from the two groups, as the forms of presentation were either visual or verbal.

Seventy-five per cent of right style children in the WG (nine out of twelve) were highly engaged, and, surprisingly, all of the left style children in the WG – eight students (13%) in the WG – were also highly engaged with the visual story.

Relatively, there was a relationship between the right style and high engagement; hence, the majority of them were highly engaged with the story. However, this

relationship was clearer in the left style, since all the left style children from the two groups were highly engaged with the story!

In addition, the high level of engagement was more prevalent in the LG (72%) than in the WG (66%).

Furthermore, it seemed that there was a relationship between the mode of presentation and the styles of L&T to some extent, as the majority of left style children in the LG and the majority of right style children in the WG were highly engaged with the story. On the other hand, there were eight left style children in the watching group, and all of them were highly engaged with the story; in contrast, there were only three right style children in the listening group, and two of them were highly engaged.

5.5.2 The relationship between the children's styles of L&T, the mode of presentation, and creativity in the two groups

This section examines the relationship between each element of creativity and the children's left and right styles of L&T, to explore whether there was any connection or association between them at all, and the mode of presentation in the two groups (WG & LG).

5.5.2.1 Styles of L&T and fluency for the WG (visual mode)

Table 5.21

N=62

	Fluency levels for the WG			
Styles of L&T	High	Medium	Low	Total
Mixed	10	8	12	30
Integrated	4	5	4	13
Left	4	2	3	9
Right	3	2	5	10

The above Table 5.21 shows that the children were distributed on all levels of styles of L&T, and on each level of fluency, and there were no significant results. Nonetheless, the mixed style seemed to have a bigger percentage on the three levels (high, medium, and low) than the other styles. This was because the majority of children in this group (WG) were located in this style of L&T. Moreover, the presentation of this group was visual, which matched the right style children; however, this group did not show a high level of fluency. That meant that there was no relationship between the right style of L&T

and the visual mode of presentation. Nonetheless, the left style children in this group (WG) were relatively higher, as 44% of them were high in fluency.

5.5.2.2 Styles of L&T and fluency for the LG (verbal mode)

Table 5.22

N= 36

	Fluency levels for the LG			
Styles of L&T	High	Medium	Low	Total
Mixed	2	5	12	19
Integrated	0	3	3	6
Left	0	2	5	7
Right	0	0	4	4

The above Table 5.22 shows that the majority of the children in the LG were at the low level of fluency. Additionally, only the mixed style children were distributed on all levels of fluency, while the other children from the other styles of L&T spread across one or two levels only. In addition, the presentation in this group matched the left style (verbal) Nonetheless, they were also low in fluency, and this indicated that there was no relationship between the left style and the verbal mode of presentation.

As shown from Tables 5.21 and 5.22 above, there was a clear difference between the children in the two groups (WG and LG) in their distribution on the levels of fluency. While the children from the WG were distributed on all levels of fluency, in the LG only the mixed style children were distributed on the levels of the fluency. This means that the relationship between the children's styles of L&T and fluency was different between the two groups; this was probably due to the impact of the mode of presentation, or the small size of the LG compared to the WG, which eliminated the children's distribution on the different styles. However, the main result here from the two tables above is that there was no connection or relationship between children's matching styles of L&T, the mode of presentation, and fluency. Even though the right style children in the WG were presented with the visual mode, and the children in the LG were presented with the verbal mode, none of those children scored high on fluency, except three children out of ten in the WG, while the majority were low in both groups. In contrast, 44% of the left style children in the WG were high fluency.

5.5.2.3 Styles of L&T and flexibility for the WG (visual mode)

Table:5.23

N= 62

	Flexibility levels for the WG			
Styles of L&T	High	Medium	Low	Total
Mixed	7	5	18	30
Integrated	3	2	8	13
Left	2	4	3	9
Right	0	4	6	10

The above Table 5.23 shows that most of the children from all styles of L&T had a low level of flexibility, except relatively the left style, as its children were distributed among the flexibility levels, and they were high (22%) and medium (44%) more than low level. In addition, mainly all the children from all styles of L&T were distributed on the three levels of flexibility, except the right style, since its children were spread between the medium and low levels of flexibility.

5.5.2.4 Styles of L&T and flexibility for the LG (verbal mode)

Table 5.24

N= 36

	Flexibility levels for the LG			
Styles of L&T	High	Medium	Low	Total
Mixed	4	6	9	19
Integrated	1	3	2	6
Left	1	1	5	7
Right	0	1	3	4

The above Table 5.24 shows that the majority of the children of all styles except the integrated style were on the low level of flexibility; however, all the children were distributed on all levels, except for the right style, since its children were only spread between the medium (40%) and the low level (60%) of flexibility.

The above Tables 5.23 and 5.24 for flexibility show that there were no clear or major differences between the WG and the LG in the relationship between styles of L&T and flexibility, apart from the children's distribution on the left (Table 5.23) and integrated styles (Table 5.24). However, the right style children within the two groups seemed to show less flexibility than the children from the other styles of L&T, regardless of the mode of presentation. This result reconfirmed the results from fluency and styles of L&T (Tables 5.20 & 5.21) in regard of the relationship between

the mode of presentation and the children's fluency and flexibility, and their styles of L&T. This result in addition could be read from the performance of the left style children in the WG, since they performed relatively better than those from the same style in the LG, yet the presentation was mismatched to their style of L&T. This could be concluded, as there was no predictable pattern to the children's performance in the two groups, and no association between their styles of L&T and the matching mode of presentation and their performance on the creativity elements. However, it seemed that the left style children in the WG also performed better with the visual presentation, as appears from Table 5.23.

5.5.2.5 Styles of L&T and originality for the WG (visual mode)

Table 5.25

N= 62

	Originality levels for the WG			
Styles of L&T	High	Medium	Low	Total
Mixed	5	3	22	30
Integrated	2	3	8	13
Left	5	1	3	9
Right	1	0	9	10

Table 5.25 above shows that the children in the WG from all styles of L&T had a low level of originality except the left style children, as 56% of them showed a high level of originality. Additionally, all the children were distributed among all levels, except the right style children, who spread across two levels, the high (10%) and low (90%) levels.

5.5.2.6 Styles of L&T and originality for the LG (verbal mode)

Table 5.26

N= 36

	Originality levels for the LG			
Styles of L&T	High	Medium	Low	Total
Mixed	10	3	6	19
Integrated	2	1	3	6
Left	1	2	4	7
Right	1	0	3	4

Table 5.26 above shows that the children from different styles of L&T were distributed on all levels of originality, except the children from the right style, who showed either a high (25%) or a low (75%) level of originality. In addition, all

children from different styles showed mainly a low level of originality, except the mixed style children, most of them showing a high level of originality.

From the above Tables 5.25 and 5.26, the children's results regarding the relationship between the styles of L&T and originality can be summarised as follows. Most of the children from all styles of L&T were distributed on all levels of originality, and they showed mainly a low level of originality. However, there were some major differences between the two groups (WG & LG). For example, there was a significant difference (0.00256) less than 0.005 on the T-test (a comparison between two small groups), between the mixed style children in the two groups. While 53% of the children in the LG had a high level of originality, only 17% in the WG had a high level of originality. On the other hand, the majority (73%) of the mixed style children in the WG had a low level of originality, and the final difference between the two groups was in the left style, since most of the children (56%) with this style in the WG were high in originality, although most in the LG were low in originality. This result indicated that there was no connection at all between the mode of presentation and the matching styles of L&T, as they did not reinforce each other, and did not promote elements of creativity.

However, there was a positive connection in the WG between the left style of L&T and the visual mode of presentation, as they reinforced each other and promoted the three elements of creativity (fluency, flexibility, and originality). As the left style children in the WG progressed better than those in the LG, this might lead to the interpretation that it is possible that the visual mode of presentation stimulated and promoted the creative abilities of the left style children more than the verbal mode did. On the other hand, there was no clear impact of the verbal mode on either style, left or right, in both groups.

To obtain more accurate coverage of the children's results in their styles of learning and thinking (L&T) and their levels of creativity, in order to answer the research questions, the following section will demonstrate more specific comparisons between the two groups.

5.5.3 Comparisons between the two groups (WG & LG) on the levels of creativity elements in each style of L&T

This section will display tables and figures as a comparison between the two groups (WG & LG), in order to explore the similarities and differences between them, on the levels of creativity elements in each style of L&T.

5.5.3.1 Level of fluency

In this subsection, the level of fluency is examined individually on each style of L&T, in comparison between the two groups (WG & LG), as is clear from the following tables and figures.

5.5.3.1.1 Level of fluency in the mixed style of L&T

Table 5.27

	Fluency Levels in WG & LG in the mixed style			
Groups	High	Medium	Low	Total
WG	10	8	12	30
LG	2	5	12	19

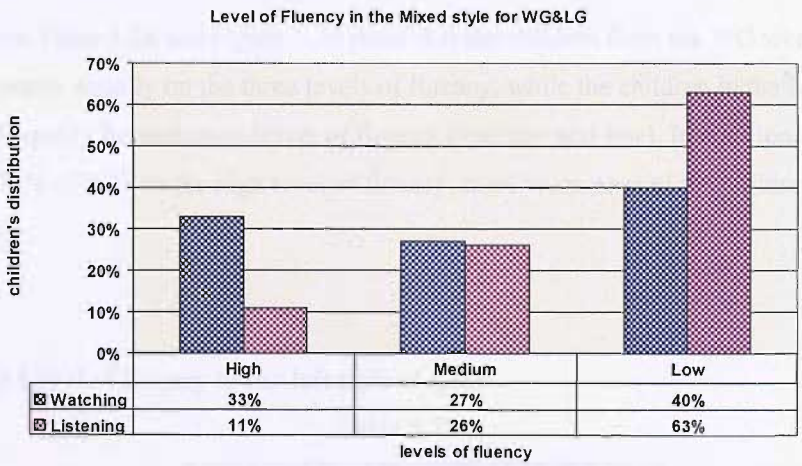


Figure 5.23 Level of fluency in the mixed style from the two groups

Table 5.27 and Figure 5.23 above show that there was a difference between the two groups in fluency. However, the children in the WG (33%) were higher than the children in the LG (11%) on the high level of fluency.

5.5.3.1.2 Level of fluency in the integrated style of L&T

Table 5.28

	Fluency levels in the WG & LG on intg. style			
Groups	High	Medium	Low	Total
WG	4	5	4	13
LG	0	3	3	6

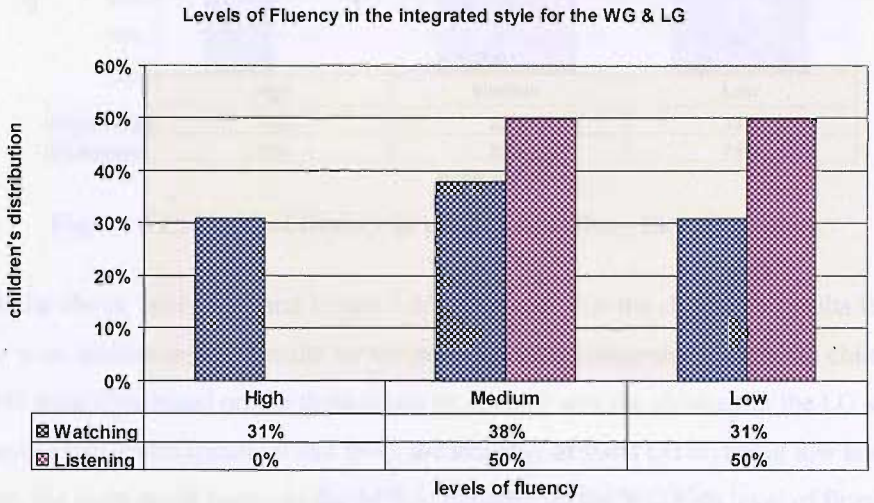


Figure 5.24 Level of fluency in the integrated style from the two groups

The above Table 5.28 and Figure 5.24 show that the children from the WG were distributed nearly equally on the three levels of fluency, while the children in the LG were spread equally between two levels of fluency (medium and low). In addition, while there were 31% of WG on the high level of fluency, there were none of the children in the LG (0%).

5.5.3.1.3 Level of fluency in the left style of L&T

Table 5.29

	Fluency levels in the WG & LG on left style			
Groups	High	Medium	Low	Total
WG	4	2	3	9
LG	0	2	5	7

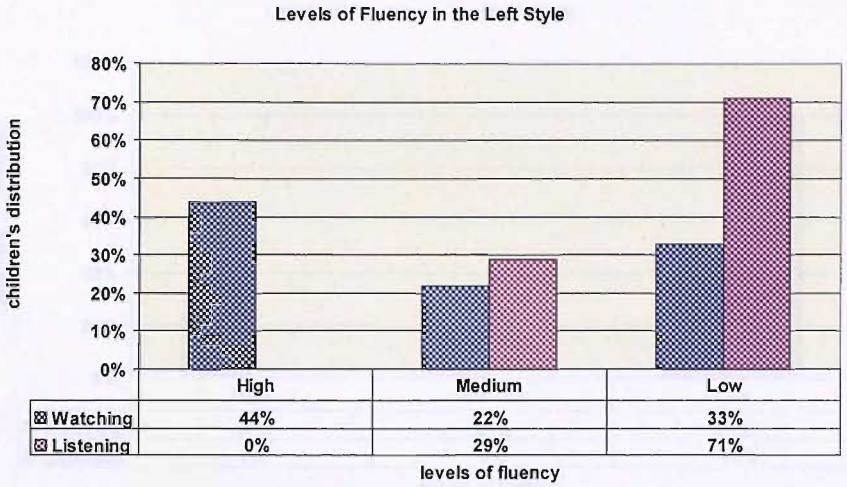


Figure 5.25 Level of fluency in the left style from the two groups

From the above Table 5.29 and Figure 5.25, it appears that the children's results for this style were similar to their results for the previous style (integrated), since the children in the WG were distributed on the three levels of fluency, and the children in the LG were spread across two levels (medium and low), the majority of them (71%) being low level. Moreover, the main result here was the 44% of children on the WG high level of fluency, while none of the children in the LG were high level.

5.5.3.1.4 Level of fluency in the right style of L&T

Table 5.30

	Fluency levels in the WG & LG on right style			
Groups	High	Medium	Low	Total
WG	3	2	5	10
LG	0	0	4	4

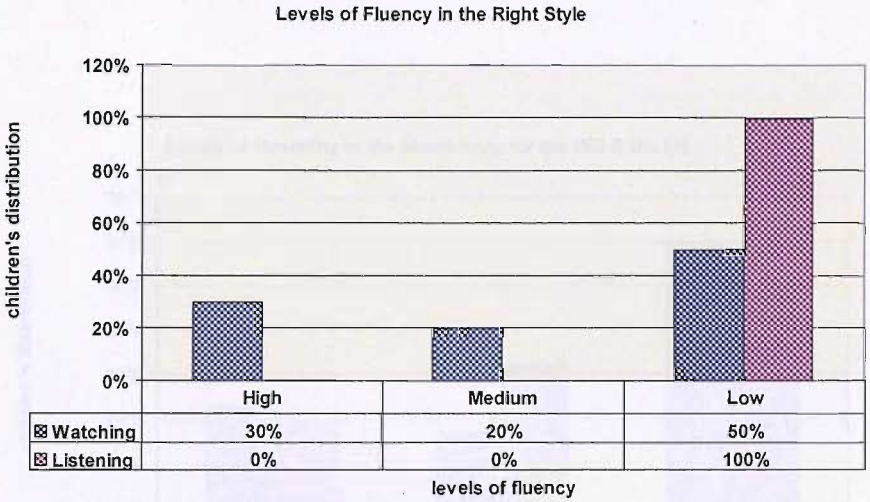


Figure 5.26 Level of fluency in the right style from the two groups

Table 5.30 and Figure 5.25 above show that the children from the WG were distributed on the three levels of fluency, whereas the children from the LG with this style (right) were all (100%) low level. However, most of the children from both groups were low level. Nonetheless, while 30% of the right style children from the WG showed a high level of fluency, none from the LG (0%) were on the high level of fluency.

From Figures 5.25, 5.26, 5.27, and 5.28, above, the apparent conclusion that could be drawn here is that the children in the WG from all styles of L&T were high in fluency, while none of the children from the LG showed a high level of fluency, except only 11% with the mixed style. Therefore, the visual mode may stimulate the children's fluency.

5.5.3.2 Level of flexibility

In this subsection, the level of flexibility will be examined individually for each style of L&T, in comparison between the two groups (WG & LG), as made clear from the following tables and figures.

5.5.2.2.1 Level of flexibility in the mixed style of L&T

Table 5.31

	Flexibility levels in the WG & LG on mixed style			
Groups	High	Medium	Low	Total
WG	7	5	18	30
LG	4	6	9	19

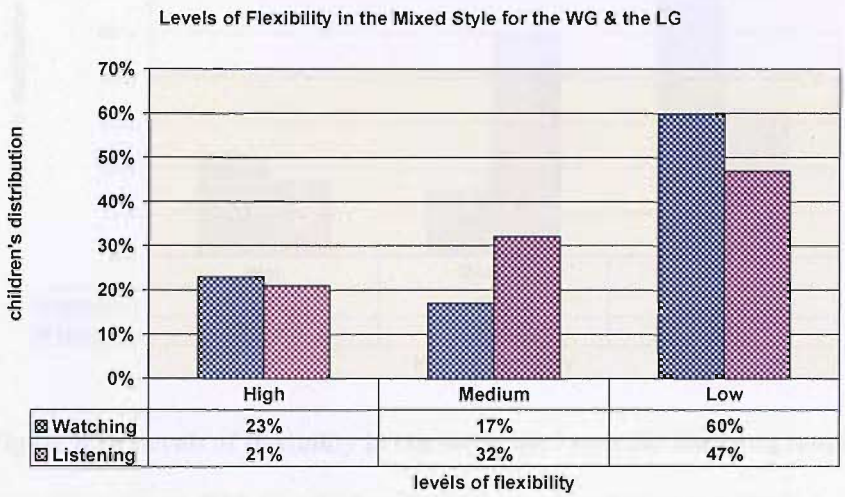


Figure 5.27 Level of fluency in the right style from the two groups

From Figure 5.27 above, it is clear that the children from the mixed style in both groups registered high percentages on the low level of flexibility.

5.5.3.2.2 Level of flexibility in the integrated style of L&T

Table 5.32

	Flexibility levels in the WG & LG on integ. style			
Groups	High	Medium	Low	Total
WG	3	2	8	13
LG	1	3	2	6

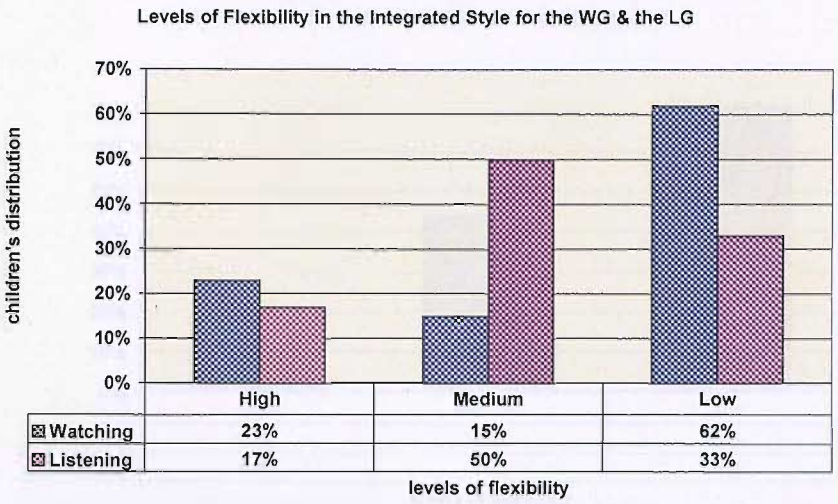


Figure 5.28 Levels of flexibility in the integrated style for the two groups

From the above Figure 5.28, the children from the integrated style in both groups were distributed on the three levels of flexibility; however, the WG was slightly higher (23%) in flexibility than the LG (17%), as well as lower than the LG on the low level, whereas most children from the LG showed medium flexibility.

5.5.3.2.3. Level of flexibility in the left style of L&T

Table 5.33

	Flexibility levels in the WG & LG in left style			
Groups	High	Medium	Low	Total
WG	2	4	3	9
LG	1	1	5	7

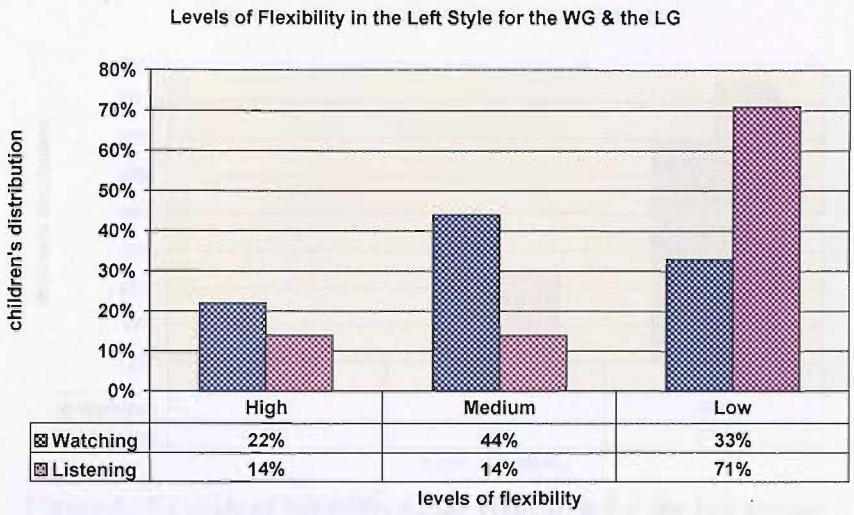


Figure 5.29 Levels of flexibility in the left style for the two groups

The above Figure 5.29 shows the results for the children with the left style in both groups on flexibility; the WG children with this style of L&T were slightly higher (22%) than those in the LG (14%), while the children from the LG were much lower (71%) in flexibility than those in the WG (33%)

5.5.3.2.4. Level of flexibility in the right style of L&T

Table 5.34

	Flexibility levels in the WG & LG on right style			
Groups	High	Medium	Low	Total
WG	0	4	6	10
LG	0	1	3	4

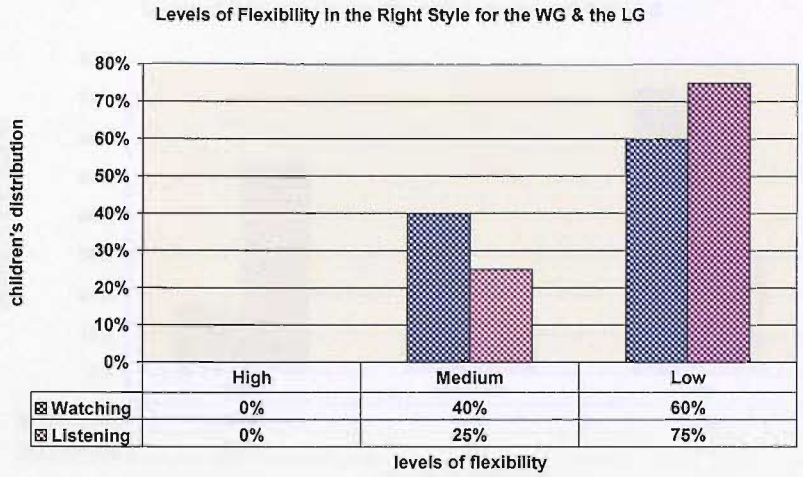


Figure 5.30 Levels of flexibility in the right style for the two groups

Table 5.34 and Figure 5.30 above show that the majority of the children from both groups were low in flexibility in the right style, and none of them were high level.

In total, however, the children from the WG performed somewhat better in flexibility than those in the LG; nevertheless, the children from all styles of L&T in both groups were very low in flexibility. It seems that there was no clear impact of the mode of presentation on flexibility.

5.5.3.3 Level of originality

In this subsection, the level of originality will be examined individually for each style of L&T, in comparison between the two groups (WG & LG), as made clear from the following tables and figures.

5.5.2.3.1 Levels of originality in the mixed style of L&T

Table 5.35

	Originality levels in the WG&LG in mixed style			
Groups	High	Medium	Low	Total
WG	5	3	22	30
LG	10	3	6	19

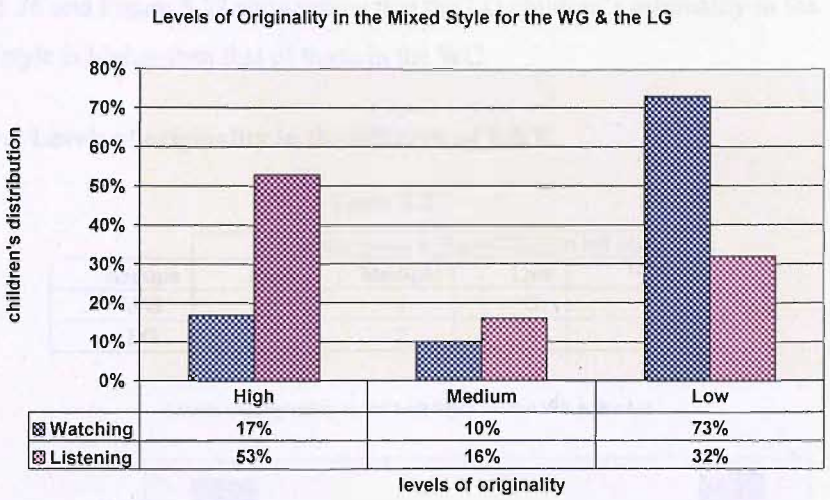


Figure 5.31 Levels of originality in the mixed style for the two groups

The above Table 5.35 and Figure 5.31 show that the mixed style children in the LG 53%) were at a much higher level than those in the WG (17%).

5.5.3.3.2 Levels of originality in the integrated style of L&T

Table 5.36

	Originality levels in the WG&LG integ. style			
Groups	High	Medium	Low	Total
WG	2	3	8	13
LG	2	1	3	6

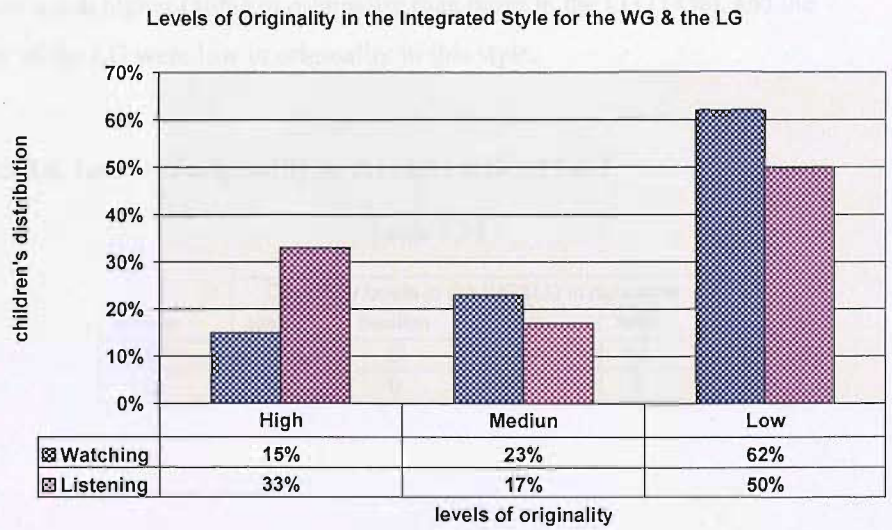


Figure 5.32 Levels of originality in the integrated style for the two groups

Table 5.36 and Figure 5.32 above show that the LG children's originality in the integrated style is higher than that of those in the WG.

5.5.3.3.3 Levels of originality in the left style of L&T

Table 5.37

	Originality levels in the WG&LG in left style			
Groups	High	Medium	Low	Total
WG	5	1	3	9
LG	1	2	4	7

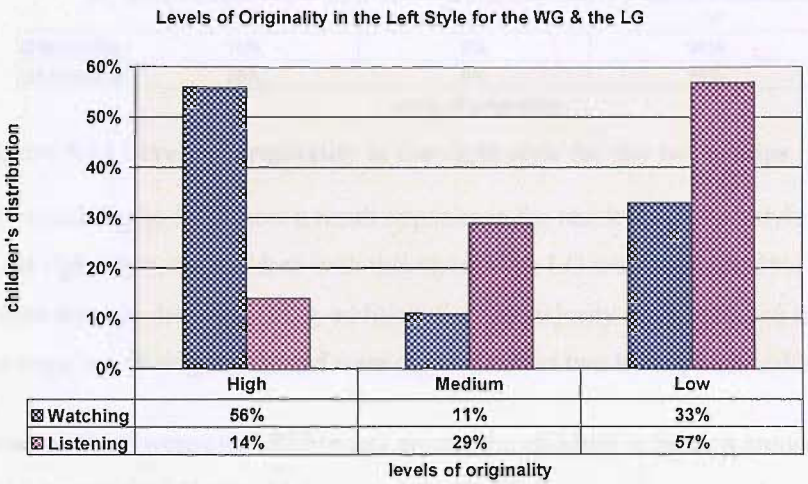


Figure 5.33 Levels of originality in the left style for the two groups

Table 5.37 and Figure 5.33 above show that in the left style the children of the WG were much higher (56%) in originality than those in the LG (14%), and the majority of the LG were low in originality in this style.

5.5.3.3.4. Levels of originality in the right style of L&T

Table 5.38

	Originality levels in the WG&LG in right style			
Groups	High	Medium	Low	Total
WG	1	0	9	10
LG	1	0	3	4

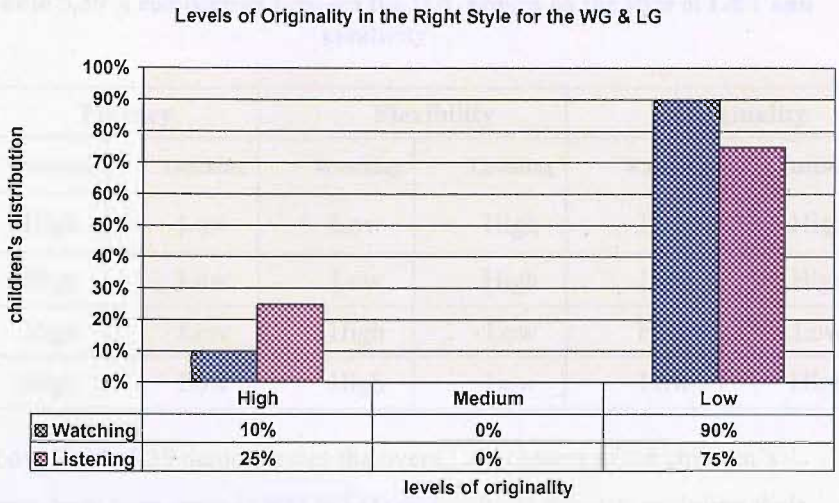


Figure 5.34 Levels of originality in the right style for the two groups

Table 5.38 and Figure 5.34 show a result opposite to the result for the left style above. For the right style, the children with this style in the LG were higher (25%) in originality than those in the WG (10%); additionally, the majority of the children from both groups were low in originality, and were divided across two levels, high and low.

In originality, there were clear differences among the children in the two groups. While the children in the LG were higher in originality in the mixed, integrated, and right styles of L&T, the children from the WG were higher in originality only in the left style. This is possibly because the visual mode of presentation impacted the originality of the children with the left style in the WG, as it did with their fluency on all styles of L&T and relatively with flexibility in the mixed, integrated, and left styles, whereas in the LG the verbal presentation impacted the originality of the right style children.

To draw conclusions from the above results, the following Table 5.39 summarises the main features of the differences between the two groups (WG & LG).

Table 5.39 A comparison between the W/L groups on the style of L&T and creativity

Styles of L&T	Fluency		Flexibility		Originality	
	Watching	Listening	Watching	Listening	Watching	Listening
Mixed	High	Low	Low	High	Low	High
Integrated	High	Low	Low	High	Low	High
Left	High	Low	High	Low	High	Low
Right	High	Low	High	Low	Low	High

The above Table 5.39 demonstrates the overall conclusion of the children's performances from both groups (WG & LG) on creativity through analysing their responses from the questionnaire and the interview in relation to their different styles of L&T, and in the light of the mode of presentation for each group. Most of the children in the two groups were low in the three elements of creativity; nonetheless, there was some variance between the two groups among the small numbers of children who performed differently with each style of L&T. Additionally, in consideration of the mode of presentation, it seems that there was no reinforcement between the mode of presentation and the matched style of L&T in promoting **fluency**, as the children from the WG performed better than those in the LG, regardless of their styles of L&T. However, the left style children in the WG performed better than the right style children in the same group, whereas there was no impact from the verbal mode of presentation on the fluency of the children with all styles of L&T in the LG.

The following Figure 5.35 summarises the relationship between the style of L&T and the visual mode of presentation and their impact on fluency, in that the visual mode of presentation seems to stimulate fluency for all L&T styles.

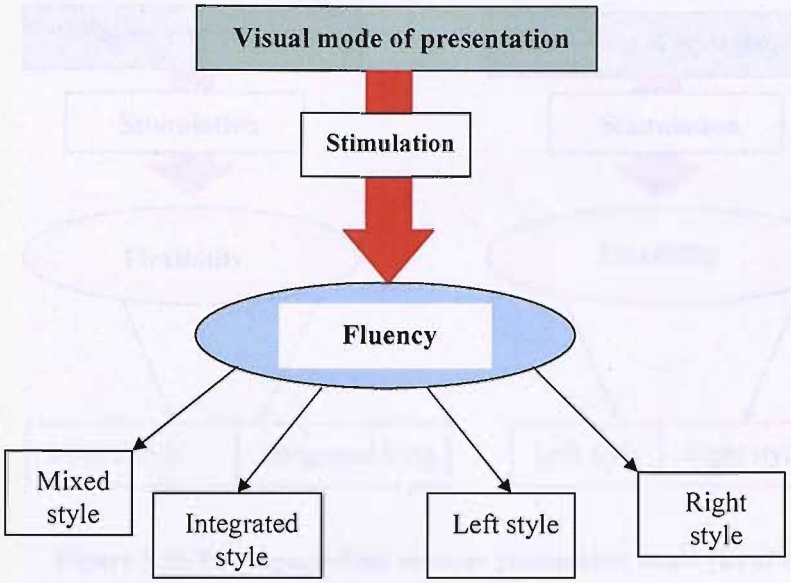


Figure 5.35 The impact of the mode of presentation on the styles of L&T on fluency

However, in **flexibility**, by considering the children's performance on the medium level as well as the high level, it seems that the mixed and integrated style children in the LG were high in flexibility, while those in the WG were low. On the other hand, the children with the left and the right styles in the WG were high compared to those in the LG, who were low. Specifically, the left style children in the WG were higher than the right style children in the same group, and also higher than the left style children in the LG. In addition, in flexibility it is apparent that the impact of the mode of presentation had two impacts: while the verbal mode stimulated or promoted the flexibility of some of the mixed and integrated style children in the LG, the visual mode of presentation stimulated the flexibility of some children from the left and right styles of L&T in the WG.

The following Figure 5.36 shows this relationship between the flexibility and the styles of L&T in the light of the mode of presentation:

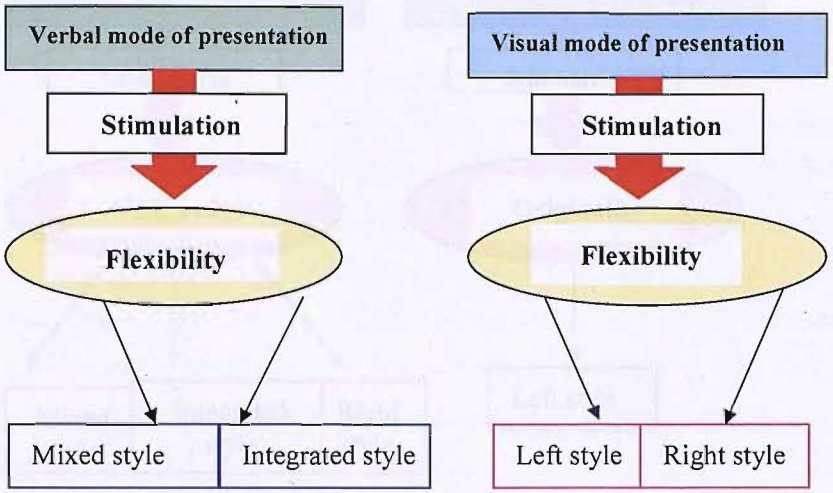


Figure 5.36 The impact of the mode or presentation and styles of L&T on the flexibility

In the case of **originality**, as is shown in Table 5.39 above, in the WG the left style children were high in originality and the other styles were low, while in the LG the children with mixed, integrated, and right styles were relatively higher than the left style children in the same group. Therefore, it seems that the verbal presentation stimulated the originality of the children with those three styles, while it did not stimulate the children with the verbal or left style, whereas the visual presentation stimulated the originality of the children with the left style.

The following Figure 5.37 explains this relationship.

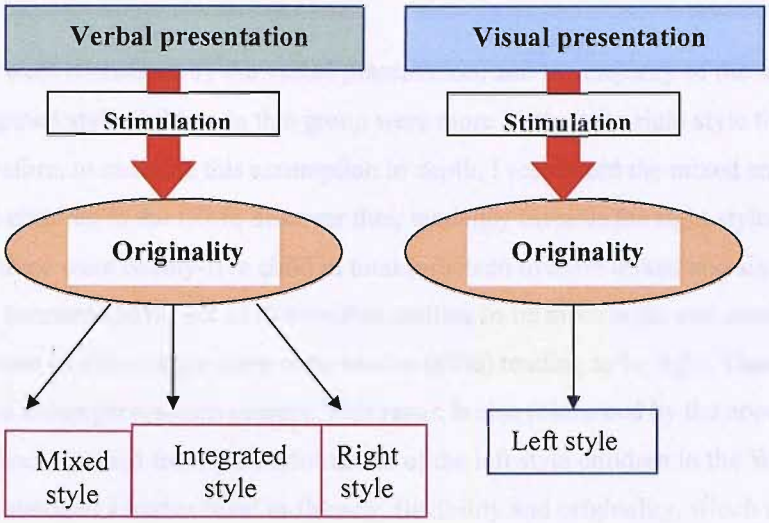


Figure 5.37 The impact of the mode of presentation and the styles of L&T on the originality

In overall conclusion, as shown in the above Table 5.39 and Figures 5.35, 5.36 and 5.37, it seems that the visual mode of presentation stimulated fluency in all styles of L&T, while the verbal mode did not have this impact. This was possibly because fluency is the simplest form of creativity, therefore it was easy to stimulate it by exposing the children to an imaginative, exciting visual presentation. Especially the fact that the story in this mode was soundless might have stimulated and encouraged the children to illustrate their verbal ability. Moreover, the children's performance in flexibility and originality was poor in total in both groups, although the WG as a group performed slightly better than the LG in flexibility. However, the better performance in this group was specifically located in two styles only (left and right), and left only in originality, while the LG presented better performance in flexibility from the mixed and integrated styles in both flexibility and originality. In addition, the right style children performed well in the LG, better than those in the WG, and this means that the verbal mode stimulated the mixed and integrated style children's flexibility. It is possible that the verbal mode stimulated the integrated style, since the mixed style is not clearly known, and is a mixture of the three styles. In this case (flexibility) and in the case of originality, it may be that the majority of the children in the mixed style tended to be more integrated. However, even the integrated style usually tends to be biased either towards the right or towards the left style (Al-Ali, 1995).In addition, as the right style children seemed to present a fairly good performance in originality in the LG, it is probably the right style children in the LG

who were stimulated by the verbal presentation, and the majority of the mixed and integrated style children in this group were more likely to be right style than left. Therefore, to examine this assumption in depth, I rechecked the mixed and integrated style children in the LG to discover their tendency towards the right style, and I found that there were twenty-five child in total (nineteen of them mixed and six integrated) with fourteen (56%) out of twenty-five tending to be more right, and among the nineteen of mixed style there were twelve (63%) tending to be right. Therefore, my above assumption seems correct. This result is also reinforced by the apparent result that was obtained from the performance of the left style children in the WG, since they obtained a higher level in fluency, flexibility and originality, which meant that they were stimulated by the opposite presentation (the visual) to their style (the verbal). In a nutshell, then, the conclusion in this research is that the evidence shows that we could stimulate ordinary children's creative imagination by exposing them to the opposite mode of presentation to their style of L&T. Another result from this exploration in the mixed style, although this research did not deal with gender differences, was that most of the girls with the mixed style in the LG were biased towards the right style, while the majority of the boys were inclined towards the left style.

The above results and findings were from quantitative data (the questionnaire) and qualitative data (the interview).The next section will illustrate and discuss the findings of the case study (qualitative), by selecting some cases from the right and left styles of L&T, among the children from both groups. Left and right styles were selected in particular as the mode of presentation in this research is visual and verbal. From the children with these two styles I then randomly selected some cases to be studied in depth, in relation to the previous section's findings and the research questions.

5.5.4 Triangulation

To answer confidently and precisely the second and the third questions of this research, I added the following table of data, obtained from cases of the children's performances, as a third perspective to triangulate and reinforce the previous results of the relationship between and the impact of the mode of presentation, styles of L&T and aspects of creative ability, as follows.

From presenting and discussing the children's results on the relationship between the children's engagement with the story, and the styles of learning and thinking (section 5.5.1, p. 51), it is noticeable that there was a positive relationship between the left style of L&T and the high level of engagement in both groups, as well as the right style and engagement. Furthermore, it was clear that the left style children from both groups were highly engaged with the story, more than the children with the right style of L&T, as was fully explained previously in that section. In the following Table 5.40, I randomly selected a few cases of left and right style children from the two groups (WG & LG), and studied their results on engagement and empathy with the story, as well as the children's performance on the elements of creativity in groups matched or mismatched to their styles of L&T. Afterward, I focused on presenting, understanding, and discussing the relationships between styles and engagement, and between styles and the originality, in particular to investigate the originality of their imaginations.

Table 5.40: A comparison between the right and the left style in WG & LG

Groups	Style	Engagement	Empathy	Fluency	Flexibility	Originality
WG Visual Mode	Left	High	Med	Low	Low	Low
	Left	High	Med	High	Low	Low
	Left	High	High	High	Med	High
	Left	High	Med	Low	Low	High
		100%	**25%**	**50%**	**75%**	**50%**
	Right	High	High	Med	Low	Low
	Right	High	High	Med	Low	Low
	Right	Low	High	Low	Low	Low
		67%	**100%**		**100%**	**100%**
LG Verbal Mode	Left	High	Med	Low	Low	Low
	Left	High	High	Low	Low	Low
	Left	High	Med	Low	Low	Low
	Left	High	Low	Low	Low	Low
		100%	**25%**	**100%**	**100%**	**100%**
	Right	High	Med	Low	med	High
	Right	High	High	Low	Low	Low
	Right	Low	Med	Low	Low	Low
		67%	**33%**	**100%**		**33%**

In the above Table 5.40 the percentages in black indicate high level and the percentages in red indicate low level, while some categories were left blank as the level was not recognisable. The sections below present a brief explanation of the categories in the above Table 5.40.

5.5.4.1 The styles of L&T and the level of engagement

In this section I will explain the performances of the children with right and left styles of L&T from both groups on engagement with the story.

1. Left style. This style showed stability in both groups, WG and LG, since all the children (100%) from both groups were exceedingly engaged with the story.

2. Right style. The results of this style were also stable and equal in both groups although the right style children were highly (67%) engaged with the story, yet their engagement was less than that of those in the LG.

These results also depended on the mode of presentation in each group, as will be stated in the summary later on in this chapter.

5.5.4.2 The styles of L&T and the level of empathy

This section demonstrates children's performance on empathy with the story and the relationship between empathy and the right and left styles of L&T.

1. Left style. The left style children from both groups had mixed levels of empathy with the story; however, it can be summarised as a medium level of empathy.

2. Right style. The results of the right style children were various, according to the mode of presentation. In other words, the children in the WG (100%) empathised highly with the story, since they were presented with the story in the visual mode (matching mode); while the right style children in the LG empathised less (67%) with the story compared to those in the WG, as they were presented with the verbal mode (mismatching mode). However, the right style children in both groups much more empathised with the story than those with the left style in the two groups (see Table 5.39 above).

In the following section, I shall demonstrate and discuss the children's performances on the aspects of creativity. Although the children's performance was low on all those aspects, there were some minor differences between the two groups.

5.5.4.3 The styles of L&T and the level of fluency

In this area the children's performances were not constant, since they were dissimilar according to the type of style (left or right) and group (WG or LG), as follows.

1. Left style. 50% of the children of this style in the WG showed a high level of fluency, whereas all the children with the same style in the LG showed low level of fluency. This result matches the previous results in this manner, indicating that the performance in fluency of the children from the WG was higher than that of those from the LG, and in total the left style children in the WG performed better than those in the LG, and better than the right style children in both groups.

2. Right style. All the right style children in the LG showed a low level of fluency, while in the WG they were in between the medium and low levels of fluency.

5.5.4.4 The styles of L&T and the level of flexibility

The majority of the children from the two groups and from the right and the left styles performed poorly on the high level of flexibility; nonetheless, there was a small difference between them as follows.

1. Left style. Most of the children from this style (75%) in the WG showed a low level of flexibility, while all the children in the LG showed a low level of flexibility. This outcome also matches the previous results, as the left style children in the WG achieved better flexibility than those of the same style in the LG.

2. Right style. All of these children in the WG were low in flexibility, and in the LG they were mainly low as well.

5.5.4.5 The styles of L&T and the level of originality

The children were mainly poor in originality; however, as mentioned previously, in total the children with the left style in the WG achieved better than those in the LG.

1. Left style. 50% of the children in the WG achieved a high level of originality, while all of those in the LG showed a low level of originality.

2. Right style. The majority of the children in both groups showed a low level of originality; however, a small percentage (33%) in the LG achieved a high level of originality. This result was also in line with the results in Table 5.39 above, which showed that the right style children performed better in the LG than those in the WG.

This provides more evidence that originality and imagination can be stimulated by exposing children to a mode of presentation that mismatches their styles of L&T in order to stimulate their creative ability.

The results of the above illustration can be summarised in the following equations.

1. **Styles of L&T and engagement**

Right style +Visual presentation = High Engagement
Left style + Verbal presentation = High Engagement

2. **Styles of L&T and empathy**

Right style +Visual presentation = High Empathy

Left style + Verbal presentation = Low Empathy
Left style + Visual presentation = Low Empathy

This result could be interpreted as right style people being more intuitive, emotional and imaginative, which is why the right style children, when presented with a visual story, were highly engaged and empathised with the story, as it touched their feelings and their emotions. On the top of that, as can be seen from their results, the mode of presentation matching their style stimulated their engagement and empathy (as well as enhancing their understanding to the story's episodes). On the other hand, left style people are more logical and able to control their emotions, depend on logic and practical and organised thinking in solving any problem, and do not depend on their intuition or imagination, unlike right style people. That is why, although they were engaged with the story as its presentation matched their style, they did not show a high degree of empathy, as most of them considered it an imaginative story and not real. On the other hand, even if they believed that the story was real, they would still use their minds and think logically and practically how to help and rescue the team in the story, rather than emotionally attaching to them and feeling sorry for them.

3. **Styles of L&T and fluency**

Left style + Visual presentation = High Fluency

There was no identified pattern to the left style and verbal mode, or to the right style and the visual or verbal mode.

4. **Styles of L&T and flexibility**

Overall the left and the right styles achieved higher level on flexibility in the WG, while the flexibility was low in the listening group for both styles the left and the right (see Table 5.39)

Left style + Visual presentation = High Flexibility
Right style + Visual presentation = High Flexibility

Left style + Verbal presentation = Low Flexibility
Right style + Verbal presentation = Low Flexibility

However, in Table 5.40: There was no clear pattern and I cannot draw a firm conclusion, as small numbers of children were involved.

5. **Styles of L&T and originality**

Originality and the style of L&T tend to act similarly to fluency and flexibility with the styles of L&T, as shown below:

Left style + Visual presentation = High Originality
Right style +Verbal presentation = High Originality

It can be said that according to these results the right and left styles of L&T work more effectively with the opposite mode of presentation (see the above examples).

5.6 Conclusion

This chapter dealt with the data that were collected from the fieldwork for the purpose of this research. These data were analysed and organised in a form that served the purposes of this research, and answered its questions.

Therefore, it was important to confirm that the imaginative story was the right tool for this study, in the sense that it was a medium that stimulated the creative imagination of the subjects of this research. This was done through examining the children's understanding of the story's episodes from the start (the preparation for the trip) to the end of the story (the children's e-mail to the children on Earth) and their degree of engagement with the story and their ability to solve the problem in unusual ways or creatively to some extent through a chain of questions in the given questionnaire. Then I investigated the role of the mode of presentation in the whole process, and its impact on the children's creative imagination, and whether there was any relationship between the mode of presentation and engagement and empathy, and summarised the results in a diagram (see Figure 5.15).

Afterwards, I explored the children's styles of learning and thinking and their relationship to their engagement, creative ability, and the mode of presentation in the two groups of children (WG & LG).

As a conclusion from the obtained results, it appears that:

✓ In regard to engagement, I found that there might be a direct relationship or a connection between the children's engagement and their originality. All the original responses came from those who had high engagement. However, not all children who had high engagement with the story came up with original responses, as 85% of the total children that were of a high level of originality were also highly engaged with the story. Yet, not all children who were highly engaged with the story obtained a high level of originality, as there were some children highly engaged with the story but their responses were not original in comparison to others.

✓ Moreover, 72% of the children in the LG and 66% from the WG were highly engaged with the story regardless of their style of learning and thinking.

✓ On the other hand, the styles of L&T played a part in engagement to some extent; since 71% of left style children were highly engaged with the story in the LG.

In contrast, 66% of the right style children from the WG were also highly engaged with the story.

✓ This study revealed that the children's styles of L&T may have a direct impact on their understanding of the story's elements or episodes and their engagement with it. On the other hand, there appears an opposite association between children's styles of L&T and the mode of presentation and their creative imagination or creative ability, as stated above in this chapter.

Chapter 6 will present more discussion and exposure of the meaning of the results that were obtained in this chapter, in order to realise the purpose of this research, and its contribution to the body of knowledge in the field of children's creative imagination and styles of L&T.

Chapter 6

Discussion and Conclusion

1. Discussion

6.1 Introduction

The first section of this chapter discusses the overall findings and conclusions that can be drawn from the research and how the central thesis is substantiated. The thesis argued that providing the children with an imaginative activity might stimulate their creativity, and the answer to the first question of this research concludes that this is the case. The thesis also explored whether there was an interrelation between the mode of presentation and styles of learning and thinking, and the impact of this linkage on the children's creative imagination. The following answers to the second and third questions of the present research discuss this relationship and its effect on the children's creative imagination. The second section of this chapter covers the contribution of this thesis in the areas of children's learning, children's creative imagination and children's styles of learning and thinking. The final section deals with the limitations of this research and recommendations for further work.

The preceding chapter presented the collected data and analysed the results of each group (WG and LG) individually, then compared the two groups in depth, in order to provide a comprehensive view and a full insightful interpretation of those findings in this chapter.

The strategies of data collection and its analysis in the previous chapter were built upon the following research questions.

6.1.1 Research questions

1. Does an imaginative story stimulate the children's creative imagination? If so, then how?

2. Does the mode of presentation (visual/verbal) contribute in stimulating children's creative imagination? If so, then which mode is more effective, and why?

3. Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

To answer the above questions, the children's results from the questionnaire, the interview, and the selected cases from both groups have been linked together to obtain an integrated holistic vision of the children's performances, as follows.

6.2 Main findings answering the research questions

This section will illustrate the findings in this study that answer the research questions.

The next section will demonstrate in detail the answer to the first question of this research.

6.2.1 Does an imaginative story stimulate the children's creative imagination? If so, then how?

The answer **from this research is that an imaginative story does seem to stimulate children's creative imagination.**. The story in this research managed to challenge and stimulate most of the children's imagination, and to involve most of them in a creative activity (the story), in which many of the children uncovered their ability to think and imagine in unusual ways, or creatively, since nearly all of them made a serious effort to solve the problem, and to present creative or unusual responses as solutions.

Initially, I made the assumption that if the imaginative story managed to capture the children's interest and enjoyment, understanding and empathy, then it was more likely to be able to stimulate their creative imagination. As a result, they would respond to the problem of the story in an imaginative way, or creatively. In other words, they would be stimulated by the story and provide imaginative solutions to the problem in it. The children's styles of L&T were considered through presenting this story in verbal and visual modes. From reading through the literatures, and consistently with some researchers' definitions of creativity, I was encouraged to formulate the above assumption. For example, in accordance with Loveless (2003),

creativity could be a challenge to create some tangible outcomes out of abstract ideas, and it could be an aptitude or potential; also, creativity 'is the creative effort of child...as this effort is original and meaningful for a child' (Runco, 2003: 30). Craft (2001) argues that creativity (LCC) involves imagination, problem solving and problem finding. Therefore, I provided the children with a challenge in the form of an open-ended story based on problem finding and problem solving. Hence, I looked at whether the children's responses, as original efforts, could present creative potential or creative aptitude. Moreover, my assumption is also supported by Joubert (2001), as she defined creativity as applied imagination, since imagination, as described by her, 'is creating a mental image, picture, sound, or a feeling in person's mind; it is a thought process that establishes a new idea or image that was not there before...imagination is a main and essential part of creativity'. Runco (2003) argues that everyone has a creative potential, and that creativity could be found in every child, not only the gifted and highly intelligent child. Craft (2001) argues that a creative outcome could be novel for the child, however not necessarily for the wider world. This concept could be applied to both ordinary and gifted children, therefore any novel idea or response that the child presents declares his/her novelty of thinking and imagination, and creative ability (Craft, 2001).

On the other hand, many researchers and psychologists mentioned the importance and impact of story on stimulating children's imagination and teaching them different knowledge and values, in whatever mode the story is presented. 'In imagination, one goes to lands far away or near, to times that are new or old' (Munkers, 1959: 22). As a conclusion, from the demonstration and discussion in the previous chapter of the children's performances and the results on recalling and understanding the different episodes of the story, enjoying the story, identifying the problem within it, and empathy with the story, it is clear that they were highly engaged and empathised with the story.

Consequently, in order to find out if this story managed to stimulate the children's creative imagination, in the previous chapter (the data analysis) I analysed and discussed the children's results from the questionnaire and the interview. Then I divided that data into sections and subsections to manipulate it and understand the results in depth as follows.

I investigated some factors that led me to the answer to this question. These factors were the children's engagement with the story, and the level of their engagement, through finding answers to the following queries:

- Did the children recall some events from the story correctly?
- Did they understand the story?
- Did they enjoy listening to or watching the story or like the story?
- Did they manage to identify the problem within the story?

The other factor was the children's empathy with the story. This factor was explored through investigating two aspects. The first was the children's willingness to help the team in the story; the second was through their contribution with the solutions they provided to solve the problem in the story.

From the findings regarding those factors, the children revealed high percentages of understanding of the story episodes, enjoyment and identification of the problem in the story (see Chapter 5, Tables and Figures 5.1-5.11 p. 104-119), and through their willingness to help and solve this problem, they declared their empathy (see Tables 5.13, 5.14 and Figure 5.13-5.15, p. 1122- 131). As a conclusion from these results, it can be said that the children empathised and were highly engaged with the story (see Table 5.12, p. 121 and figure 5.14 p. 126). This was clear from most of the children's attempts to present unusual and imaginative solutions to solving the problem, and from some of them involving themselves in the rescue process. Most of the children were stimulated and provided unusual solutions when they were provided with an imaginative stimulus (the story), which motivated them and sustained their engagement with the story, and according to Loveless (2003), motivation and engagement are important factors in solving problems creatively.

Some researchers assert that the novelty of children's outcomes could be on the individual level, among peers or globally (Porter, 1999; Craft et al., 2001; Runco, 2003). According to this, the children's creative ability in this research was calculated from the novel solutions or ideas the children presented as solutions to the problem. The novelty of the children's solutions was obtained by comparing each child's responses to those of the rest of the children (his/her peers).

Although the children's performance on the elements of creativity (fluency, flexibility and originality) was mainly low, as they are ordinary children, yet a good number of them performed well (high and medium).

This conclusion reinforced my preliminary assumption about the impact of an imaginative story in stimulating the children's creative imagination.

Prior to answering the second question of this research, I shall present and discuss some other introductory results that also appeared from the analysis in this research.

6.2.1.1 The impact of the mode of presentation on engagement

Generally, the overall results revealed that most of the children were highly engaged with the story regardless of the mode of presentation. However, with deeper investigation I found that the mode of presentation might have an impact on some aspects of the children's engagement. For example, the mode of presentation (the WG + visual mode of presentation and the LG + verbal mode of presentation) appeared to shape the children's understanding to the problem. This was apparent from the differences between the two groups (WG and LG) after the comparison between their responses (see Questions 1, 2, 3, and 4 in section 1, and Questions 1 and 2 in section 2, Chapter 5). The mode of presentation also seemed to affect their empathy (for more details see the children's results in Figures 5.12 and 5.15), as the children's responses were bonded with what they watched or what they heard.

As stated above, the engagement includes these elements: recalling, understanding to the story's episodes, enjoyment, problem identification, and willingness to help (and self-involvement for high empathy). The following findings are presented from the comparison between the results for the two groups.

❖ **Recall.** Recalling events and episodes by the children from both groups (WG & LG) was one of the aspects of engagement that seemed affected by the mode of presentation. The children's performance was nearly the same in the two groups (see Chapter 5, Figures 5.1-5.4, p.104-109). However, some of the children in the WG were more elaborate and fluent in their answers, and provided more answers than the children in the LG, regardless of their styles of L&T (see Figure 5.2). This might

show the impact of the visual mode of presentation on the children's memory (however, memory is not included as a topic for investigation in this research).

❖ **Understanding.** In understanding of the story episodes, some children in the WG were more fluent in their answers, and provided more answers than the children in the LG (Figure 5.5). Nonetheless, in Figure 5.7 the majority of them of the LG were more positive in their answers than those in the WG about how easy it was to understand the story. This also indicates how the mode of presentation might have influenced the children's understanding (how children understand, as a topic, is not a part of this research to be investigated in depth). The results revealed a strong reversible connection between the children's understanding to the story episodes and their recalling, enjoyment, liking, problem identification, and willingness to help. For example, the children who managed to identify the problem, they appeared to have understood the story, and vice versa; the children who understood the story managed to identify the problem in it. However, this understanding did not seem to impact on the children's degree of empathy (i.e. self-involvement). Therefore, although understanding has an impact on the children's willingness to help, yet it has no impact on their degree of empathy. In other words, understanding might only have a partial impact or relationship with empathy. In a sense, it may be due to the children being influenced by the mode of presentation that they empathised with the story and demonstrated their will to help, but this impact was not clear in driving them to involve themselves in the rescue process (the rescue indicates the degree of empathy).

❖ **Enjoyment and liking.** It seems that the vast majority of the children from both groups enjoyed the story, regardless of their styles of L&T (Figures 5.9 and 5.10). However, in the LG the children were more consistent in their answers than those in the WG, as the verbal form of the story was more comprehensive and explicit than the visual form.

❖ **Identification of the problem.** In this part of this subsection, the influence and the impact of the mode of presentation is clear and in some ways is in favour of the verbal mode. The vast majority of the children in both groups identified the problem, yet there were some differences between the two groups. For example, in the WG since the children were watching the animated soundless story, they mentioned that fuel was decreasing, as they considered the oxygen cylinder to be gas fuel (this is

also an impact of the culture, as gas in Qatar delivered to houses in cylinders to be used for cookers in kitchens only; unlike the purpose and system of delivering the gas in the UK, in Qatar people do not use heating systems at homes but electric air conditioners instead). While some (28%) of the children from the LG mentioned the fault in the spacecraft as a problem, only a few (18%) of the children in the WG mentioned it as a problem (Figure 5.6). In addition, in the interview with children from both groups, the children gave the same answers as above (see interview extracts in Chapter 5, p. 102).

❖ **Degree of Engagement.** In degree of engagement, the children from the two groups were very similar and they showed a high degree of engagement in general (5.12, p. 121). Overall, most of the children from both groups (WG & LG) preferred to watch the story, and this may reveal their preference for the visual mode rather than the verbal mode. This finding confirms the arguments of Grainger (2004) and Latham (2000) that the new generation of children are trained to be visual by the media that attract children with visual displays on TV, video, DVDs, CDs, etc.

On the other hand, Garrett-Petts (2000) argues that depending on verbal presentation only will dull the visual imagination of the recipient. I would comment on Garrett-Petts's arguments that from the children's results I found that visual presentation without sound also confuses the children and their understanding (see Chapter 5, Figure 5.6, for example). Therefore, the findings of this research were in line with Garrett-Petts's (2000) argument that it is better to present knowledge to children in the primary grades using both modes, the visual and the verbal. This argument is supported by Safran (2001) and Lapp, Bender, Ellenwood and John (1975).

On the other hand, there was an apparent impact of the mode of presentation on the quality of the children's answers to the question, since they seemed influenced by the mode of presentation in the above examples of the engagement aspects.

6.2.1.2 The impact of the mode of presentation on empathy

The impact of the two modes on empathy seems to be nearly equal for the children generally, from both groups. Nonetheless, it slightly tends to be in favour of the visual mode.

In empathy, the first part was about the children's willingness to help (Figure 5.13, p.124), which was also included in engagement and the children from both

groups were willing to help the team in the story by solving their problem. However, the degree of empathy was higher in the WG (visual mode) about half of them (44%) than the LG there were only a few children (14%). This finding clarifies the impact and effectiveness of the visual mode (as explained in Chapter 5).

In sum, the vast majority of the children seem to be engaged with the story, and enjoyed it regardless of its mode of presentation. This means that selecting the imaginative story as a tool for this study was successful in engaging the children and making them empathise with the problem, in stimulating their imagination, and in challenging them to provide unusual responses. However, this finding did not clearly clarify the impact of the mode of presentation on the degree of empathy in particular. As a consequence, I examined the impact of the mode of presentation in depth, by relating the visual mode of presentation to the performance of the right style children, and the verbal mode with the performance of the left style children, on engagement and empathy, as follows.

6.2.1.3 The impact of the mode of presentation on engagement in light of the left and right styles of L&T

There was apparent high engagement with the story from most of the children in both groups, WG and LG, regardless of whether the mode of presentation matched or mismatched their styles of L&T. However, the result of the children's engagement was not absolutely in line with Lapp, Bender, Ellenwood and John (1975), Garrett-Petts (2000), and Safran (2001), as they emphasised that the presentation of knowledge to children should match their learning styles (Chapter 2, p.39). In this research, the majority of the children from both groups were highly engaged with the story regardless of their styles of L&T or the mode of presentation, which may be due to the nature of the story. Nevertheless, the left style children showed higher engagement than those with the right style (see Table and Figure 5.12, p.121). Further, all (100%) the left style children were entirely engaged with the story, no matter whether the mode of presentation was visual or verbal, whereas the right style children, although highly engaged with the story in the two modes of presentation, nevertheless were fewer (67%) than the left style children (see Table 5.40, Chapter 5, p.164). In particular, within each group, it seems that the right style children were more engaged with the visual mode of presentation. In contrast, the left style children

were engaged with the story in general regardless of the mode of presentation (see section 5.5.1, Chapter 5, p.142).

Right style + Visual presentation ⟶ High Engagement

Left style + Verbal or Visual presentation ⟶ High Engagement

6.2.1.4 The impact of the mode of presentation on empathy in light of the left and right styles of L&T

There was a clear and positive relationship between the right style and the visual mode of presentation, which resulted in high empathy (see Table 5.40, p.164). However, the right style with the mismatched mode (verbal) and the left style with the matched (verbal) and/or the mismatched (visual) mode of presentation indicated medium empathy.

This section will disclose and explain the relationship between the children's left and right styles of L&T and the verbal and visual modes of presentation on their empathy with the story.

The right style children performed similarly in engagement and empathy. These children when presented with the matching mode of presentation to their styles of L&T (visual mode) tended to show a high degree of empathy.

Right style + Visual presentation ⟶ High Empathy

However, the right style children when presented with the verbal mode mostly achieved a medium level of empathy.

Right style +Verbal presentation ⟶ Medium Empathy

In contrast, the left style children from both groups when presented with the matching presentation (verbal) or the mismatching presentation (visual) in both cases mostly achieved a medium level of empathy with the story.

Left style + Verbal presentation → Medium Empathy

Left style + Visual presentation → Medium Empathy

From the above findings, it seems that the visual mode of presentation has a strong impact on the engagement and empathy of the right style children, as it might attract them more to the story, and stimulated their engagement and empathy with the story more than the verbal mode. In contrast, the left style children seemed to have a neutral or medium empathy with the story, no matter what mode they were presented with, while they were highly engaged with the story despite the mode of presentation. Consequently, the visual mode seemed very important to the children's learning, either in respect of their styles of L&T, or their new culture of learning according to the influence of the visual media, or any other reason. Moreover, their individual differences, such as age and/or mental development might have played a role in their ability to learn, to engage, to empathise, and/or solve the problem creatively; these individual differences have not been explored in this research. These findings are in line with the arguments of Lapp, Bender, Ellenwood and John (1975), Garrett-Petts (2000), and Safran (2001) in respect of the importance of matching between children's styles of L&T and the mode of presentation for the children with the right style, as they emphasised that the presentation of knowledge to children should match their learning styles (Chapter 2 p. 39). Nevertheless, their findings were partially in line with the findings of this research about left style children, since these children showed high engagement with the story regardless of the mode of presentation, and medium in empathy with the two modes of presentation (verbal and visual). This may be for the reasons I have mentioned in Chapter 5 (p.165). In fact, Levin (1976) argued that children seem to learn better when they are presented with visual material (i.e. pictures) than when they are presented with verbal materials (words); additionally, he argued that cognitive development is unequal in children and this might impact their learning ability. Levin's opinion could be applied to the findings of this research, and would explain the children's performance in some aspects of this research, since the majority of the children had an undetermined style of L&T (mixed style), and they were unable to choose their preferred mode of presentation. Grainger (2004, p. 33), on the other hand, argued that culture or environment has an impact on children's

preferred mode, and although it can be said that the children in this research came from a verbal culture (Arabic culture), from the findings in this research, the influence of visual media has more impact on their preferred mode of presentation. Another mode of presentation that could have an impact on the children is the kinaesthetic mode of presentation (for instance, virtual reality presentation, where the child can move and manipulate the circumstances in the story), which was outside the scope of this study, as the children in this research were receptive only.

The above discussion is related to the first research question from the findings in the analysis chapter (Chapter 5).

The next section will provide and discuss the answer to the second research question.

6.2.2 Does the mode of presentation (visual/verbal) contribute in stimulating the children's creative imagination? If yes, then which mode is more effective, and why?

This research has shown no clear-cut answer to this question.

The answer could be yes, to some extent. As the mode of presentation contributed in stimulating the children's creative imagination, however, the relationship between the stimulated creative imagination and the mode of presentation was vague, since there was no appreciable pattern to this relationship.

To find the answer to this question, I compared the children's performances in both groups in light of the impact of the visual mode of presentation and the verbal mode of presentation. The findings were as follows.

In general, first, creative abilities were low among all subjects; this issue was discussed in the previous chapter. Second, there were no very obvious differences between the two groups. However, by considering those minor differences, bearing in mind the small number of children in each group, there were some interesting features to be noted:

- The visual mode of presentation in general seemed to stimulate the children's fluency more than the verbal mode, since the children with all styles of L&T in the WG had a higher level of fluency, in comparison with the children in the LG.

Visual mode + all styles stimulation → **high fluency**

- The visual mode of presentation also seemed to stimulate flexibility in the right and left styles of L&T.

Visual mode + R+L styles stimulation → **high flexibility**

- The visual mode of presentation stimulated the originality of the left style children only.

Visual mode + Left style stimulation → **high originality**

On the other hand:

- The verbal mode of presentation had no impact on fluency at all, since the connection between them was very weak.

Verbal mode + any style no stimulation → **low fluency**

The verbal mode of presentation seemed to stimulate flexibility in the mixed and integrated styles of L&T. This is an interesting result, as in flexibility only, the styles of L&T split into two sets in respect of their sensitivity to the mode of presentation, as is clear below, and above in the visual style (affected both left and right).

Verbal mode + (mix+integ) styles stimulation → **high flexibility**

- The verbal mode of presentation stimulated the originality of all styles except the left style.

Verbal mode + (R+mix+integ) styles stimulation→ **high originality**

These were the findings in general, which means it is difficult to find a specific answer to this question. As is seen above, each mode of presentation stimulated the three investigated aspects of creativity, and accordingly it could be argued that both modes of presentation contributed in stimulating creative imagination for some children, and did not affect others. On the other hand, it seemed that the verbal mode managed to stimulate the originality of a larger number of the children than the visual mode did. In contrast, the verbal mode was not effective at all on fluency.

However, if we concentrate on the contribution of the mode of presentation on the right and the left styles only, as they match the two modes of presentation, we find a

impact of the visual mode in stimulating the creative imagination. Hence, the visual mode managed to stimulate the fluency of both styles, the flexibility of both styles, and the originality of the left style only. It would be easy to say that the visual mode was more effective, if it stimulated the originality of the children with the right style, and to argue that this is because of the effect of the new culture of the visual media. Nevertheless, this was not the case. Then, the verbal mode has to be there in order to stimulate the right style children. That is why the presence of both modes together is important, in order to provide children with a clear presentation of knowledge in order to help them understand what we try to teach them, or what we want them to learn, on the level of individual learning or by their teachers or educators. This conclusion is confirmed by Day (2000), Garrett-Petts (2000), Safran (2001) and Levin (1976) (See Chapter 2).

The reader might wonder here, if this had already been proved, then what the novelty of this research in this respect is. The novelty in this research is the exploration of the role of the mode of presentation in stimulating ordinary children's creative imagination, and explaining the individual impact of each mode of presentation on children's creative imagination in relation to their styles of L&T.

The above section discussed the role or impact of the mode of presentation in stimulating the creative imagination, and found that the visual and verbal modes have to be combined together while presenting children with knowledge, in order to stimulate their imagination, if we wish to present knowledge to a wider range of children with unspecified styles of L&T. However, if we desire to stimulate the originality of children who do have a specific style of L&T, for instance left style, then we should perhaps present them with the opposite or mismatched mode of presentation (the visual), and vice versa for children with the right style, we should present them with the verbal mode to stimulate their creativity.

Nonetheless, usually the classroom contains children with a variety of styles of L&T; therefore we should present them with the combination of modes of presentation, visual and verbal (and if it is possible another mode – touchable – where the children can touch and deal with things to learn better and stimulate their creative imagination, for kinaesthetic pupils – outside the scope of this research).

Nevertheless, if children learn separately according to their styles of L&T, in this case we can provide them with the opposite mode of presentation to stimulate their creative

imagination. However, as a fact, even if the human depends on one side or hemisphere of the brain, s/he still uses and needs the cognitive functions of the other hemisphere. For instance, if one is good at imagining things (right side) s/he still needs language (left side) in order to express and to describe the pictures of those things in his imagination. This is because the centre of language (speaking, reading and writing) is located in the left hemisphere of the brain, whilst the imagination is located in the right hemisphere of the brain. Consequently, I could argue according to the findings of this current research that it is more appropriate to provide and present knowledge with both modes of presentation, and by providing children with certain activities we can stimulate and train the cognitive functions in the hemisphere of the brain. For instance, if we would like to train the right hemisphere and stimulate the creative imagination in children with the left style, we could expose the children to certain activities that stimulated their imagination in the right part of their brain, such as the imaginative story in this research.

The next section will discuss the answer to the third question of this research.

6.2.3 Do the children's responses imply any relationship between their styles of learning and thinking and the mode of presentation?

There was no definitive, conclusive answer to this question, and the finding is interesting. The result in general did not imply any relationship between the styles of L&T and the mode of presentation, as the majority of the children were mixed style, which is unknown or unspecified style. Therefore, those children were not classified as visual or verbal.

However, when the left style (verbal) and the right style children (visual) were eliminated from the total subjects, I discovered that there was concrete evidence of the existence of that relationship. This relationship is embodied in the explanation of the answer to the above question 2.

As mentioned previously, if we look at the result in general, there was no relationship or connection between the mode of presentation and the styles of L&T. In addition, even when I made my investigation more detailed and specified in the right and left styles only, by choosing randomly some cases of left and right styles from each group (see Table 5.40, p. 164), I found the following results, which I present tentatively, since the numbers of children in each group were very small.

• In the WG, the left style children progressed better (medium) than the right style (low) children on **fluency** with visual presentation.

Left style + visual mode → Medium Fluency

Right Style + visual mode → Low Fluency

• On flexibility, there was no relationship, since the children's results were mainly low.

Left/ Right Style + Visual Mode → Low Flexibility

Left/ Right Style + Verbal Mode → Low Flexibility

• On originality, there was a low to medium level of originality in both groups, with the two modes of presentation.

Left/ Right + Visual Mode → Medium-Low Originality

Left/ Right + Verbal Mode → Medium-Low Originality

Therefore, the children's responses did not imply any clear or certain pattern of relationship between their styles of L&T and the mode of presentation, and the answer to this question is still a curiosity.

However, the styles matched with mode of presentation (left style + verbal mode, and right style + visual mode) implied a strong and positive relationship between the children's styles of L&T and the mode of presentation, in their engagement and empathy with the story.

2. Conclusion

The relationship between the research findings and the children's learning

Figure 6.1 summarises the relationships found between the engagement and the mode of presentation that might have an impact on the children's performance in a learning situation (e.g. the children's understanding to the story's episodes):

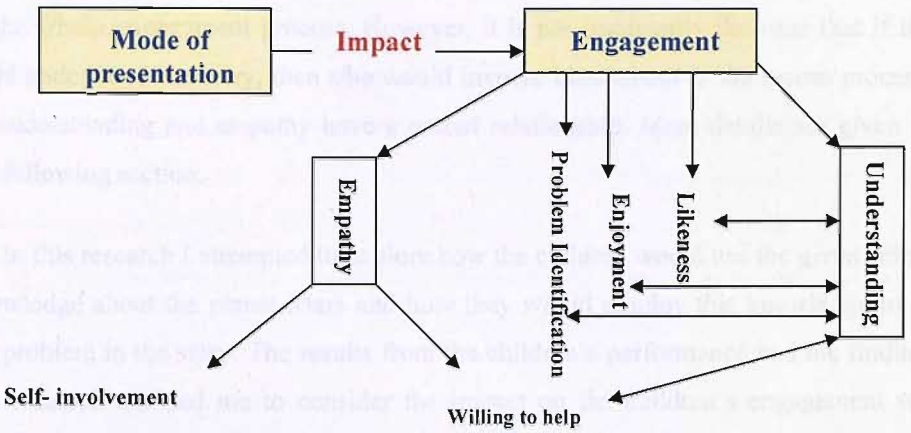


Figure 6.1: The relationship between modes of presentation and engagement

However this diagram represents a tentative relationship –according to the data and the results of this current research-and testing this model in future research would be useful.

The above diagram shows:

1. The aspects of engagement, which are understanding the story episodes, liking, enjoyment, problem identification and empathy. Empathy itself has two parts: willingness to help and self-involvement in the helping or rescue process.

2. The main aspects of engagement are a comprehensive understanding of the story episodes and empathy with the story.

3. The impact of the mode of presentation on engagement with all its aspects (matching with the style of L&T).

The above model could be tested further. It might explain how the mode of presentation impacts engagement (this relationship has been explained above in detail). This shows that high engagement means that the child understood the story's episodes, liked and enjoyed the story, identified its problem, then empathised with it and offered his/her help, and if the child empathised highly then s/he involved him/herself in the rescue process as mentioned in Chapter 5. On the other hand, this diagram shows the relationship among the aspects of engagement, as if the child understood the story, then according to the findings s/he would like and enjoy the story, be encouraged to identify with it, and show willingness to help. Likewise, if s/he sensed all these aspects it means s/he understood the story episodes, which would

reflect high engagement with it. Therefore, understanding the story is the main issue in the whole engagement process. However, it is not necessarily the case that if the child understood the story, then s/he would involve him/herself in the rescue process, so understanding and empathy have a partial relationship. More details are given in the following section.

In this research I attempted to explore how the children would use the given scientific knowledge about the planet Mars and how they would employ this knowledge to solve the problem in the story. The results from the children's performance and the findings of this research enabled me to consider the impact on the children's engagement with a learning situation (i.e. the story in this research).

The children's responses in this research confirmed that the children came with a set of knowledge, experience and understanding that was already organised in their minds, in whatever order (Driver, Guesne and Tiberghien, 1989; Grainger, 2004) see ch 2, p. (42-44). Mindham (2005) argues that if children bring with them their experiences, knowledge and understanding, then the ways in which they lean and employ their imagination will also differ. The findings of this research confirmed Mindham's argument, since the children provided a variety of responses according to their different abilities in dealing with the new knowledge, and how to fit it with the old. For example, they employed their previous knowledge about photosynthesis in solving the problem in the story (see p.121-122- for some examples of the children's responses). The findings of this research also confirmed the importance of presenting knowledge to children through the mode of presentation that matches their styles of L&T (Lapp, Bender, Ellenwood and John, 1975) in order to engage them with a learning situation.

On the other hand, the findings of this research clarified and added some new expositions to theories of child learning. In one sense, this research explains the factors of which children understood the story (which could be any other knowledge), until they reached the phase of engagement (see the above Figure 6.1), in which the children were stimulated and ready to provoke their minds and respond with unusual imaginative responses to the problem in the story. These stages were:

- Liking and/or enjoyment of the story. These were, along with the mystery of the story, and feeling for the problem, in the first place the factors that attracted the

children to understand the story and identify the problem in it, and to show their empathy. Each one of the above factors was in a reversible relationship with understanding (as explained above below the diagram). In other words, understanding the story episodes made the children like and enjoy the story, sense the problem and identify it, and also will to help, which indicates that there appear correlations between engagement and understanding but it is not clear which is causes which.

- All the above factors and the children's empathy (which is the willingness to help and self-involvement in the rescue process) formulated their engagement with the story.
- The degree of engagement seemed to be affected by the mode of presentation. This indicates the important role the mode of presentation played in the children's understanding, enjoyment and liking of the story, and in sensing and identifying the problem, as well as its role in capturing the children's empathy with the story, and then their full engagement with the story. This engagement resulted from the children seeming to have absorbed in their minds the knowledge they had learned from the given lesson before watching or listening to the story and from the displayed episodes and features of the story itself. Then, they added the new knowledge to the old knowledge they had learned or experienced before. Then they reorganised all the knowledge in their minds. Finally, they utilised all the knowledge they had to solve the problem.

Furthermore, the research findings also reveal the importance of making the children like, enjoy, and feel the importance of the presented knowledge, so they would make an effort to understand it and deal with it in an active manner, as active learners, since the learning process is an interactive process between children and teacher within a specific learning environment (Hood, 1995). Moreover, by facilitating the children's engagement by presenting knowledge to them with a suitable form or mode of presentation, we can help children to understand and engage better with knowledge. Afterwards, by presenting them with the mismatched mode of presentation, we possibly stimulate their imagination and their originality.

The following Figure 6.2 explains this relationship between the mode of presentation and engagement and the mode of presentation and originality (creativity):

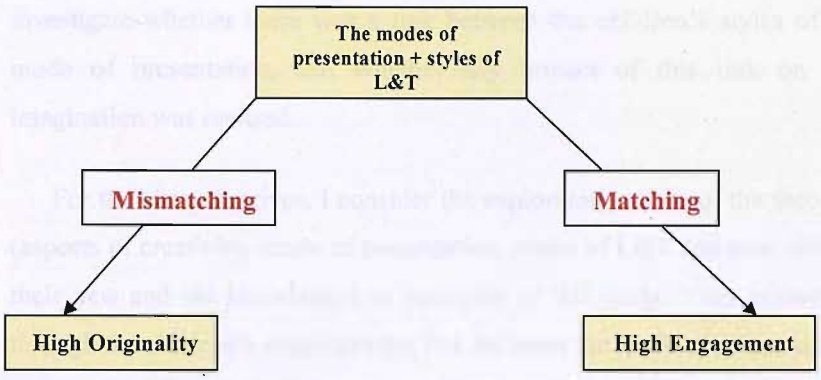


Figure 6.2: The matching/mismatching relationship between the MOP and the styles of L&T with the engagement and originality

The above Figure 6.2 explains the relationship between the mode of presentation, styles of L&T, engagement and originality. If the mode of presentation and the style of L&T match (e.g. right style and visual mode or left style and verbal mode), the children will become highly engaged with the learning situation (the story in this research). In contrast, if the mode of presentation mismatches the style of L&T (visual mode with the left style or verbal mode with the right style) the children's imagination probably will be provoked and they could provide original responses (in this research it was original solutions to the problem of the story).

6.3 Strengths and limitations of the study

I drew upon and represented theories and conclusions from different research and studies, to understand the multiplicity and variety of perspectives on children's engagement with a learning situation, children's literatures, children's creativity, and children's styles of L&T, in order to provide a multi-disciplinary exploration. This allowed me to improve my understanding of these issues and plan the aspects of my research in a way that enabled me to explore clearly the features of the research. I attempted to explore, using different methods, the imaginative story as a suitable stimulus or a convenient medium to stimulate the children's creative imagination. In addition, I attempted to explore how to help the children to learn effectively, through investigating the impact of the two modes of presentation in presenting knowledge to the children, and finally I explored the effect of the styles of L&T on the children's

engagement with learning situation and their creative imagination. Then, I tried to investigate whether there was a link between the children's styles of L&T and the mode of presentation, and whether any impact of this link on their creative imagination was realised.

For the above motives, I consider the exploratory nature of the theoretical framework (aspects of creativity, mode of presentation, styles of L&T and how children learn and fit their new and old knowledge) as strengths of this study. They allowed me to discover through the children's responses the link between the mode of presentation, the children's styles of L&T and their impact on their creative imagination, without imposing pre-determined categories and fixed definitions.

The methodology I chose was appropriate for the in-depth exploration of the children's engagement and creative imagination, because of the nature of the data collection, which was from the children's written responses and interviews, and the comparative design between these aspects.

I endeavoured to explore the impact of the mode of presentation and the children's styles of L&T and the imaginative story on the children's creative imagination equally and independently, and then tried to discover if there was any association between these aspects.

I believe that this approach constitutes another strength of the present study. Placing the data on the children's performance (from the questionnaire and their responses to the story) and their styles of L&T at the central part of the analysis and seeking possible interrelations on creative imagination, and then reversing this, provided a strong framework for exploring the link between the mode of presentation and the children's styles of L&T, and its impact on the creative imagination of the children.

Furthermore, the variety of quantitative and qualitative methods I employed for investigating both the children's engagement with the story and their creative imagination, provided substantial and multi-perspective data that enabled me to construct a rich perspective and a wide clear picture of the children's creative imagination, the best learning method for creative education, modes of presentation and styles of L&T among the children of the study.

A significant consideration in this research is whether the assessment of children's styles of L&T is valid and reliable. The assessment has been based on one instrument (see appendix 6). However, the original instrument (in English) has been used in many studies, such as Torrance, Reynolds and Ball (1978) and Jacobs, Marlowe & Stellern (1983) and fully validated in both western and Arabic cultures as an appropriate instrument to assess L&T styles. The instrument is straightforward to score, thus I have confidence that it has been administrated reliably in this research.

It has to be noted as well that the way the concepts of the study were approached and the different methods adopted would never have been possible without the experience of being an "insider", from educational, psychological and cultural perspectives. Knowledge and experience of creativity and styles of L&T enabled me to apply the best method to explore and clarify how the children's styles of L&T and the mode of presentation interacted, and the impact of their interaction on the children's creative imagination. Moreover, knowledge of the specific culture (Islamic Arabic culture) enabled me to discuss and interpret the cultural background of the children's styles of L&T and the devitalising effect of media in their culture on their styles of L&T.

Nevertheless, there were some challenges and limitations in this present research, mainly from a methodological perspective.

6.4 The research challenges and limitations

One challenge was the limitation of time, during the fieldwork and data collection, as these were done only a few weeks before the first term exams and in the revision time for the children. That was one reason for the reluctance of most schools to co-operate and allow me to apply my study tools. Therefore, I was unable to spend more time with the children and be involved in their day-to-day interaction, to observe them in and out the classroom, to gather more information about their activities and their ways of tackling problems, or to learn more about their hobbies and draw a comprehensive detailed picture of each child.

The limitation of time also forced me to reduce the time I planned to spend at each school, and obliged me to deal with only two classes from each of those two schools (small sample of children). Nonetheless, the co-operation of the two schools was amazing in providing me with the information I needed from the children's files, such as their ages; also, they made some alterations to the school's timetable to fit my

schedule. Additionally, spending a week in each school among the teachers and the administration staff allowed me to gather and collect substantial data that enriched my research and enabled me to compare the two groups of children (the WG and the LG).

Also due to time limitations, the children were given a relatively short time to answer the questionnaire and respond to the problem in the story. Ideally, the children should have been given longer to think through the problem, imagine and recall the story's episodes, and think of the pros and cons and different alternatives to solve the problem. That would have helped them to provide more and maybe better quality solutions. However, I was not able to give them longer as I was bounded by the lesson time (45 minutes), 15 minutes of which was used to listen to or watch the story and listen to the instructions. Nonetheless, the children managed to write some interesting responses that enriched the study.

Other challenges were the availability of obtaining some assessments, since it was difficult to obtain some assessments such as the creativity test, and the delay in receiving the Arabic version of the styles of L&T assessment.

A further limitation was the delay in Bahrain's reply to my request to apply my research tools in their schools, after rejection of co-operation from Southampton primary schools. The research was initially about gifted and talented children, and the Kingdom of Bahrain has a developed project for gifted and talented children, but their reply was delayed and then came with a refusal. This compelled me to completely change the methodology to deal with ordinary children in Qatar's primary schools, and I started contacting them. Nevertheless, this did not degrade the importance of this research and its findings, as the application of my study to ordinary children provided me with a useful source of more understanding of how to stimulate the imagination of ordinary children, and allowed me to generalise my findings.

The burglary limitation! A theft happened in my office in which I lost a large amount of my recorded data, such as the children's interviews. I had video-recorded them in their classrooms, while applying the assessments, while watching/listening to the story, and while interviewing them, as a compensation for the limited time I spent with them interacting with them at their schools. I planned to study their attitudes and other issues to understand their styles of L&T and their ways of thinking more, but the video camera was stolen together with the data before I had viewed all the film, as well as the journal in which I had written some of my thoughts, reflections on the fieldwork, and some useful information. Despite this incident, I managed to analyse

the data I had, plus the backup data, the written interviews with the children (as I was writing and video recording at the same time). Even so, the data I had was enough to give me insightful results and enable me to reach interesting phenomenon findings.

The children's written responses gave some information about the limitations of their thinking and the expression of their thoughts, because of their young age, their limited experiences and their individual differences.

The novel idea of the open-ended, problem-solving and imaginative story took the children by surprise and challenged them, as they were not used to dealing with such a developed and provoking activity, in which children were obliged to actively participate.

6.5 Contribution of the thesis

This thesis contributes to research on children's creativity (specifically children's imagination) in the area of creativity, in the sense of how to stimulate children's creative imagination. In addition, it contributes to the field of styles of learning and thinking and cognitive styles, in the area of educational cognitive psychology (cognitive functions of the right and the left hemispheres of the human brain) through exploring and outlining the relationship between styles of L&T and children's creativity. It contributes to children's learning through presenting aspects of engagement with the educational situation, and by explaining and presenting the impact of the mode of presentation on children's creative imagination. Finally, it contributes to children's literature, through introducing an imaginative story for children, which can be used for different age groups to explore their creative imagination.

It is focussed on stimulating children's creative imagination in the light of their styles of L&T and the mode of presentation.

On the one hand, it is focussed on designing a stimulus tool and an appropriate context to provide and emphasize a good, suitable, attractive and engaging educational stimulus to the children's creative imagination. On the other hand, it is focussed on the mode of presenting this stimulus (story) in consideration of the children's styles of L&T.

The aim of the thesis was to achieve deeper learning and understanding of how to stimulate children's creative imagination, through exposing children to a tailored imaginative story, and then to study their responses to the problem within the story, in the

light of the basic aspects of creativity (fluency, flexibility, and originality). In other words, the aim was to explore whether presenting the children with such a stimulus (the story) would stimulate at least the basic abilities of creativity. Additionally, the thesis aimed to obtain insightful in-depth understanding of what impacts children's creative imagination. Is it the mode of presentation, their styles of L&T, or both of these? How, and why? The aim here was to enhance children's learning process with effective techniques and/or tools by which the creative imagination of the children could be stimulated and emphasised (these aspects and their impact have been mentioned previously in this chapter).

More directly, the educational stimulating design of the imaginative story aimed to facilitate the exploration and evaluation of the impact of the mode of presentation and the styles of L&T on the children's engagement, and to promote their creative imagination. Furthermore, it promoted the use of evidence and rational reasoning, and enabled me to discover and understand (to some extent due to small sample of children) in depth what could stimulate children's creative imaginative ability, and enabled me to add a step to children's creative learning or creative education. It also enables me to mark a first step in the impact of the mode of presentation and the children's styles of L&T on children's education.

The major phenomenon contribution of this study was discovering the tentative relationship and association between the mode of presentation and the children's styles of L&T on promoting their creative imagination (see sections 6.2.2 and 6.2.3 and Figure 6.2).

Moreover, the second contribution was to identify the impact of this relationship (between MOP and styles of L&T) on the children's engagement with the educational situation, which is the story in this research (see Figure 6.2).

The third contribution was establishing and presenting the potential aspects of engagement (understanding, liking/enjoyment, problem identification, and empathy) and their effect on the children's engagement with learning –or educational situation- and creative imagination, as by managing to engage the children with the educational situation (the story in this research) they were prepared and encouraged to provide their responses, some of which were original and creative. Also, it contributed through explaining the steps of how to present a problem to children in a way that

engages them with it (the story) and encourages them to solve its problem; and this can be applied in any educational situation involving problem solving, and with any children.

The fourth contribution was introducing the relationship between the children's understanding of the story and other elements or aspects of engagement (liking/enjoyment, problem identification and willingness to help).

The final and fascinating contribution of this thesis was to develop an innovative educational tailor-made imaginative story. This story was written by the researcher, and was then implemented on computer in animated form, especially for the purposes of the present research.

6.6 Recommendations for further work

From the detailed exploration of the impact of the mode of presentation and the children's styles of L&T on their creative imagination, I propose the following as important areas for further research:

- One of the findings of the study was that using a matching mode of presentation with children's styles of L&T might assist children to understand and engage with the knowledge of the educational situation (the story). Therefore, it would be valuable if this finding was applied in different educational situations, in various ways, on matching between the mode of presentation and the styles of L&T.
- This study confirmed that it is useful to present children in primary education with an inclusive presentation of knowledge that embodies visual and verbal modes of presentation (Lapp, Bender, Ellenwood and John, 1975; Garrett-Petts, 2000; Safran, 2001). It would be helpful to explore children's responses if another researcher added a sound to the story, or created a similar one with a verbal aid (sound), and then presented the children with it.
- This research could be applied using the same tool (the story) and strategies on gifted and talented children, to explore how such children respond or react to such a tool, and what kind of responses they provide.
- This research had a small number of the children who had right and left styles of L&T, which was why it was difficult to present a definite conclusive answer about the impact of the type of relationship between the MOP and styles of L&T. Therefore, it

would be valuable if another researcher could separate two groups of children (a group of left style children and another group of right style children), and present each group with the matched mode and then the mismatched mode to their styles of L&T, and then explored the impact of doing so.

o This study offered a hint of the impact of the visual mode on children's memory; it would be good if another researcher investigated this issue.

o This study provided a sign of the impact of the visual mode on children's understanding; it would be helpful if another researcher studied this effect on children's understanding in depth.

o This study revealed that there were differences between the responses of the children, who came from different cultures and environments. It would be useful to investigate the effects of the surrounding environment and culture on children's imagination.

o Due to time limitation and my existence in the UK, I was not able to meet the children once more in order to discuss with them and thank them for the solutions they had provided to solve the problem in the story. As well as to reassure them with the safety of the team in the story by considering the children's solutions to solve their problem, or just tell them that the story was imaginative, and they have been given that task in order to stimulate their creative ability. This could be important for some children who might raise some concern or anxiety about the team fate in the end of the story.

o The following suggestions are for the practice of teachers, educators and curriculum planners:

- The findings of this research revealed that it is useful to engage the children and stimulate their empathy, as this helps in promoting their engagement in the educational situation. Therefore, it is helpful to engage children with the lesson by stimulating their empathy if it is possible and if the topic of the lesson so allows.

- This research also discovered that to stimulate the children's creativity (particularly originality), we should provide them with the mode of presentation that mismatches their styles of L&T. Consequently, it could be desirable to separate children into different classes according to their styles of L&T, and then provide them with suitable methods and forms of presentation according to this. This suggestion would be appropriate for children in the higher stages of education and not for

primary education, since this and other research argues that children's styles of L&T remain blurred in the stage of primary education.

- Therefore, in primary education it might be convenient to provide children with activities and a variety of tasks that incorporate both visual and verbal presentations. Moallem (2002) stated in her study that 'we should not teach each student exclusively according to his or her preferences, but rather to strive for a balance of instructional methods'. Furthermore, we should give children the freedom to choose among those activities, assuming that they will select what matches their preferred style of L&T.
- Alternatively, children could be asked to present some tasks, and allowed to decide which method they would like to present with – which could be verbal or visual – also providing assistance or promise of helping them to achieve their goals. This is because from this research I found that children's imaginative capacity is very great, and what stops them is their limited knowledge, experience, maybe their limited physical ability, for their young age, to achieve and realise their thoughts and imagination. However, if there was a supportive teacher who encouraged them, was eager to engage them, provoked them and triggered their imagination with that activity, they will provide fantastic ideas, as this is one method of stimulating their creativity.

Such additional knowledge would shed added light on the findings of this thesis. However, it worth recording here in conclusion that this study marks a first step in the documentation of the phenomenon of children's learning process through their engagement with an educational situation, children's literatures, and mainly children's creative imagination, through the impact of the mode of presentation and the styles of learning and thinking, and furthermore the complex and subtle links between educational psychology and practice. Optimistically, this study may inform current and future parents, educators, and educational practice and policy makers of the need for creative learning for Qatari children, such as those studied in this thesis, in all educational stages.

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Appendix (1)

The Story:

"Mission on mars"

"A team of volunteers consist of, a family of two parents - the father is a scientist, the mother is a medical doctor, and their two children one boy his age is 10 years old, and one girl she is 9 years old, one physicist, one ecologist, one psychologist, and one engineer travelled to mars planet, to explore and experience the life on this planet, and study the atmosphere, the nature of the planet, and the possibility that human may live, and build on this planet.

Preparation for the Journey:

- ***At home:***

Children are very excited they and their mother learn about mars and try to expand their knowledge about it. They read, view some pictures with their mother about outer-space and particularly mars planet, the boy said: 'let us watch the video film dad brought, about mars to learn more about nature and climate on the planet, and explore if there is any kind of life, water, oxygen'. However, children noticed that mars planet has no water, no oxygen, very cold in the evening and very hot during day, and it has plenty of storms, that may happen anytime a day! They became worried asking their mother: 'how are we going to live then', but the mother laughed and said: 'don't worry, all these circumstances has been considered, do you think they will sent us to die there'. Therefore, the children look very excited and anxious; they asked more questions about the way they will play in the space-ship, 'where shall we play in the space-craft? When? What is our role in the trip, the girl asks: 'mum what we shall do to help you and the other when we all in the space-craft?'

** - The mother told them that they have to go to hospital tomorrow morning, to get some blood test, and clinical diagnosis for your heart ,lungs, liver, kidneys, and other main organs in your bodies you have to give samples of urine as well, do some x-rays, before the trip. Children said 'hmmm, ok mum, but we don not like needles though', mum said 'I am afraid you have to in order to go with us, we all going to do so'*

- ***At symposium's location:***

** - next day afternoon, the mother and the children went to meet the father (the Scientist) at his work the "outer-space research centre". Then, they all go together to meet the rest of the team- to attend a symposium runs by some experts from NASA. Where they explain and talk about their experiences in outer-space and answer their enquiries, and mention some difficulties from their experiences, and the way they went over it, and what kind of problems they might face on mars. Such as, the strong storms on the planet, the big differences in temperature between day and night. Furthermore, show them films and pictures and samples from outer-space, and finally, they decided on meeting to discuss the final preparations for the trip and they were all excited and schedule their tasks and equipments they will need to do their jobs in and out the space-craft. One of the scientist looked at children and ask while he is smiling: 'I hope you are ready as well?'. The children nodded their heads and smiled happily.*

- On their way back home, they where talking about the symposium they attended. Children and mother said that they really enjoyed it and learn more about outer space and children said: 'we couldn't wait to travel to the mars planet, and see the earth planet from the space'. The daughter said: "my friends at school asked me if they can join us in this trip, but I said: I am afraid no. you cannot, as we have been selected among children, because our parents are volunteers in this mission'. The father seemed remember something and he said: 'tomorrow you and your mother have to go to measure your space suits'. Children passionately loudly said ' heeeeeeeeey' and clap with their hands. The parents start laughing at them, and everybody was happy.

Travelling to mars:

- ***In base or the station***:

children with rest of the team seemed very enthusiastic, smiling while they are heading towards the space craft, after a while of their entering the space-craft, it launched as we usually watch on television, it started flying very fast with a huge flame came from it, and flow in the sky of earth which seemed light blue as we know (the narrator).

- ***In the space-craft:***

On the way to mars: children were a bit frightened in the beginning, but then they joined the others in eating and drinking, then , they started moving from a place to another in the space-craft. Then they go to their special place to play and read, and write e mails to their friends on earth.

Next day, they heard their mother shouts, they run to her, and she asked them to watch the earth and other planet with them. Everyone from the team was astonished with outer space viewed and pointed at planets, stars, moons, and looking to earth from the outer-space, it looked like blue egg, as most of it covered with water.

- *- Children asked how far they are from the Earth now, especially their house and their schools? 'Can we see the people and other creatures on earth? ' they asked. Then they started taking notes, drawing what they see, and writing their observation. After this exciting time, their mother measured their blood pressure, temperature, pulse, heart beats, examine their respiratory system, and blood samples, and so the rest of the team included herself. Afterward, The scientist (the father) was checking plant samples, that he brought with him from the earth, while, the physicist was taking notes, on the other side, the psychologist was sitting talking to children, and writing his notes and recording their impressions, and discussing with them how to handle their feelings if they miss their friends at school and in the neighbourhood. This is because he will study the impact of this trip on their psychological state specifically, although, other members of team included in his research, but mainly he interested in children. Whereas, the Ecologist and engineer are busy taking pictures and measuring the dimensions.*

- **Landing on mars planet:**

** **Day (1):**

All team remain in the space-craft.

* *- Children where very happy and excited looking from windows, and seeing the pink sky of mars, and the red land that they heard about them and saw them in pictures and films. Then they started asking about things they have learned about mars while they were on the earth, like the ice polar on mars, and storms. After few minutes a storm started, and they were observing, they were afraid and opened their eyes and moths widely, but their parents calmed them down, and told them that this space-craft is made against this storms, so don't worry nothing will happen to us. In*

the evening, they felt tired, they have their meals, and went to sleep, whereas, the rest of team is busy working and preparing for the next day, when they are going to leave the craft, and start exploring the planet, and establishing their experiments and investigations about the possibility of life on Mars.

***** Day (2):***

** - Today everyone is going to leave the space-craft, to begin their jobs on the planet; except the mother and the children, they have to stay in the craft today as well. While others do different tasks on the planet, such as, collecting some samples from the soil, measuring the gravity, measuring level of carbon dioxide, exploring the possibility of finding out a source of water on the planet, the light on the planet, the temperature, and etc.*

** - In the afternoon, they all back to obtain some rest and food.*

** - In the evening children play together, write their observations in their notebook. Afterwhile, 'it is time to go to bed' mother said.*

** - Children go to their beds, and their mother starts read them a story before sleep.*

***** Day (3):***

** - In the morning, all together having breakfast meal, and talking about what they are going to do today.*

** - Children are excited because they are allowed to leave the space-craft today after they finish their study and homework.*

** - Children and their mother are wearing especial suits the girl wears a pink suit and the boy wears a blue suit, and the mother is wearing red suit, and ready to leave the craft for the first time, and expose to real atmosphere on the plant. They rode a buggy with their mother to wonder on the planet, they look very happy and asking a lot of questions about the planet, and try to explore as much as they can, take photos with rest of the team.*

** - Once children came back they rush to write e- mails to their friend, telling them about their experience on the planet today, and write their observation and memories in their notebooks.*

- ***After four months:***

In the evening after children went to sleep.

Adults are discussing very big problems they are facing:

They are running out of water, food, and oxygen, according to a fault in the space-craft system. Moreover, they can not go back to earth according to this fault in the system of the craft. They contacted the base on the earth already to help them mending and correcting that fault which the engineer couldn't fix it, however it seemed that will not be easy to do that, and they have to send them another space ship with more facilities, equipment, food, water, and spare parts to this craft. On the other hand, they haven't finished their tasks and jobs they came for. They have to solve this problem before two month, because the facilities they have got will last for only two months, and the aid from earth couldn't reach them before four months at least!!!. The team is really disparate and people in base on the Earth are panic trying to resolve this problem, and save the team's lives, they are many studying alternatives. Back to the team in space ship they attempt to find a solution for this fatal problem. While they are discussing different solutions and alternatives, the boy was dreaming a bad dream, suddenly, he screamed. The mother ran to him to see what was wrong? She stayed beside him for a while until he calmed down, then she left him, back to continue the discussion with rest of the team. The boy couldn't sleep quickly, and he noticed that all adults are a wake and talk. He couldn't resist his curiosity to listen to what they talk about. He realised what they are talking about, and noticed on their monitor some signs and pictures showes that food, oxygen and water are running out. He scared and got panic. He decided to wake up his sister to tell her, and they both think of solution to help themselves, their parents, and the rest of the team to survive and protect their lives.

The sister- became afraid and started cry and said: 'are we going to die, very soon?, I miss my grand's and my friends, I want to go back to our home and play with my friends, I don't want to die here'. The boy-her brother- tried to calm her down, and told her: 'we don't have time to cry, we have to think practically and quickly to help our team to solve this problem, and rescue our lives'. The boy and the girl sat on their beds to think and discuss how to resolve this crucial problem. Each of them takes a paper and a pen and tries to put as much as they can think of solutions to help, and discuss it together. They decided to send e-mail for all children on the earth as well, to ask them to think with them in order to help them finding solutions for this problems, and safe their lives. In addition, they provide some information about Mars planet atmosphere and explain how it is difficult to any human being to live there

without water, food, oxygen, and special clothes to resist the outer atmosphere on that beautiful planet. In addition, they told children on the earth about how wonderful to be on mars, and if they find solutions for their problems, it may be easy for other children to visit the planet in the future, with more flexible facilities to live there. Moreover, they might help solving a lot of problems on earth, and treat many of severe diseases among human being on the earth if they succeeded this mission."

Then a general question would be applied to all the subject, as a child on the earth planet, can you help them, and find the solutions for those problems they will be facing in two months time, and protect their lives?

The problems they will face are as follows:

1- they are running out of water.

2- they are running out of oxygen.

3- they are running out of food.

4- They have only two months left, but the earliest rescue craft will arrive in four months time?

Appendix (2)

Facts about planet Mars

- Mars is the fourth planet from the sun.
- Mars orbits the sun once every 687 days.
- Day length on Mars = 24 hours 37 minutes.
- Mars has mountains, deserts, canyons, volcanoes and polar caps of frozen carbon dioxide.
- Surface temperatures range from 20c to -140c (very cold)- The difference in temperatures between day and night is very big on Mars
- Mars has two moons. (Earth has one moon). (and above from: Johnsy and et al, 2000)
- Storms may happen at anytime
- Mars's gravity is one third (1/3) of Earth's gravity
- Mars has traces of primitive life, and some valleys used to be full of water
- Mars now has no water
- Mars has no enough oxygen for human
- Mars has no plants

Appendix (3)

Narrative Assessment 1: (Listening Group-verbal mode)

School:.....

Class:.....

Date:.....

Name:.....

1- After you listened to the story, do you remember the following:

1- How many children were there?

2- What did the children do before they went to Mars?

3- What did the children do when they arrived in Mars?

4- What did the grown-ups do when they arrived in Mars?

2- Write down what do you know about:

What do humans need to live?

What do you think was the problem they faced on Mars?

3- Select one answer, then put ( ) in the circle after each answer:

	Agree	**Not sure**	**Disagree**
1. The story was interesting.	◯	◯	◯
2. I like the story.	◯	◯	◯
3. The story was easy to understand	◯	◯	◯
4. I want to help the children to solve their problem	◯	◯	◯
5. I did not like the story	◯	◯	◯

6. I liked to hear more stories like this. ○ ○ ○

7. I would rather listen to the story than watching it. ○ ○ ○

8. I would rather watch the story than listening to it. ○ ○ ○

3- How will you help the children to solve the problem and survive? <u>Write down solutions as much as you can.</u>

Appendix (4)

Narrative Assessment 2: (Watching Group- visual mode)

School:.....

Class:.....

Date:.....

Name:.....

1- After you watched the story, do you remember the following:

2- How many children were there?

3- What did the children do before they went to Mars?

4- What did the children do when they arrived in Mars?

5- What did the grown-ups do when they arrived in Mars?

2- Write down what do you know about:

What do humans need to live?

What do you think was the problem they faced on Mars?

3- Select one answer, then put ( ) in the circle after each answer:

	Agree	Not sure	Disagree
8. The story was interesting.	◯	◯	◯
9. I like the story.	◯	◯	◯
10. The story was easy to understand	◯	◯	◯
11. I want to help the children to solve their problem	◯	◯	◯
12. I did not like the story	◯	◯	◯

13. I liked to see more stories like this. ○ ○ ○

14. I would rather listen to the story than watching it. ○ ○ ○

15. I would rather watch the story than listening to it. ○ ○ ○

3- How will you help the children to solve the problem and survive? <u>Write down solutions as much as you can.</u>

Appendix (5)

Narrative Assessment 2: (Watching Group- visual mode)

1- What would you like to do in your free or spare time? Have you got any hobbies?

2- What do think of think of the story you have listened to or watched earlier?

3- Can you tell me what the problem was in the story?

4- What did you suggested as a solution to that problem?

5- Why did you suggested that solution(s)?

6- How would you like to explain your ideas is it with writing or with drawing?

7- How would you like to learn science?

8- How would you like your teacher to teach you the science lesson?

9- Usually what do you prefer to listen to or to watch the story?

10- When your teacher gives a lesson do understand it better by listening to her explanation or by seeing coloured picture or watching a movie?

Appendix (6)

Children's Styles of Learning and Thinking Assessment

Done by:

K. Ball

E. Paul Torrance

R. Reynolds (1978)

Translated and Modified (adapted in Arab culture) by:

Dr. Anwar Riad Abdul-Rahim

Dr. Ahmad Abdul-Latif Ebada (1986)

ملحق رقم (٢)

الصورة (ب)

الاسم : ..... تاريخ الميلاد : .....

المدرسة : ..... الصف الدراسي : .....

الجنس : ذكر (....) أنثى (....) الدرجة : ( ) س - ( ) م - ( ) ك

تعليمات :

يفكـــر الأطفال ويتعلمون أشياء كثيرة بطرق عديدة مختلفة ويتناول كل ســـؤال فـــيما يلي ثلاثة طرق مختلفة يستخدمها الأطفال في تفكيرهم وتعلمهم لهـــذه الأشياء اختر واحدة من هذه الطرق الثلاثة التي تعبر بدقة عن طريقتك فـــي التفكير والتعلم ، وذلك بوضع علامة (✓) بين القوسين أمام الحرف الدال على الطريقة التي تناسبك في التفكير فيما يلي :

١- ( ) أ - أنا شاطر في تذكر الوجوه .

( ) ب- أنا شاطر في تذكر الأسماء.

( ) ج- شطارتي في تذكر الأسماء مثل شطارتي في تذكر الوجوه .

٢- ( ) أ - أجيب بطريقة جيدة على الأسئلة المقدمة إليّ شفهياً أو تحريرياً

( ) ب- أجيب بطريقة جيدة على الأسئلة عندما يعطيني شخص ما مثالاً عليها .

( ) ج- أستطيع الإجابة بالطريقتين السابقتين بنفس الدرجة .

٣- ( ) أ - أحب أن يعرف الناس ما أشعر به .

( ) ب- أظهر مشاعري للأصدقاء المقربين فقط .

( ) ج- أحتفظ بمشاعري لنفسي .

٤- ( ) أ - أحب أن أجرب الأشياء التي لم أجربها من قبل .

( ) ب- عندما أجرب شيئاً جديداً أحب أن أفكر جيداً قبل أن أجربه .

( ) ج- حبي لتجريب الأشياء الجديدة مساوي لحبي في تجريب الأشياء التي رأيتها وفكرت فيها من قبل .

٥- ( ) أ - أحب أن أفعل شيئاً واحداً في وقت واحد .

( ) ب- أحب أن أفعل أكثر من شيء في وقت واحد .

( ) ج- مـن الممكن أن أفعل شيئاً واحداً في وقت واحد ، أو أفعل أكثر من شيء في وقت واحد .

٦- ( ) أ - أحب الامتحانات التي تتطلب أسئلتها اختيار أفضل الإجابات من بين عديد من الإجابات المعطاة .

( ) ب- أحب الامتحانات التي تتطلب أسئلتها كتابة معلومات كثيرة من عقلي .

( ) ج- أفضل النوعين السابقين من الامتحانات .

٧- ( ) أ- أستطيع أن أعرف متى يكون الشخص سعيداً أو غير سعيد عندما أراه أو أسمعه وهو يتكلم .

( ) ب- لا أسـتطيع أن أعرف متى يكون الشخص سعيداً أو غير سعيد عندما أراه ، أو أسمعه وهو يتكلم .

( ) ج- أحـياناً أسـتطيع أن أعرف متى يكون الشخص سعيداً أو غير سعيد عندما أراه وأسمعه وهو يتكلم ، وأحياناً لا أستطيع ذلك .

٨- ( ) أ- أجيد التفكير فيما يضحك من قول أو فعل .

( ) ب- لا أجيد التفكير فيما يضحك من قول أو فعل .

( ) ج- أحياناً أجيد التفكير فيما يضحك من قول أو فعل وأحياناً لا أجيد التفكير فيما يضحك من قول أو فعل .

٩- ( ) أ - أحب الحصة الدراسية التي يسمح لي فيها المدرس بحرية الحركة والعمل .

( ) ب- أحب الجلوس في الفصل والإنصات إلى شرح المدرس .

( ) ج- أحب الحركة داخل الفصل كما أحب الجلوس والإنصات إلى الشرح .

١٠- ( ) أ - أحب أن أعرف كل شيء عن أي عمل قبل أن أقوم به .

( ) ب- أستطيع أداء العمل بشكل أفضل إذا كنت أحبه أو تعودت عليه .

( ) ج- قبل أداء أي عمل أحياناً يتوفر لدي معلومات عنه مع حبي له وتعودي عليه .

١١- ( ) أ- أحب المزاح (المرح - الهزار) عندما أقوم بعمل ما .

( ) ب- أحب الهدوء عندما أقوم بعمل ما .

( ) ج- أحياناً أحب المزاح ، وأحياناً أحب الهدوء عندما أقوم بعمل ما .

١٢- ( ) أ- أحب أن أقوم بالألعاب التي اسمع عنها وأراها وليست ما يخبرني الناس عنها .

( ) ب- أحب دائماً أن اوهم نفسي بأنني ألعب مع الآخرين .

( ) ج- أحب كل من (أ - ب) .

١٣- ( ) أ - في معظم الأحيان ، أكون مستعدا لاستخدام أي شيء لأداء عمل ما .

( ) ب- لست دائماً مستعداً لاستخدام أي شيء حولي لأداء عمل ما .

( ) ج- أحب أن استخدم الشيء المناسب لأداء عمل ما .

١٤- ( ) أ - أحب المدرس الذي يخبرني ماذا أتعلم وكيف أتعلمه .

( ) ب- أحـــب المدرس الذي يخبرني ماذا أتعلم ويترك لي حرية اختيار طريقة التعلم .

( ) ج- أستطيع أن أحقق نجاحاً مع كلا النوعين من المدرسين .

١٥- ( ) أ- أستطيع دائماً اختراع أشياء جديدة .

( ) ب- أستطيع أحياناً اختراع أشياء جديدة .

( ) ج- لا أستطيع أبداً اختراع شيء جديد .

١٦- ( ) أ - أفكر أفضل عندما أكون مسترخياً على ظهري .

( ) ب- أفكر أفضل عندما أكون جالساً .

( ) ج- أفكر أفضل عندما أمشي أو أتحرك .

١٧- ( ) أ - أحب تعلم الأشياء التي أستطيع استخدامها بصورة صحيحة .

( ) ب- أحب تعلم الأشياء حتى ولو لم أعرف كيف استخدمها .

( ) ج- أحـــب تعلـــم الأشياء التي أستطيع استخدامها والتي لا أستطيع استخدامها بطريقة صحيحة .

١٨- ( ) أ - عندما لا أعرف إجابة سؤال ما ، أحب أن أخمن الإجابة .

( ) ب- عندما لا أعرف إجابة لسؤال ما ، أقوم أحياناً بتخمين الإجابة .

( ) ج- عـــندما لا أعـــرف إجابـــة سؤال ما ، أفضل ألا أقوم بتخمين الإجابة .

١٩- ( ) أ - أحب أن أخبر الناس بما أشعر به بالضبط .

( ) ب- احب أن أعبر عن مشاعري عن طريق قصيدة أو أغنية .

( ) ج- أحـــياناً أخـــبر الناس بما أشعر به وأحياناً أخرى أعبر عنه في قصيدة أو أغنية .

٢٠- ( ) أ - كثيراً ما أستطيع اشتقاق الأفكار من قصيدة أو من النظرة لصورة ما .

( ) ب- أحياناً أشتق فكرة من قصيدة أو من صورة .

( ) ج- نادراً ما اشتق فكرة من قصيدة أو من صورة .

٢١- ( ) أ - أحب أن أجيب عن الأسئلة السهلة .

( ) ب- أحب أن أجيب عن الأسئلة الصعبة .

( ) ج- أحب أن أجيب عن الأسئلة السهلة والصعبة .

٢٢- ( ) أ - أحب أن أتبع الشخص الذي يثيرني بغموضه .

( ) ب- أحب اتباع الشخص الذي أستطيع فهمه (مفهوماً لي) .

( ) ج- أحب اتباع كلا من الشخصين .

٢٣- ( ) أ - أحب أن أتناول مشكلة واحدة في وقت واحد .

( ) ب- أحب أن أتناول مشاكل عديدة في وقت واحد .

( ) ج- أستطيع أن أتناول مشكلة واحدة أو أكثر في وقت واحد .

٢٤- ( ) أ - أحب أن أتعلم الأشياء التي ثبت صحتها من قبل .

( ) ب- أحب أن أتعلم ما يعتقده الناس أنه سيحدث يوماً ما .

( ) ج- أحب أن أتعلم كلا من أ ، ب .

٢٥- ( ) أ - أحب أن استخلص معنى من أي شيء أقرأه .

( ) ب- أحب أن استخدم الأشياء التي أقرأ عنها .

( ) ج- أحب أن استخلص معنى من أي شيء أقرأه ، كما أحب أن استخدم الأشياء التي أقرأ عنها .

٢٦- ( ) أ- أحب أن استعمل الطريقة التي تناسبني في حل المشكلات .

( ) ب- أحل أي مشكلة باختراع أنسب شيء لها .

( ) ج- أحب استعمال كلتا الطريقتين .

٢٧- ( ) أ- أحب حل المشكلات باستخدام طرق جديدة .

( ) ب- أحب حل المشكلات باستخدام طرق تعلمتها من قبل .

( ) ج- لا أهتم بالطريقة التي أحل بها المشكلة .

٢٨- ( ) أ - احـــب أن أجيب عن الأسئلة عن طريق الاختيار الحذر لأفضل الإجابات .

( ) ب- أحب أن أجيب عن الأسئلة بالتخمين .

( ) ج- أحب أن أجيب عن الأسئلة بالطريقتين السابقتين .

٢٩- ( ) أ - أستطيع أن أعبر عن نفسي بوضوح بالكلام .

( ) ب- أستطيع أن أعبر عن نفسي بوضوح باستخدام الحركات واليدين أثناء الكلام .

( ) ج- أستطيع أن أعبر عن نفسي بأي الطريقتين السابقتين .

٣٠- ( ) أ - أستطيع أن أتعلم أفضل عندما يشرح لي المدرس شفهياً .

( ) ب- أســـتطيع أن أتعلـــم أفضل عندما يستخدم المدرس الصور في الشرح .

( ) ج- أستطيع التعلم بكلتا الطريقتين .

٣١- ( ) أ - أتذكر جيداً عندما يشرح لي المدرس الدرس .

( ) ب- أتذكر الإجابات بطريقة أفضل عندما أتصورها في عقلي .

( ) ج- أتذكر الأشياء بأي من الطريقتين السابقتين .

٣٢- ( ) أ - أحب أن أفكر فيما قمت من أعمال لإيضاحها .

( ) ب- أحـــب أن أقوم بطريقتي الخاصة في العمل الذي أقوم به لأول مرة .

( ) ج- لا اهتم بتوضيح طريقتي في أداء الأعمال .

٣٣- ( ) أ- أحب أن أتحدث واكتب عن الأشياء .

( ) ب- أحب أن ارسم وأصنع الأشياء .

( ) ج- أحب أن أعمل الاثنان أ ، ب .

٣٤- ( ) أ- من السهل أن أتوه في الأماكن التي زرتها من قبل .

( ) ب- من السهل أن أعرف طريقي حتى في الأماكن الغريبة .

( ) ج- أحياناً أستطيع أن أعرف طريقي بسهولة وأحياناً أتوه بسهولة .

٣٥- ( ) أ- أحب أن أشرح الأشياء بالعمل .

( ) ب- احب أن أشرح الأشياء بالكلام .

( ) ج- أحب أن أشرح الأشياء بالعمل والكلام .

٣٦- ( ) أ - أحب التواجد في الأماكن الصاخبة والمزدحمة حيث يقوم الناس بأداء أعمال كثيرة في نفس الوقت .

( ) ب- أحب التواجد في الأماكن الهادئة حيث أفكر بهدوء .

( ) ج- أستطيع أداء أعمالي في أي مكان .

٣٧- ( ) أ - أفضل أن أرسم واستمع للموسيقى .

( ) ب- أفضل أن عمل مع أناس آخرين .

( ) ج- أستطيع عمل الاثنين معاً (أ ، ب) .

٣٨- ( ) أ – عندما أكبر أتمنى أن أصبح رجل أعمال أو عالماً .

( ) ب- عندما أكبر أتمنى أن أصبح مدرساً أو وزيراً .

( ) ج- أنا لا أهتم حقيقةً بما سأكون عندما أكبر .

٣٩- ( ) أ – أتعلم فقط ما أقرأه وما يخبرني به الناس .

( ) ب- أتعلم كثيراً من الأشياء والتي لم أتعلمها من الناس .

( ) ج- أحياناً أحب تعلم كل شيء وأحياناً أحب أن أتعلم الأشياء المهمة فقط .

٤٠- ( ) أ – أحب أن استعمل الأشياء التي اسمع أو أقرأ عنها .

( ) ب- أحب أن أفكر في الأشياء التي اسمع وأقرأ عنها قبل استخدمها .

( ) ج- أستطيع أداء عمالي بكلتا الطريقتين .

Translation for the assessment of styles of learning and thinking

By:
Mariam Al-Ali 8/ 2007

1- ( ) a. I am clever at remembering faces.
( ) b. I am clever at remembering names.
( ) c. I am clever in remembering both.

2- ( ) a. I am good in answering verbal or written questions.
( ) b. I am good in answering questions when I am given an example.
( ) c. I am good in answering questions in either ways.

3- ( ) a. I like people to know how I feel.
( ) b. I show my feelings to my close friends only.
( ) c. I keep my feelings to myself.

4- ( ) a. I like to try new things.
( ) b. I like to think very well before I try something new.
( ) c. I like to try new things as much I like to try the things I have seen or thought of before.

5- ( ) a. I like to do one thing at a time.
( ) b. I like to do more than one thing at a time.
( ) c. I can do one thing or more at a time.

6- ( ) a. I prefer exams with multiple-choice questions.
( )b. I prefer exams to have questions that demand writing a lot of knowledge from my brain.
( ) c. I like both types of exams' questions.

7- ( ) a. I am able to know if the person happy or not, when I see or listen to him while he is talking.
( ) b. I am unable to know if the person happy or not, when I see or listen to him while he is talking.
( ) c. Some times I am able and other times I'm un able to know if the person happy or not, when I see or listen to him while he is talking.

8- ( ) a. I can think of funny things to say or to do.
( ) b. I can not think of funny things to say or to do.
( ) c. sometimes I can and other times I can not think of funny things to say or to do.

9- ( ) a. I like the lesson where the teacher allows me to move and do things.
( ) b. I like to sit and listen to the teacher during the lesson.
( ) c. I like either ways.

10- ( ) a. I like to know everything about any thing before I do it.

( ) b. I can do things better if I like them or used to do them.
( ) c. I like to know everything about things I like them or used to do them.

11- ( ) a. I like joking and entertaining when I do something.
( ) b. I like to do things quietly.
( ) c. Sometimes I like joking and entertaining when I do some things and other times I like to do thing in quiet.

12- ( ) a. I like to play with things I can listen to and see it, not what others tell me about it.
( ) b. I like to imagine that I play with others.
( ) c. I like both (a and b).

13- ( ) a. I often like to be ready to use anything to do something.
( ) b. I am not always ready to use anything to do something.
( ) c. I like to use the right thing to do something.

14- ( ) a. I like the teacher who tells me what to learn and how to learn it.
( ) b. I like the teacher who tells me what to learn and give me the freedom to learn it in my own way.
( ) c. I can be success with both types of teachers.

15- ( ) a. I am always able to invent new things.
( ) b. I sometimes be able to invent new things.
( ) c. I am unable to invent new things at all.

16- ( ) a. I think better when I am lay down on my back.
( ) b. I think better when I sit down.
( ) c. I think better when I walk or move.

17- ( ) a. I like to learn things that I can use it correctly.
( ) b. I like to learn things even if I don't know how to use them.
( ) c. I like to learn things that I can or can not use.

18- ( ) a. I like to guess an answer, when I do not know the right answer for a question.
( ) b. Sometimes I guess an answer for a question I do not know its answer.
( ) c. I prefer not to guess an answer, when I don't know the right answer.

19- ( ) a. I like to tell people how do I feel exactly.
( ) b. I like to express my feelings in a poem or a song.
( ) c. Sometimes I tell people how do I feel, and sometimes I express my feeling with a poem or a song.

20- ( ) a. I am often able to derive ideas from of a poem or a picture.
( ) b. Sometimes I can derive an idea from a poem or a picture.
( ) c. I rarely can derive an idea from a poem or a picture.

21- ( ) a. I like to answer easy questions.
( ) b. I like to answer difficult questions.

( ) c. I like to answer easy and difficult questions.

22- ( ) a. I like to be with a mysterious person.
( ) b. I like to be with an understandable person.
( ) c. I like to be with both persons.

23- ( ) a. I like to deal with one problem at a time.
( ) b. I like to deal with many problems at a time.
( ) c. I can deal with one or more problem at a time.

24- ( ) a. I like to learn facts.
( ) b. I like to learn what people think it will happen one day.
( ) c. I like to learn both (a and b).

25- ( ) a. I like to obtain meaning from what I read.
( ) b. I like to use the things I read about it.
( ) c. I like to obtain meaning from what I read, as well as use things I read about.

26- ( ) a. I like to solve problems with a way that suits me.
( ) b. I invent a suitable way to solve any problem.
( ) c. I like to use both ways in solving problems.

27- ( ) a. I like to use new ways to solve problems.
( ) b. I like to use familiar ways –I learned before- to solve problems.
( ) c. I don not care about the way I solve problems with.

28- ( ) a. I like to carefully select the right answers for questions.
( ) b. I like to guess answers.
( ) c. I like to answer with both ways.

29- ( ) a. I can explain myself clearly through talking.
( ) b. I can explain myself clearly by using hand and body movements while I am talking.
( ) c. I can explain myself by either ways.

30- ( ) a. I learn better when teacher explains the lesson verbally.
( ) b. I learn better when teacher uses pictures in explaining a lesson.
( ) c. I can learn with either ways.

31- ( ) a. I remember the lesson better when the teacher explain it.
( ) b. I remember answers better when I imagine them in my mind.
( ) c. I remember things with either ways.

32- ( ) a. I like to think of what I have done to explain it.
( ) b. I like to do things for the first time with my own way.
( ) c. I do not care of explaining my way in doing things.

33- ( ) a. I like to talk and write about things.
( ) b. I like to draw and make things.

( ) c. I like to do both a and b.

34- ( ) a. It is easy to loose my way in places I have visited before.
( ) b. It is easy to find my way even in new places.
( ) c. Sometimes I easily find my way and other times I easily loose my way.

35- ( ) a. I like to explain things by doing them.
( ) b. I like to explain things verbally.
( ) c. I like to explain things by talking and doing things.

36- ( ) a. I like to be in noise and crowd places, where people do many things at the same time.
( ) b. I like to be in quiet places to think quietly.
( ) c. I can do my jobs anywhere.

37- ( ) a. I like to draw and listen to music.
( ) b. I like to work with others.
( ) c. I can do both together (a and b).

38- ( ) a. When I grow up I wish to be a businessman or a scientist.
( ) b. When I grow up I wish to be a teacher or a minister (in the government).
( ) c. In fact I do not care what am I going to be when I grow up.

39- ( ) a. I learn only what I read or what people tell me.
( ) b. I learn a lot of things I have not learned them from people.
( ) c. Sometimes I like to learn everything, and sometimes I like to learn important things only.

40- ( ) a. I like to use things I hear or read about it.
( ) b. I like to think of things I read or heard about before I use it.
( ) c. I can do my work in either ways.

Appendix (7)

School Access Negotiating

Consent letter for school headmistresses after verbal negotiating with them

.....Independent School
Ministry of Education
Doha- State of Qatar

Dear Mrs.

Following our conversation on the phone, I send you my fieldwork plan, and I would like to obtain your kind permission to access your school and meet children of (9-11 years old) age group to apply my research tools, which are concluded in:

1. Observation for 3 days without involvement in their classroom activities at all, and build a rapport with them during these days, which I will observe the way children respond to their teachers questions, the way they prefer to express their answers, and thoughts in 3 subjects: science, art and language.
2. Apply styles of learning and thinking assessment on them. (Time: one lesson)
3. I will teach them a lesson about mars and assess them immediately after the lesson. (Time: one lesson)
4. Present an imaginative story into two modes for two different groups one is verbal (story telling) and the other is visual story watching using the computer to present it. Then after, request children written responses, as story ended up with problem needs children to solve it. (Time: one lesson)
5. Interview with some children, they will be selected randomly. (outside classroom)

- A consent letter is ready to be send to children parents.

Please accept my thanks and appreciation for your help and co-operation in advance, with my best wishes,

Yours sincerely,

Mariam Al-Ali
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PhD student- School of Education
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Appendix (8)

Parents' consent letter

"The actual letter will be written in Arabic language, as the participants are Arabic-speaking children. However, I write here the English version of this letter to be understood what I am to write and explain in the parents consent letter. I shall include the Arabic form in my research as well".

The letter:

/ / 2005.

Dear ..... (Child's name).... Parent,

I write to advise you that I am a Qatari postgraduate student from Southampton University- United Kingdom. I would like to obtain your kind permission to include your child at..(school name)...School in my research participants.

My research is about children (9-11 years old) creative imagination, and my research tools are as follow:

1. General observation: I will attempt to observe children interactions inside and outside their classroom, with their teachers and their peers, I shall observe child's questions and answers in the classroom in Language, Arts and Science lessons, I also attend to observe child's favourite activities at school.
2. Apply Styles of Learning and thinking assessment to uncover the child's style of learning and thinking.
3. Teach children a science lesson about planet Mars, and obtain their answers after this lesson on the lesson assessment.
4. Display an imaginative story about planet Mars, children will listen or watch this story, then answer some question, and try to solve the problem in the story. (One class will listen to the story and the other class will watch the same story).

5. Interview some children, as they will be selected randomly. This means your child might or might not be included in this interview. This interview is mainly to get children's opinion about the story, and clarify closely their styles of learning and thinking.

6. Video and record children in the classroom, in order to study their interaction fully, and catch up with what I miss during the observation in the classroom.

I would like to express my thanks in advance for your understanding and your co-operation with me to completing my research requirements,

Your sincerely,

Mariam Al-Ali
PGR- Southampton University
United Kingdom.

Parent's name:
Signature:
Date:

For any enquiry please feel free to contact me on:
Qatar: 5535579.
E mail: maa2@soton.ac.uk

I agree ☐

I disagree ☐

Appendix (9)

Consent letter for using Dr. A. R. Abdul-Rahim and Dr. Ebada about their styles of learning and thinking assessment

Dr. Anwar Riad,

Dean, Faculty of Education

Minia University

Egypt.

Dear Dr. Anwar,

Following our conversations on the phone, regarding the use of your assessment of Styles of Learning and thinking for Children and your thankful cooperation and permission, I would like to thank you and Dr. A. Ebada for your kind permission to use your above assessment and for sending that assessment to me from Egypt.

Yours sincerely,

Mariam Al- Ali.

PRG- Southampton University.