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WP1 – Context of Use and User Requirements
Deliverable D1.1

State of the art of methods for user analysis and description of context of use

Abstract – This document reports the state of the art of methods for user analysis and a description of the context of use of TERENCE users. It is a report of part of the activities concerning Task 1.1.

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2 Executive summary

This document is prepared in the context of the TERENCE project, and, more specifically, within the framework of its first Work Package, namely WP1: “Context of Use and User Requirements”. Involving users implies knowing them and in general knowing the context of use of the system. Therefore, D1.1 is the first deliverable produced within WP1 and provides the description of the context of use of TERENCE and of the methods used for user analysis.

It is worth recalling that the TERENCE project aims at developing an adaptive learning system for improving the reading skills of poor comprehenders, i.e. 7-11 year old children, hearing and deaf, that have difficulties in relating the meaning of sentences in a text, making inferences and detecting inconsistencies in what they read.

To guide the design and development of the system, we adopt the user-centred design (UCD) methodology, which involves the end-users into the project from the very beginning, and aims at the overall usability of the system.

Understanding and specifying the context of use is a complex and articulated task, especially in the TERENCE project where, for example, we need to understand how children are assessed by psychologists as poor comprehenders, and how designers can classify the TERENCE learners within the TERENCE adaptive learning environment. Therefore, the analysis of the context of use hereby reported is initially conducted through a preparatory study, whose aim is twofold: addressing the cross-disciplinary nature of the project and the consortium, and gathering information concerning the different administrative, legal and ethical issues in the UK and Italy. Then, the analysis of the context of use proceed with two field studies, in the UK and Italy, according to the aforementioned preparatory study.

Our analyses were conducted by using several methods belonging to different research fields. D1.1 also describes them, since the consortium is highly interdisciplinary and not everybody is expert of the methods of the others. Two types of user analysis methods were employed and are hereby presented. The first is concerned with the assessment of reading comprehension of the learners, the second considers the users as the end-users of a software system.

The deliverable ends by focusing on the results that represent the primary output to the other related tasks of the project.

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4 Organisation of the Deliverable and its Rationale

The **TERENCE users** are learners and educators. The **TERENCE learners** are 7-11 year old children, hearing and deaf, that are poor comprehenders, i.e. children that do not have problems in recognising and reading single words, but that have difficulties in relating the meaning of sentences in a text, making inferences and detecting inconsistencies in what they read. The **TERENCE educators** are those that teach reading comprehension to the **TERENCE learners**, and hence they are primarily teachers, then special education needs teachers (in particular, for deaf children), and also parents.

For designing and developing the TERENCE project, we adopt the user centred design methodology. Such a software engineering methodology requires the analysis of the context of use, which is the focus of this deliverable, structured into two main parts:

- **Part I** (“Background”) contains the introduction to the user centred design followed in the TERENCE project (Chapter 5), and the state of the art of the methods for user analysis (Chapter 6);
- **Part II** (“Context of use”) describes the context of use of the TERENCE project, divided into preparatory studies (Chapter 7) and field studies (Chapter 8), as well as their conclusions (Chapter 9).

In Part I, the user-centred design is briefly overviewed and two major classes of user analysis methods are introduced: for the assessment of reading comprehension in hearing and deaf poor comprehenders in Italy and the UK (Section 6.1), and for studying users as the end-users of an information system, such as the adaptive learning system to be developed in the context of TERENCE (Section 6.2).

In Part II, the analysis of the context of use is reported. For analysing the context of use, we initially went through preparatory analyses described in Chapter 7. The need for preparatory studies is due to several reasons, like the cross-disciplinary nature of the project and of the consortium, as well as the differences in the two fields of study, namely, Italy and UK. These studies were useful to describe the organisational environments, as well as to set the goals of the field studies reported in Chapter 8 and to direct and conduct them.

The deliverable ends with conclusions (Chapter 9) structured as the context of use part is. Each section of the conclusions critically and constructively argue on the corresponding part of the context of use, and give inputs for (i) guiding the definition of the TERENCE system user requirements, (ii) helping the development of the conceptual models of the adaptive learning system, and (iii) highlighting the need for pilot studies in real-life instructional contexts as well as for classifying the learning material.

PART I – Background

This part of the deliverable introduces some background material regarding the user-centred design (UCD) methodology (Chapter 5), and concerning the state of the art of the methods for user analysis. We analyse, from the **cognitive point of view**, the state of the art of methods for discovering if a learner is a poor comprehender or not (Section 6.1). From the **interaction point of view**, we report on the UCD methods adopted in the analysis of the context of use, that enable to understand of how learners and educators shall interact with the TERENCE system (Section 6.2). More in details, the state of the art of methods for user analysis is divided as outlined in Table 1.

| | | |
|---|---|---------|
| User Analysis Methods for the assessment of poor comprehension | | 6.1 |
| | Assessment of Reading Comprehension | 6.1.2.1 |
| | Assessment of decoding and word reading | 6.1.2.2 |
| | Assessment of Oral Language Skills | 6.1.2.3 |
| UCD Methods for the Context of Use Analysis of TERENCE | | 6.2 |
| | Participant Journals or Diaries | 6.2.2.1 |
| | Contextual inquiry | 6.2.2.2 |
| | Observation | 6.2.2.3 |

Table 1: Structure of Part I

5 A Short Introduction to The User Centred Design

This chapter introduces the **user centred design** (UCD) methodology followed in the TERENCE project. We explain the general principles of this specific methodology in the design and development of information systems. Their concrete applications within TERENCE are in Part II of D1.1.

In the process of designing and developing the TERENCE system, we follow a UCD methodology. Generally speaking, the UCD places the end user, user organisations and support teams at the centre of the design and evaluation processes. This means that the system's users are involved from the very beginning of the project, and can participate in the design and evaluation of the system. The UCD methodology can thus be defined as "a process focusing on usability throughout the entire development process and further throughout the system life cycle" (Gulliksen et al., 2003).

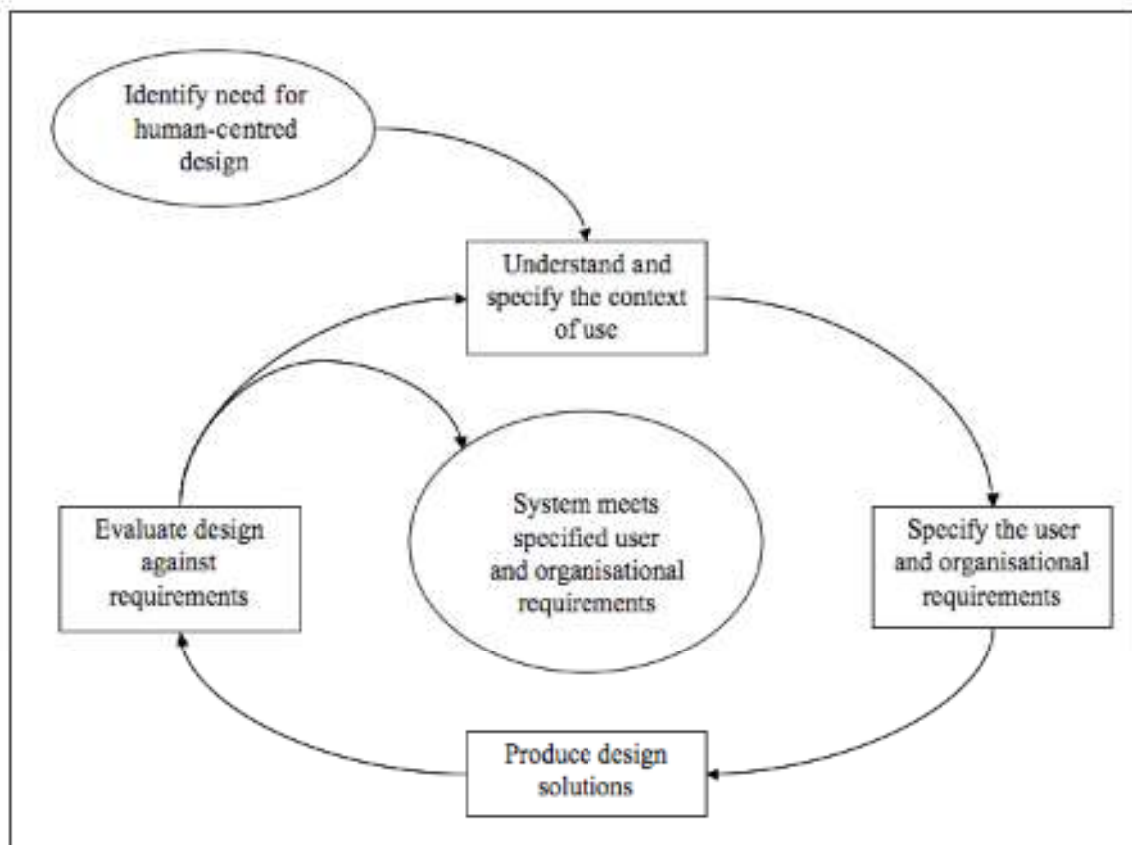


Figure 1. UCD iterative cycle

Several different definitions of usability exist, but all focus on the users, and all stress that the users' perspectives should be incorporated in each critical point of the design process. In particular, Donald Norman describes the UCD as a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable (Norman, 1998). The user-centred design process was also formalised in the ISO standards. In (ISO Consortium, 2010), usability is characterised as the extent to which a product can be used with efficiency, effectiveness and satisfaction by specific users to achieve specific goals in a specific environment. According to this, the UCD is an iterative process, which is repeated until attaining the usability of the system under development.

The iterative design revolves around the following main activities: a) analysing and specifying the context of use; b) specifying the user requirements; c) producing design solutions; d) evaluating designs against requirements. See Figure 1. In particular, the context of use, the focus of D1.1, is defined by analysing and specifying the following intermediate components.

1. The characteristics of the users define the context in which the system is to be used. Relevant characteristics include knowledge, skills, experience, education, training, physical attributes, habits and capabilities.
2. Task description includes the overall goals of the use of the system, as well as the allocation of activities and operational steps between humans and technological resources.
3. The description of the environment includes organisational, physical and socio-cultural characteristics that may influence the usage and acceptance of the system. In most design processes, there is a major activity specifying the functional requirements as well as others for the product or system.

The user requirements are thus derived in relation to the context of use. Once these are specified, the process of iterative design can start, see again Figure 1. The process is based on a continuous interaction with the system users, e.g., by showing the users concrete realisations of design solutions in form of models, mock-ups, or allowing them to simulate real tasks, and using their feedbacks for improving the design.

In this manner, in the UCD, the evaluation takes place at all stages in the system's life cycle; see Figure 1. Early in the analysis of the context of use, it allows one to obtain useful information concerning, for instance, the characteristics of the users and their tasks. Early in the design, the evaluation aims at obtaining feedback, for instance by showing mock-ups of the system, that can guide the design itself. Later, when a realistic prototype is available, the evaluation should aim at measuring whether the user and system goals have been achieved. Since changes are less expensive in the early stages of design and development than in later stages, the evaluation has to be started as soon as the first design proposals are available. Depending on the development stage of the project, the evaluation could be used to select and validate the design options that best fit the user requirements, or to elicit feedback and further requirements from the users, or to diagnose potential usability problems and identify needs for improvement in the system.

6 State of the Art of Methods for User Analysis

In this chapter, first we analyse, from the **cognitive point of view**, the state of the art methods of cognitive psychology for discovering if a learner is a poor comprehender or not, and then, from the **interaction point of view**, we analyse the UCD methods adopted in the analysis of the context of use, that enable to understand how learners and educators shall interact with the TERENCE system.

6.1 User Analysis Methods for the Assessment of Poor Comprehension

Before discussing the methods for assessing poor comprehension, we firstly introduce background information concerning poor comprehension (Subsection 6.1.1). Then we describe the methods for assessing poor comprehension (Subsection 6.1.2). It is worth noting that in the cognitive field, the method for assessing poor comprehension is also named as test or tool.

6.1.1 Introduction

In this subsection we introduce the essential concepts about poor comprehension in school-aged children.

First of all, broadly speaking, **reading comprehension** is the capacity to understand the meaning of a written text. In order to understand the meaning of a written passage, a reader must not only perceive and recognize sequences of letters as words, but must also understand the meaning of these words and the way they are related in sentences to express ideas, and must put the ideas in individual sentences together into a coherent whole to form a representation of the text overall. These processes require memory (such as the capacity to keep in mind the first word of a sentence while reading the last one), attention (the capacity to concentrate on reading), and motivation (the will to concentrate on the reading task). Reading comprehension is thus a complex interaction of language, perception and attention skills, memory and motivation.

A good assessment of reading comprehension skill will reflect the complex nature of this process (Woolley, 2008). No assessment tools or procedures are perfect, but different assessment tools may be more appropriate than others, depending on the specific goals of the educator and/or examiner.

Poor comprehenders are children who struggle with deriving meaning from text. Normally, these readers do not have problems in recognising and reading single words, but they may have difficulties in relating the meaning of sentences in a text, making inferences and detecting inconsistencies in what they read.

In general, the assessment of poor comprehension requires the **assessment of at least four elements or factors**, whose role in affecting text comprehension is broadly recognized (Carretti et al., 2007):

- **The child's reading comprehension ability:** the ability of making meaning of the text while reading. The child's reading comprehension scores show evident and severe problems at this level (e.g. a performance that is one to two standard deviations below the expected for the child's age). A problem in meaning making emerges even when listening (vs. reading) comprehension is assessed.
- **The child's word reading skill:** the ability to automatically recognize printed words on the page. There is an association between speed of word reading and text comprehension. However, to classify a child as a poor comprehender, the child's word reading skills (i.e. the ability to accurately read single words)

must be within normal ranges or relatively appropriate to the child's age. When reading problems can be attributed to poor decoding or poor word recognition skills, the assessment of dyslexia rather than poor comprehension is made.

- **The child's language.** Reading is dependent on language development and children apply their linguistic knowledge to read texts. Text comprehension draws on a broad range of language skills, at a sub-lexical level (such as morphological knowledge), at a lexical level (such as vocabulary knowledge) and at a sentence-level (such as knowledge of grammatical structures). Although poor vocabulary knowledge may be associated with poor comprehension, the child's linguistic knowledge is normally appropriate to her/his age. Poor readers who present a primary severe delay in language development are diagnosed as Language-impaired or Hearing-impaired if the language delay is due to sensory problems.
- **The child's cognitive skills.** Different cognitive factors appear to affect the development of reading skills, such as memory attention. However, poor comprehenders normally show IQ scores within the normal range. When cognitive delays or mental retardation are present, poor comprehension is considered secondary to these causes.

A typical assessment of poor comprehension in hearing children thus considers these four factors. Typically a **hearing** poor comprehender shows a selective difficulty in making meaning of oral and written texts. That is, (s)he lacks (a) but not (b), (c), and (d). Assessment of poor comprehension in **deaf** readers is normally more difficult, because deaf readers may also show problems in (b) and (c). In general however, not much is known yet about poor comprehension in deaf readers.

6.1.2 Description of Methods

Clinical and educational assessment of poor comprehension requires reference to standardized tools and to normative data. Various testing tools exist for this purpose. In the next section, the most frequently used tools will be discussed. Procedures to assess poor comprehension **in Italy and in the UK** are very similar and will therefore be described together.

As already mentioned in the previous section, assessment of poor comprehension is currently not possible for **deaf readers**, due to a lack of standardized instruments and of normative data appropriate for this population (see (Arfé, 2006) and (Arfé, in press)). Assessment of reading comprehension skills and profiles in deaf school-aged children is therefore carried out using the instruments listed below.

The next sections provide an overview of the most commonly used assessment tools, in Italy and the UK, arranged according to the assessment criteria described in the previous section: reading comprehension (Section 6.1.2.1), decoding and word reading (Section 6.1.2.2), and oral language skills (Section 6.1.2.3). Cognitive skills can also be assessed when suspect of cognitive delay or mental retardation is reported by teachers. However, frequently, teachers' judgments are considered sufficient to exclude cognitive impairment.

6.1.2.1 Assessment of Reading Comprehension

In **Italy**, two tests can be used to assess text comprehension skills. They are almost equivalent, but the second reduces the risk of false negatives (i.e. the probability to not detect true cases of poor comprehenders):

- Prove di lettura MT by (Cornoldi & Colpo, 1995).
- Nuova guida alla comprensione del testo. Prove criteriali, by (De Beni et al., 2003).

| | |
|---------------------|---|
| Name | Prove MT di Comprensione |
| Authors | Cornoldi & Colpo |
| Date of publication | 1998; 1995 |
| Description | A battery of reading comprehension tests, consisting of short narratives of graded difficulties. Children are required to read a text appropriate to his/her grade level and answer multiple choice questions assessing comprehension of the text |
| References | (Cornoldi & Colpo, 1995) (Cornoldi & Colpo, 1998) |

| | |
|---------------------|--|
| Name | Nuova guida alla comprensione del testo. Prove criteriali |
| Authors | De Beni et al. |
| Date of publication | 2003 |
| Description | The battery consists of short narratives of graded difficulties. Children are required to read a text appropriate to his/her grade level and answer multiple choice or open-ended questions, assessing different reading comprehension components (inferences, reading monitoring, reading strategies, etc). |
| References | (De Beni et al., 2003) |

In the **UK**, The Neale Analysis of Reading Ability (1989) is used to assess reading comprehension skills:

| | |
|---------------------|--|
| Name | Neale Analysis of Reading Ability - Revised British Edition |
| Authors | Neale, 1989 |
| Date of publication | 1989 |
| Description | The Neale test consists of a series of short self-contained stories, graded in difficulty. Children read each story aloud and any words that are misread or refused by the child are supplied by the tester. After each story they are asked a series of questions about the story. Testing stops after the child has made a prescribed number of word reading errors, i.e. no further stories are attempted once this limit is reached. |
| References | (Neale, 1989) |

The Neale Analysis has recently been superseded by the YARC (Snowling, 2009; YARC, 2011), which has similar characteristics.

| | |
|---------------------|---|
| Name | York Assessment of Reading Comprehension |
| Authors | Snowling, Stothard, Clarke, Bowyer-Crane, Harrington, Truelove & Hulme |
| Date of publication | 2009 |
| Description | The YARC consists of a series of short self-contained stories, graded in difficulty. Children read each story aloud and any words that are misread or refused by the child are supplied by the tester. After each story they are asked a series of questions about the story. |
| References | (Snowling, et al., 2009; YARC, 2011) |

6.1.2.2 Assessment of Decoding and Word Reading

In **Italy**, the (Sartori et al., 2007) standardised battery for the evaluation of dyslexia and dysorthographia is

used to assess decoding and word reading.

| | |
|---------------------|---|
| Name | Batteria per la valutazione della dislessia e disortografia evolutiva |
| Authors | Sartori & Tressoldi |
| Date of publication | 1995; new standardisation 2007 |
| Description | Two subtests of the battery are normally used to exclude word reading and decoding difficulties in Italian children: a) single word reading and b) nonword reading. The first assesses comprises four lists of 28 words graded for frequency and concreteness that children are asked to read aloud as fast and as accurately as possible. The second, designed to assess decoding skills, consists of three list of 16 nonwords that vary for length. The child is told that invented words will be presented to him /her and that his/her task to read the stimuli aloud as fast and as accurately as possible. |
| References | (Sartori et al., 2007) |

In the **UK**, the (MacGinitie et al., 2000) tests are used to assess decoding and word reading.

| | |
|---------------------|--|
| Name | Vocabulary subtest of the Gates-MacGinitie Primary Two Test |
| Authors | MacGinitie & MacGinitie |
| Date of publication | 2000 |
| Description | The test is administered to whole classes, and provides an indication of a child's ability to read and understand isolated words. This test is used to screen out exceptional readers, i.e. those children who perform either very badly or very well. |
| References | (MacGinitie et al., 2000) |

6.1.2.3 Assessment of Oral Language Skills¹

In **Italy**, many tests exist to evaluate language skills in school-aged children. However, those in the following 4 tables are the most commonly used.

| | |
|---------------------|--|
| Name | Peabody Picture Vocabulary Test-Revised |
| Authors | Stella et al. |
| Date of publication | Italian translation and standardization: 2000 |
| Description | The test assesses the child's breadth of receptive vocabulary knowledge. The child is asked to choose from four pictures the one representing the target word. Words are pronounced aloud by the examiner and no further hints are given |
| References | (Stella et al., 2000) |

| | |
|---------------------|---|
| Name | TROG |
| Authors | Bishop- Italian short version by Bisiacchi et al., (2005) |
| Date of publication | Italian standardisation: 2005 |
| Description | The TROG (Bishop, 1982) assesses the child's ability to comprehend syntactic and grammatical structures. The test, designed for English-speaking children, has been translated and adapted to Italian. Normative data on a population from 5 to |

¹ Translation and standardisation of language comprehension tests for Italian Sign Language are not available on the market.

| | |
|------------|---|
| | 11 years are available for a short version, including a selection of the most sensitive items for Italian (18 items). |
| References | (Bisiacchi et al., 2005) |

| | |
|---------------------|---|
| Name | TROG-2 |
| Authors | Bishop- Italian version by Suraniti et al., (2000) |
| Date of publication | Italian standardization: 2009 |
| Description | The TROG-2 (Bishop, 2003) assesses the child's ability to comprehend syntactic and grammatical structures. The test, designed for English-speaking children, has been translated and adapted to Italian. Normative data on a population from 4 to 87 years are available. |
| References | (Suraniti et al., 2009) |

| | |
|---------------------|--|
| Name | TCGB |
| Authors | Chilosi & Cipriani |
| Date of publication | 2005 |
| Description | The test assesses the child's ability to comprehend syntactic and grammatical structures. The test, designed for Italian-speaking children, presents the children 76 sentences (and grammatical structures) of increasing complexity. The child is asked to match each sentence with one of four pictures. |
| References | (Chilosi & Cipriani, 1995). |

The first three tests are translations and adaptations of tests originally developed in English.

In the **UK**, the tests in the following two tables are used to assess oral language skills.

| | |
|---------------------|--|
| Name | British Picture Vocabulary Test |
| Authors | Dunn, L. M., Dunn, L. M., Whetton, C., & Pintillie, D. |
| Date of publication | 1982 |
| Description | The test assesses the child's breadth of receptive vocabulary knowledge. The child is asked to choose from four pictures the one representing the target word. Words are pronounced aloud by the examiner and no further hints are given |
| References | (Dunn et al., 1982). |

| | |
|---------------------|--|
| Name | TROG-2 |
| Authors | Bishop |
| Date of publication | 2003 |
| Description | The TROG-2 assesses the child's ability to comprehend syntactic and grammatical structures. The test, designed for English-speaking children, has been translated and adapted to Italian. Normative data on a population from 4 to 87 years are available. |
| References | (Bishop, 2003). |

6.2 User Analysis Methods for System Interaction

6.2.1 Introduction

As described in Chapter 5, in the process of designing a information system, and more specifically, an adaptive learning system such as TERENCE, the analysis of the context of use is a mandatory first step: therein, the researcher tries to get a clear understanding of the **users**, their activities or **tasks**, and their **environment**.

The methods for user analysis belongs to two criteria, namely: user-based and expert-based. The user-based analyses **directly** involve the end users, while the expert-based analyses take advantage of the contribution of domain experts for **indirectly** obtaining information about them.

The general schema for the the user-based analyses consists of the:

- **Experiment Design**, that is, the definition and description of goals, models, and metrics;
- **User Description**, that is, the description of the involved users;
- **User Teaching**, that is, exhaustive explanation for people involved in the analysis about the modus operandi in the experiment sessions;
- **Experiment Execution**, that is, the description of experiment sessions;
- **Result Analysis**, that is, the collection of data and description of significant results.

The general schema for the expert-based analyses consists of the:

- **Preliminary Study**, that is, the study of the state of the art for the goals;
- **Experiment Design**, that is, the definition and description of goals, models, and metrics;
- **Expert Description**, that is, the description of the involved experts;
- **Experiment Execution**, that is, the description of experiment sessions.
- **Result Analysis**, that is, the description of significant results.

Section 6.2.2 overviews the methods we adopted for conducting the analyses, in the UK as well as in Italy, together with their advantages and disadvantages.

6.2.2 Description of the Adopted UCD Methods

The choice to use one method or another is established in relation to the project, weather to perform it with the users or the experts, the time to spent and the available resources. In the following table, we summarise the methods used for the analysis of the context of use, highlighting the main advantages and disadvantages.

| Method Name | Advantages | Disadvantages |
|---------------------|----------------------------------|----------------------------|
| Journals/Diaries | Allow collecting numerous data | Response rate can be low |
| Contextual Inquires | The interviewers can guide users | The time spent can be high |
| Observational | High level of precision | Difficult to organise |

| | | |
|---------------------------------|-------------------------------|---------------------|
| Brainstorming | Highlight consensus/conflicts | Difficult to manage |
| Studies of Documentation | No users/experts involved | Incomplete |

Table 2. Methods for the analysis of the context of use

It is worth noting that brainstorming meetings and the study of documentation are not specific of UCD, and that they do not follow the two schemas mentioned above (Section 6.2.1). Therefore, only journals/diaries, contextual inquiries, observations, are discussed below.

6.2.2.1 Participant Journals or Diaries

Participant journals² are diaries in which users are requested to log their actions and observations. They are intended to help capture users' activities, and their thoughts and feelings about these activities.

The structure of a participant journal can vary from very loose to very specific. Also, the time period to be captured in a diary can vary: from a long period, to a more specific focus on certain activities.

The exercises or assignments presented in a journal are intended to trigger or reveal emotions, both pleasant and unpleasant. They can provide useful insights to a variety of experiences over time. Journals must therefore be usable, with any page layout being carefully considered.

Usually, journals are handed out or sent to the users with a brief explanation on how and when to use them. After the agreed time period, the journals are returned full of information and knowledge from the participants.

Advantages of this technique:

- With participant journals, rich and accurate information can be captured. They are very useful when a deep, detailed understanding of the thoughts, feelings or activities of users is required.
- Participant journals are often a good complement to other design research techniques, such as contextual interviews.
- The very presence of a journal acts as a physical motivator to participants to record their thoughts on a regular basis.
- The usefulness of journals as a source of qualitative data in educational research has been studied, and the journals appeared to help teachers think about teaching, classroom activities, and teacher-student interactions.
- Presenting information from the journals to project stakeholders with photos taken by participants helps to build a convincing story.
- The format of journals allows both easy skimming, and deeper interpretation.

Disadvantages of this technique:

- The main disadvantage of participant journals is that there is no observer present to see what the user is doing. Certain expressions of feelings, such as facial expressions or comments expressed during difficult parts of the journal, are missed this way.
- The design of the journal has a huge impact on how it is used. The structure, and the explanation given to the participants, determines how the users will respond, and therefore the nature of the data.
- The information gathered by participant journals is preferential rather than empirical. Depending

² Information from (Girauld , 1999), <http://usability.jameshom.com/>, and http://www.enginegroup.co.uk/service_design/m_page/participant_probes

on the goal of the research, this could be a disadvantage.

6.2.2.2 Contextual Inquiry

Contextual inquiry ³ is a specific type of interview for collecting detailed information about user work practice. The researcher or interviewer spends time with a person, in their own territory (often their home, social place or workplace). He observes the user and talks to him about the work while s/he works, in the normal context of the work. The researcher stays in the background and lets the user lead the situation as much as possible.

The user is reminded to behave as naturally as possible; to do the things he would normally do with the people he would normally do them with and encourage him not to change their behavior or put on a show for the researcher. The researcher has the challenge of conducting an interview without it seeming to be an interview, but rather a chat where questions and answers are exchanged in both directions. This way, the researcher tries to form a partnership with the user i.e. learning (but not doing) as an apprentice while the user is the master of the work. This helps the researcher understand the user's work. The goal is to understand how and why something is done or why something is not done.

Advantages of this technique:

- Spending time with a user reveals a deep understanding of his behavior, needs, problems, desire and motivations. The output of an interview is rich and meaningful observations and insights that build a story on the user.

Disadvantages of this technique:

- Observing the user while his doing his task, and meanwhile interrupting him to ask questions about his task, can be disturbing to the user.
- Interviews can be time consuming.

6.2.2.3 Observation

Observational methods ⁴ involve an investigator viewing users as they work in a field study, and taking notes on the activity that takes place. Observation may be either in presence, where the investigator is actually present during the task, or deferred, where the task is viewed by some other means such as through use of a video recorder. The method is useful early in user requirements specification for obtaining qualitative data. It is also useful for studying currently executed tasks and processes.

Observational methods allow the observer to view what users actually do in context. Direct observation allows the investigator to focus attention on specific areas of interest. Indirect observation captures activity that would otherwise have gone unrecorded or unnoticed.

Observation is prepared by clearly establishing objectives and information requirements: should the coverage be in breadth or in depth? It is extremely important to decide what will happen to the end-

³ Information from (Beyer and Holtzblatt, 1998),

http://www.enginegroup.co.uk/service_design/m_page/contextual_interview1,

<http://project.cmd.hro.nl/cmi/hci/toolkit/card.php?recordid=63>, <http://www.usabilitynet.org/tools/contextualinquiry.htm>,

<http://usability.jameshom.com/context.htm>, and <http://articles.sitepoint.com/article/contextual-enquiry-primer>.

⁴Information from <http://www.usabilitynet.org/tools/userobservation.htm>, <http://project.cmd.hro.nl/cmi/hci/toolkit/card.php?recordid=117>, http://www.enginegroup.co.uk/service_design/m_page/shadowing.

product of this process, and to tailor the whole process to the requirements of those who will receive the results.

Advantages of this technique:

- Observing a user in his real-life environment renders very detailed and realistic data.
- Observing will deliver another kind of data than, for example, an interview. The observer enters into the user's "life", allowing him to observe behavior that would otherwise (for example, in an interview) not be available.

Disadvantages of this technique:

- Observation can be obtrusive and subjects may alter their behavior due to the presence of an observer.
- Notes and videotapes of the observation session need to be analysed by the note-taker, which can be time consuming and prevents the task being split up for analysis by a number of people.

PART II – Context of Use

For analysing the context of use, we went through an analysis of the state of the art, brainstorming, study of the documentation, and through expert-based and user-based analyses as (ISO Consortium, 2010) suggests. As explained in Chapter 5, specifying the context of use in the TERENCE project means analysing: the characteristics of the TERENCE users; the users' tasks; the physical and organisational environments.

Analysis of the characteristics of the users. The users in the TERENCE project are: the learners, namely, hearing poor comprehenders and deaf poor comprehenders aged 7-11 year old; their educators, e.g., primary school teachers, support teachers, parents.

Analysis of the users' tasks. Tasks in the context of the TERENCE project are the users' activities in relation to reading comprehension.

Analysis of the organisational and physical environments:

1. the physical environment in which educators and learners read, and the satisfaction associated with it (e.g., school, house);
2. the instructional environment in which educators and learners do their activities, consisting of (a) the demographic and socio-cultural instructional context, and (b) instructional and literacy policies;
3. devices (e.g., software) for such activities.

The analysis of the context of use is in Chapters 7 and 8. Chapter 7 reports on preparatory analyses that describe the organisational environment, and are of help for conducting and organising the field studies of Chapter 8. More in details, the analysis of the context of use is divided as outlined in Table 3.

| Users' characteristics | | | | |
|------------------------|-----------------------|--------------|--|----------------------|
| | Learners | | | |
| | | – | Studies of documentation, brainstorming | 7.1 |
| | | User-based | Diaries, observational | 8.1.1.1.1, 8.2.1.1.1 |
| | | Expert-based | Diaries, contextual inquiries | 8.1.1.1.2, 8.2.1.1.2 |
| | Educators | | | |
| | | User-based | Diaries, observational, contextual inquiries | 8.1.1.2, 8.2.1.2 |
| Tasks | | | | |
| | Reading comprehension | | | |
| | | – | Studies of documentation, brainstorming | 7.1 |
| | | User-based | Diaries, contextual inquiries | 8.1.2, 8.2.2 |
| Environments | | | | |
| | Physical | User-based | Diaries, observational | 8.1.3, 8.2.3 |
| | Instructional | – | Studies of documentation | 7.2.1, 7.2.2 |
| | Devices | – | Studies of documentation | 7.2.3 |

Table 3: Structure of Part II

7 Preparatory Studies

The studies hereby summarised are preparatory for the field studies reported on in Chapter 8. Preparatory studies are necessary for building the knowledge base of the consortium team, which is highly cross-disciplinary, and hence for gathering information relevant for the field studies, like the characteristics of the TERENCE learners known in the literature and the different administrative, legal and ethical issues in UK and Italy. The analyses hereby reported originated from state of the art studies, then assessed by means of brainstorming meetings between the ICT researchers, cognitive psychologists and educational psychologists of the consortium, and educational stake-holders. The analyses are divided as follows.

Analysis of the characteristics of the users. In order to define the aims for the field studies concerning the characteristics of the TERENCE learners, we sought answers to typical questions, e.g. what the learners' reading skills are, what their difficulties in reading texts are. This meant analysing the state of the art pertaining to classical reading comprehension models during brainstorming meetings between ICT researchers, cognitive and educational psychologists. The meetings lead to a preliminary classification of the characteristics of the TERENCE learners useful for setting the aims of the field studies concerning the characteristics of the users of Chapter 8. The field studies, in turn, helped us to refine the classification of the characteristics of the users as specified in Section 9.1.

Analysis of the user's tasks. Tasks in the context of the TERENCE project are the users' activities in relation to reading comprehension. In this phase of the project, this was studied with educational psychologists and educational stake-holders. The meetings lead to a preliminary definition of the tasks of the TERENCE learners related to analysing texts, useful for setting the aims of the field studies concerning the users' tasks of Chapter 8. The field studies, in turn, helped us to specify the users' tasks as in Section 9.2.

Analysis of the organisational environment. In this phase, this is split into the analysis of:

- the instructional environment in which educators and learners do their activities, consisting of (a) the demographic and socio-cultural instructional context, and (b) instructional and literacy policies;
- devices, namely, paper-and-pencil interventions as well as software for such activities.

Knowing them also helped us to organise the field studies of Chapter 8, e.g., to estimate the number of hearing learners and deaf learners we could expect to find in a British class or in an Italian class.

In details, Section 7.1 overviews conceptual models of reading comprehension that are useful for analysing the characteristics of the TERENCE learners and their tasks. Section 7.2 describes the organisational environment as follows: Subsections 7.2.1 and 7.2.2 present an analysis of the British and Italian instructional environments, respectively; Subsection 7.2.3 outlines the devices useful for the TERENCE learners and for text comprehension in general.

7.1 Conceptual Models of Reading Comprehension

Achieving reading comprehension (see Subsection 6.1.2) is one of the main goals of the educational curriculum from the early school years, and a basic concern of educators, as explained in details in Subsections 7.2.1 and 7.2.2. Hereby, we present two main conceptual models of text comprehension, known in the literature of cognitive and educational psychology. Such models were assessed in brainstorming meetings between the ICT researchers, cognitive psychologists and educational psychologists

of the consortium, and educational stake-holders. The meetings lead to a preliminary classification of the characteristics and tasks of the TERENCE learners useful for the field studies of Chapter 8, which in turn helped refine and specify the classification as in Chapter 9.

Such models are also useful for classifying the devices of Subsection 7.2.3. More in general, they give us key terms for the remainder of this deliverable.

The first conceptual model is very general, the second regards inference-making, i.e., the main focus of the TERENCE adaptive learning system.

7.1.1 A General Conceptual Model

(Day and Park, 2005) proposed six concepts for classifying interventions for reading comprehension. We outline them in the following and comment on them below.

- *Literal comprehension* amounts to the understanding of the literal meaning of the text, like explicitly stated dates and locations. Questions pertaining to literal comprehension can then be answered by a sort of pattern-matching process with the text. Such questions are primarily used to check if the students understand the basic meaning of the text. If a text states “The accident occurred in January 1923” then a literal comprehension question may be “When did the accident occur?”.
- *Reorganisation*. Students must use information from various parts of the text and combine them. Questions that address this type of comprehension are important because they teach students to examine the text in its entirety, helping them move from a sentence-by-sentence reading for achieving local coherence, to a more global reading for achieving global coherence.
- *Inference-making and monitoring*, e.g., (Yuill and Oakhill, 1988). According to (McKoon and Radcliffe, 1992) inference is any piece of information that is not explicitly stated in text. We will see further a taxonomy focusing on inferences. Usually questions pertaining to inferences on events relates to the characters participating in an event (“who” questions), the temporal features (“when” questions), clausal features (“why” questions) or spatial features (“where” questions) of events, or their relations. For example a learner might read at the beginning of a text that a king named Artù visited the land of Legoland where he met a beautiful girl named Ginevra, and then at the end of the text the learner may read that the king married Ginevra. In order to answer the question “Did Artù marry a beautiful girl after visiting Legoland?” the student has to put together two pieces of information and generate a temporal relation (“after”) that is not explicitly in the text.
- *Prediction* means determining what might happen in the future that should be consistent with present information.
- *Evaluation* requires that the learner gives a global or comprehensive judgement about some aspect of the text.
- *Personal response*. Such questions appeal to each learner's emotional sphere. Answers are not found in the text; they relate to the personal appealing of the story for each specific reader

Other effective interventions are related to

- *Mental imagery*, that is, to generate mental images of the text contents while reading (e.g. Oakhill and Patel, 1991), as well as *visualising and verbalising*, that is, to create mental images or “mental

movies” of a text and recall its contents through verbal summaries (Johnson-Glenberg, 2000; Johnson-Glenberg, 2005).

As such a conceptualisation is very high level, it has ambiguities and inner logical dependencies, which renders its usage for classifying interventions quite difficult. For instance, reorganisation should be related to making inferences: for being able to coherently reorganise the read information, the reader needs to make inferences, like in our example above about King Artù.

7.1.2 A Taxonomy for Inference Making

Inferences involve generating relations between events of the story in order to (re)construct a coherent representation of the story. To the best of our knowledge, the most fine-grained taxonomy concerning inference-making on texts is presented in (Chikalanga, 1992), built by refining existing taxonomies from the literature. In the author's intentions, educators can use the taxonomy for classifying questions concerning learners' reading material, accompanying manual or handbooks. In order to understand the proposed taxonomy, we first need to understand the proposed connection between questions and responses. There are three types of relations between questions and responses, explained as follows.

- (1) Textually explicit: the responses are right there in the text.
- (2) Textually implicit: both question and answer are present in the text but at least one step of logical inference is necessary to justify the answer.
- (3) Scriptural implicit: the question is derived from the text but the answer is not. The user has to combine information from the text and some background knowledge.

The three upper concepts of the taxonomy are: lexical, propositional, and pragmatic or scriptural inferences.

- (a) Lexical inferences can be both textually implicit or scriptural implicit. The main sub-concepts are pronominal inferences and ambiguous words.
- (b) Propositional inferences (a.k.a., logical inferences) are derived from the semantic contents of the text, and are textually implicit. The main components are as follows:
 - logic information inferences ask the reader to determine the main features of an event, namely, the involved characters and their attributes, the time and location of an event. In other words, inferring logical information means answering “who”, “what”, “where”, and “when” questions;
 - logic explanatory inferences means providing the intentions (goals) of the characters, as well as the causes and consequences of events, and conditions that enables the events to occur. Inferring explanatory information means answering questions of the form “why” and “how”.
- (c) Pragmatic inferences relate to the reader's store of prior knowledge, hence the related questions are considered to be scriptural implicit.

The three inferential concepts/processes and sub-concepts are not disjoint. Therefore, if a question activates more than one of them, which will be considered most relevant? Which inferential processes are not activated if the child does not give the right answer? Possible remedies to this lies in training the system for learning this.

7.2 The Organisational Environments

7.2.1 Instructional Environments in UK

7.2.1.1 Demographic and Socio-cultural Instructional Contexts

Hearing poor comprehenders – The incidence of poor reading comprehension skills for the UK context (DCSF, 2010) is that 31% of students fail to attain the expected level 5 in reading at age 14. This alarming data suggests that reading comprehension problems may be largely underestimated or undetected in UK schools during primary and first order secondary school (grade 2-7).

UK teachers normally appear poorly prepared to recognise the specific learning problems of poor comprehenders (Nation, 2006) and attribute them to poor attention or motivation.

Deaf poor comprehenders – Hearing loss in childhood is a relatively infrequent phenomenon: again, statistics show similar levels of prevalence of preverbal hearing loss across countries, with 1 to 2 children per thousand births (Fortnum et al., 2001; Spencer and Marschark, 2010). Describing this group of children is difficult. The majority of deaf children present reading comprehension problems (Arfé, 2006; Kyle and Harris, 2010; Spencer and Marschark, 2010), but their form, nature and degree may vary a lot according to the aetiology of the hearing loss and factors associated with it. Not infrequently, learning problems in deaf children are the results of a combination of factors: a) the child's difficult access to oral (or sign) language, b) neurological or developmental problems associated with deafness (especially in deafness with syndromal and perinatal origins) c) inadequate or poor learning opportunities, d) socio-cultural disadvantage. For example, the percentage of deaf children from low income and immigrant families is increasing in Italy and in the UK. Woll (2008) estimates that about 30% of deaf children in the UK are growing up in homes where neither English nor BSL is the first language. Furthermore, preverbal deafness and mild and moderate hearing deficits may be associated with other risk factors for learning disabilities (e.g. prematurity, perinatal anoxia, cytomegalovirus infection, etc.). As a result, approximately the 30% of these children show concomitant learning disabilities due to co-morbidities (Fortnum et al., 2002). However, gross estimates of how many deaf children have concomitant learning problems differ, due to variations in definition and reporting procedures (Mauk and Mauk, 1992).

In general, Italian and English authors (Arfé, 2006, in press; Arfé and Perondi, 2008; Arfé et al., 2010; Caselli et al., 2006; Kyle and Harris, 2006, 2010, in press) report a severe delay in the development of reading and writing skills for these students. Even the construction of basic literacy skills may be problematic when the child's access to speech is incomplete or the learning environment is poor or inadequate, as it may be the case for a deaf child. An exception to this rule is represented by cochlear implanted children. Children who received early cochlear implantation (within the second or third year of life) can develop appropriate language skills and are normally more successful at school. Bosco (2006) reports that, on a sample of cochlear implanted children from 3 to 13 years of age, 64% followed the standard curriculum for their age level and 62% did not present any learning delay. However, the population of children with cochlear implantation is also very heterogeneous and some children may present moderate or severe learning problems (Arfé, in press).

In the UK, there are a number of different approaches to communication with the deaf. Four main categories of communication approaches have been reported (Fortnum et al., 2002). These are aural/oral,

sign or sign bilingual, total communication and other signed. The *aural/oral approach* refers to a purely spoken approach to communication (including natural aural and structured oral), focusing on amplified residual hearing and speech reading. *Sign or sign bilingual* is when the first or primary language learned is BSL, which is then used as a way to access a second language: spoken and written English. *Total communication* refers to a broad approach that combines signed and spoken languages, including BSL and Sign Supported English, predominantly as support alongside spoken English. *Other signed* includes other sign-based communication approaches, such as Makaton, but does not include Signed Supported English or Signed English. (Bimodal education in the UK would consist of Sign Supported English).

It is estimated that about 85% of deaf children in the UK are educated in mainstream schools (Woll, 2008), but these children might be educated orally, through Signed Supported English or in BSL (with a communication support worker) in mainstream schools. Note that this estimate includes all levels of hearing loss, and that there are more children with mild or moderate hearing loss than severe or profound. Children with mild to moderate hearing loss have always been educated in mainstream schools or hearing impaired units within such schools. Thus, it is not the case that 85% of deaf children with severe or profound hearing loss are accommodated in mainstream schools in the UK. Recent data on the exact numbers of special schools for the deaf in the UK are hard to come by, but in 2003 there were only 26 specialist schools and 360 Hearing impaired units attached to mainstream schools. These hearing impaired units can be oral, bilingual, Signed Supported English or total communication, but the majority of specialist schools for the deaf in the UK have adopted a bilingual policy.

7.2.1.2 Instructional and Literacy Policy

There is a strong research base supporting current UK policy on teaching primary pupils how to read, in terms of the skills needed for decoding and fluency, including combining synthetic phonics with a range of other reading strategies. This evidence-based policy is summarised in the Rose Review (2006) and is reflected in both the National Curriculum (QCA, 2007) and Primary National Strategy (DCFS, 2007), and is now embedded in Initial Teacher Education programmes (Ofsted 2009). However, there is not the same clarity in UK policy or practice in the equally critical area of developing pupils' reading comprehension, including independent reading, either in the later years of primary or in secondary English lessons (Ofsted, 2009). There is extensive discussion of the importance of, and need to teach, comprehension skills in the Rose Review. Teachers in primary education are now more effectively trained to teach a set of discrete and often sequential skills explicitly to develop pupils' decoding and early comprehension skills, moving from the level of phoneme and phonics to word, sentence-level and some whole-text work on short texts, see (Rose Review, 2006; DfES, 2001, 2006; Ofsted, 2009). However, there is currently far more information for teachers, and materials for teaching, aimed at teaching word level reading than comprehension skills.

The *National Literacy Strategy* (DfES, 2001, 2006a, 2006b) produced guidelines on the teaching of reading strategies, drawing on an evidence base summarised by Harrison (2002). Recommended strategies include guided reading, derived from Palincsar and Brown's reciprocal teaching (1984), prediction, visualisation, 'reading between the lines' to develop inference, 'reading backwards and forwards' in texts and developing empathy. These strategies are outlined in resources designed for primary teachers, e.g. (DfES, 2006a). However, no specific guidance is given on how to develop the higher-level inference skills needed to comprehend complex, whole texts, despite these being key skills in the renewed National Curriculum (DfES, 2006a).

This deficit in information about effective teaching methods is reflected in the figures for national (UK) attainment in reading: 31% of students fail to attain the expected level 5 in reading at age 14 (DCSF, 2010) and international comparisons: the UK is currently identified as being 20 out of 35 OECD countries for attainment in reading (PISA, 2009).

In the UK, as in Italy (see below) comprehension problems per se are not recognised as a specific learning difficulty, and so children with such problems do not fall into a specific clinical group and, thus, have no special provision.

As outlined above, many severely and profoundly deaf children in the UK attend special schools, but those with mild to moderate hearing impairments are typically accommodated within mainstream schools, often in an attached Hearing Impaired Unit, where they will receive support from specialist teachers.

7.2.2 Instructional Environments in Italy

7.2.2.1 Demographic and Socio-cultural Instructional Contexts

Hearing poor comprehenders – The incidence of poor reading comprehension skills among Italian students is exceptionally high: about 25 % of high school students in a population of more than 1000 high school students present problems in comprehending texts (Pianta and Stella, 2005).

Italian teachers normally appear poorly prepared to recognise the specific learning problems of poor comprehenders (Carretti et al., 2007). In many cases, reading comprehension problems are identified late (during the last years of primary school or after primary school, at the age of 13 years), when instrumental reading skills (that is the ability to read fluently aloud) are no longer the focus of teachers' and parents' attention (Carretti et al., 2007).

Deaf poor comprehenders – What reported in general in Section 6.2.3.2.1 for the UK context also applies in Italy. For the specificities of Italy, Italian schools adopt three different approaches to the education of deaf children: the auditory-oral method, the bilingual method, the bimodal method. In oral education the focus is on promoting production and understanding of spoken language. In bilingual education the child and the teacher use both Italian sign language and oral (or written) language to communicate, provide information and express ideas. Sometimes, the child may shift from one to the other, depending on the activity and personal preferences (Galvan, 2010). The bilingual method provides rich language environments where verbal and sign languages are used independently and in their natural form. In bimodal education children are exposed to the simultaneous production of oral and sign language (simultaneous communication), but, differently from bilingual method, signs are used in support to speech; that is, they accompany spoken words and are produced in the same order of the words in speech, rather than according to sign language rules. Two bimodal systems can be alternatively used: Signed Italian, where the use of some signs support the comprehension of Italian language, but many Italian morphemes are not represented, or Exact Signed Italian, in which systems to represent also these morphemes have been developed. In Italy oral education is dominant for deaf children (Caselli et al., 2006) and most deaf children are included in mainstream schools. Few special schools and few institutes for the deaf exist for deaf children between 6 and 15 years and their orientation towards Sign Language, Bilingual, Bimodal and Oral education varies from oral communication (or bimodal communication) (e.g. Primary school of Mompiano, Brescia), to bilingual communication (e.g. primary school of Cossato, Biella).

7.2.2.2 Instructional and Literacy Policies

The Italian Ministry of Public Education offers some general indications for teaching oral and written language skills in preschools, primary schools and 1st order secondary schools (grades 6-8) (Indicazioni per il Curricolo, 2007) and appropriate pedagogical objectives are discussed for each school level.

Primary school (grade 1 to 5). The indications for the curriculum value diverse instructional objectives, from developing basic writing and reading skills (i.e. the ability to spell and decode written words) to fostering oral language through the design of learning contexts and classroom activities that facilitate linguistic interactions. Special attention is addressed to the acquisition of reading behaviours and reading skills. Some indications for the development of the reading curriculum are: extending reading to a variety of text types and purposes (i.e. aesthetic pleasure, gathering information); activating the child's cognitive processes necessary to reading comprehension and stimulating children to apply different reading strategies; facilitating the child's access to books through scholastic libraries; fostering discussion about texts; motivating autonomous reading.

First order secondary school (grade 6 to 8). From grade 6, instructional intervention should focus more on linguistic and metacognitive awareness. The aim is to enhance students' awareness of different linguistic registers and styles and of different text genres. Instructional activities should be designed in order to enlarge children's vocabulary and stimulate metacognitive reflections on texts. The reading curriculum may include these specific objectives: scaffolding reading lessons to allow the discussion and negotiation of meaning, stimulating metacognitive and metalinguistic reading activities (e.g. reflecting on the use of registers or styles in the text); promoting autonomous reading and interpretation of texts. Critically, the need to experience the integration of written language with other languages in multimedia communication is also underlined.

Measures for poor comprehenders

The Italian Ministry of Public Education does not provide indications on how to address the educational needs of children with special learning disabilities or, in particular, poor comprehenders. A recent law (*Nuove norme in materia di disturbi specifici di apprendimento in ambito scolastico*: GU 244/2010) recognises dyslexia, dysgraphia, dysorthographia and dyscalculia as specific learning disabilities and individuates pedagogical measures to support these children. No mention is made of poor comprehenders, who, according to the law, would not meet the criteria for clinical identification. The possibility of identifying a clinical group of readers failing in comprehension, but not in decoding, is only envisioned by the recommendations for clinical practice (*Raccomandazioni per la pratica clinica*, 2007), elaborated on the basis of the Consensus Conference of Montecatini (22-23 September, 2006). The document reports the existence of specific text comprehension difficulties documented by international studies and also invites the consideration of this specific learning profile as a learning disability.

Measures for deaf children

According to the Italian educational system, deaf children may attend mainstream classrooms (*law 517/77* and *law 104/92*) or special institutes for the deaf; when included in mainstream classrooms, children may be assisted by a special education needs teacher or a special educator. These can be present for about 6 or 7 hours a week, mainly during Italian classes. An interpreter or communication assistant (if Sign Language is the child's first language) can also assist the child and the classroom teacher, depending on the choices of the child's family (*law 104/92*). Frequently, deaf children following oral language rehabilitation are included

in mainstream schools, whereas deaf signers can attend special schools and institutes for the deaf. However, in Italy inclusion in mainstream classrooms is very frequent also for deaf signers (Caselli et al., 2006). Many of these children may present special learning needs associated with a moderate or severe linguistic delay. In these cases, individualised interventions and programmes are designed by the teachers with the help of the child's speech-therapist and psychologist. Individualised interventions consist in adapting the curriculum to the child's learning skills and needs and, for some activities, to work with the child on an individual basis, outside the classroom.

7.2.3 Devices

7.2.3.1 For Hearing Poor Comprehenders in the UK

A very recent summary of training programmes designed to help children who have reading, writing and spelling difficulties can be found at: <http://www.interventionsforliteracy.org.uk>. Although a number of the reading programmes are designed for use in the primary years (Years 1-6, i.e. 5-11 years), only four appear to specifically train comprehension (i.e., *Sound Reading System*, *Academy of Reading*, *Lexia Reading* and *Inference Training*). Three of those are computer-based (the first three above), and only one (*Inference Training*) is in a paper-and-pencil format. Interestingly, however, seventeen separate reading programmes received *effectiveness ratings* with regards to comprehension, despite the fact that they did not appear to train comprehension (according to the descriptions of each scheme). A brief overview of these schemes is provided in Appendix 1. The type of children involved in the evaluation studies were not typically poor comprehenders as such. They were variously described as 'low attainers', although some programmes had been evaluated with children described as 'Special Educational Needs'. The length of each intervention was, on average, around 10 weeks, although they ranged from 4-26 weeks. Across all the schemes, there is a fairly even split in terms of whether the programmes were computer or paper-and-pencil based, and in whether the programme required specially trained assistants or not. All the schemes (apart from one, not summarised here) appear to have been evaluated in mainstream schools in the UK.

Some further information about the four main programmes aimed at developing comprehension skills is provided below.

The Sound Reading System is described as a synthetic phonics reading and spelling programme, with each lesson working to promote skill in phoneme segmenting and blending, the mastery of sound-symbol relationships, handwriting, spelling, reading fluency, and reading comprehension in general. It received a 'remarkable' effectiveness rating for comprehension for Y2 through to adult.

Academy of Reading is described as a computer-based reading intervention programme that is designed to give pupils the basic reading skills they need to form a foundation of reading success. The programme includes work on phonemic awareness, sound-symbol association, phonics and decoding, and comprehension. It received a 'useful to substantial' effectiveness rating for comprehension for Y3-6.

Lexia Reading is described as a computer-based Independent Learning System (ILS) with several programs. It begins with phonemic awareness and moves to initial letter level, and then real and nonword decoding. It also includes sight word, fluency and comprehension elements. Pupils work through a program independently and at their own pace. The computer keeps track of their progress, adapting automatically to provide extra practice where needed. Teachers can monitor progress. The ILS element is supported by age-appropriate printable worksheets and lesson plans. Teachers need to give initial guidance on using the program, teach and reinforce some units, and mainly oversee and monitor how their pupils are getting on.

It is web-enabled, and can therefore be accessed from home if schools allow. It received a 'useful' effectiveness rating for comprehension for Y2-6.

Inference Training (see also (Whatmuff and Puttick, 2008)) comprises paper and pencil training materials, and is specifically designed to train comprehension skills focusing on inference making. It is based on the reciprocal teaching study by Yuill and Oakhill (1988), in which an intervention that specifically targets inference-making was developed for use by teachers in classrooms in one Education Authority in the Midlands (UK). The procedures have been shown to have beneficial effects on poor comprehenders in particular (see (Whatmuff and Puttick, 2008) for evidence of their effectiveness).

One recent set of training materials not mentioned on the above website (perhaps because the published evaluation came out only very recently) are those that came out of the '*READING for MEaning*' project (Clarke et al., 2010). This large scale randomized controlled trial, compared different approaches to ameliorating the reading comprehension difficulties of poor comprehenders. For instance, Text Comprehension training comprised work on inferencing and metacognition to develop strategies to support text comprehension and production, whereas Oral Language training focused on the development of vocabulary and understanding of figurative language. Both versions of the programme (or a combined version), delivered by trained teaching assistants as part of a 20-week intervention, were effective in bringing about significant gains in reading comprehension, though the Oral Language group had made greater gains (compared to a control) at a post-training follow up.

7.2.3.2 For Deaf Poor Comprehenders in the UK

Where possible, the same programmes mentioned above are also used for deaf children. There are no programmes in the UK specifically targeted at deaf poor comprehenders.

In the wider English-speaking context, we have *CornerStones*, a tool for teachers of early primary-school children who are deaf, or have visual learning capabilities and literacy problems (Loeterman et al., 2002; CornerStones, 1998). Academic experts in literacy and deafness, along with teachers of deaf students participated in its development. An essential element of *CornerStones* is a story taken from the PBS's literacy series "Between the Lions", complemented by versions of the story in American SL and other visual-spatial systems for communicating with deaf children; word games are part of the tool. *Cornerstones* adopts storytelling to enrich the vocabulary and world knowledge of children, and improve their reading comprehension. However there is no intelligent or adaptive component in *CornerStones*, which is essentially made up of a collection of hypertext pages and games.

7.2.3.3 For Hearing Poor Comprehenders in Italy

Some instructional programmes for promoting reading comprehension in 7 to 13 year-old children are available in Italy. Table 4 summarises the programmes, distinguished according to the reading comprehension components they intend to enhance and the target groups of learners. All the interventions consist of series of paper-and-pencil activities, balanced for difficulty, and are intended for both individual and group administration. Most of the programmes have never been evaluated and data on their efficacy are not available. Two exceptions are represented by "Lettura e Metacognizione", whose efficacy was tested in the study by Lucangeli et al. (1995) (see Subsection 6.1.2), and "Nuova guida alla comprensione", where a study on part of the intervention has been recently carried out by Meneghetti et al. (2009). Both these programmes have been shown to enhance reading comprehension.

| Components | References | Suitable for children |
|--|--|------------------------|
| Inference making | Nuova Guida alla Comprensione del Testo (De Beni et al. 2004) | From 8 to 13 years old |
| Text structure | Nuova Guida alla Comprensione del Testo (De Beni et al., 2004) | From 6 to 13 years old |
| | Strategie semplici di lettura (Ferraboschi and Meini, 1993) | From 6 to 10 years old |
| Use of cohesive devices like connectives | Nuova Guida alla Comprensione del Testo (De Beni et al., 2004) | From 6 to 13 years old |
| Comprehension monitoring | Nuova Guida alla Comprensione del Testo (De Beni et al., 2004) | From 6 to 13 years old |
| Metacognition | Lettura e metacognizione (De Beni and Pazzaglia, 1991) | From 8 to 13 years old |
| | Nuova Guida alla Comprensione del Testo (De Beni et al., 2004) | From 6 to 13 years old |

Table 4. Paper and pencil instructional programmes for improving reading comprehension

Lettura e Metacognizione (De Beni and Pazzaglia, 1991) is a paper and pencil metacognitive programme. The programme aims at developing three basic reading skills: 1) children's awareness of the goals of reading 2) children's knowledge and use of reading strategies; 3) children's sensitivity to textual typologies (i.e. different types of text). In general, the programme consists of texts of increasing complexity and metacognitive activities addressed to elementary and middle-school students.

Nuova Guida alla Comprensione del Testo (De Beni et al., 2004) considers different aspects of reading comprehension. For what concerns the text structure, the programme permits to improve child's knowledge about the characteristics of different text genre (in other words to reflect on the typical structure of different texts).

Strategie semplici di lettura (Ferraboschi and Meini, 1993) aims at developing reading strategies. The programme, addressed to children with learning disability or cognitive impairment, offers a spectrum of activities: a) making semantic inferences; b) prediction, that is, anticipating events and content in reading; c) understanding and using story schemata;⁵ d) identifying the text structure; e) identifying main ideas/elements in the text; f) discriminating and selecting relevant information. Table 1 summarises these programmes according to the component skills they focus on (e.g. inference making) and their target population.

Besides paper and pencil programmes, some software products are on the market and are currently used for promoting reading comprehension in poor readers. Table 5 lists the software products available in Italy

⁵In psychology literature, a schema is a cluster of knowledge that describes the typical properties of the concept it represents.

according to the reading comprehension components they are intended to enhance and the target group of learners. None of this software is experimentally tested.

| Components | Reference | Suitable for children |
|-----------------------------------|--|------------------------------|
| Inference making and integration | Cloze (Azienda USL Bologna, Anastasis, 2007) | From 8 to 15 years old |
| | Comprensione del testo (3) (Beech and Cretti, 2002) | From 7 to 13 years old |
| Text structure | Highlighter (Cornoldi, Lonciari e Paganelli, 2009) | From 6 to 13 years old |
| | Il labirinto (Azienda USL Bologna, Anastasis, 2008) | From 6 to 13 years old |
| | Comprensione del testo (1) (Townsend and Cretti, 2002) | From 7 to 13 years old |
| | Recupero in...comprensione del testo (Rosiglioni et al., 2010) | From 8 to 13 years old |
| Cohesive devices like connectives | Anafore (Azienda USL Bologna, Anastasis, 2007) | From 7 to 13 years old |
| | Comprensione del testo (2) (Townsend and Cretti, 2002) | From 7 to 13 years old |
| Comprehension monitoring | Highlighter (Cornoldi, Lonciari e Paganelli, 2009) | From 6 to 13 years old |

Table 5. Software for improving reading comprehension.

7.2.3.4 For Deaf Poor Comprehenders in Italy

When possible, the programmes listed in Table 4 and in Table 5 are also used with deaf children. Some deaf children may in fact show linguistic skills adequate to the variety of activities that the programmes offer. More frequently, the instructional materials and activities included in the programmes in Table 4 and in Table 5 are not employed in their original form, but adapted to the deaf child's specific needs and abilities in individualised instructional interventions. The way materials and activities are used by special need teachers can vary quite a lot from case to case, according to the relative needs, skills and interests of the child.

Material adaptation may include: adding pictures to represent word meanings, adapting texts to the reader's specific needs, taking into account her/his lexical and grammatical knowledge, her/his background knowledge, and her/his specific difficulties with the genre.

Activity adaptation may include: focusing on words meaning or focusing on sentence meaning, re-assembling sentences of a text, drawing the story narrated in the text or drawing comic strips of the story read (Libralesso, 2010; Romagnolo, 2010).

Few programmes for improving reading comprehension are specifically addressed to deaf children or, more in general, to children with language difficulties.

Stimolare le capacità percettivo-uditive: storie e script per bambini ipoacusici (Basoli et al., 2008). The programme, addressed to young deaf readers, offers short narratives varying in length and graded for linguistic complexity. Activities comprise both oral and reading comprehension and aim at developing the child's language skills and her/his comprehension of text structure: 1) sentence completion, 2) filling in gaps (e.g. complete the text filling in missed words), 3) use of synonyms (e.g. replacement of a word in the text with a synonym); 4) arranging pictures to represent the sequence of events in the story, 5) answering "Who", "Where" and "Why" questions, 6) drawing the story or its elements.

Narrativa facile: semplificazione e adattamento di testi narrativi (Giustini, 2004). More than a programme, the volume is a selection of adapted materials, suitable for children with poor comprehension and language difficulties and for their teachers. It consists of texts (e.g. tales, fables, stories, etc.) presented in their original form, and subsequently a) their main elements (theme, places, time and characters), b) a linguistically adapted version (where language is simplified and initial event, central episodes, and conclusion are clearly identified), c) a schematic version, in which characters are associated with actions.

Recupero e sostegno linguistico (Beech and Townsed, 1987): the programme consists of texts and activities of graded complexity. The activities aim at developing key components of reading comprehension: recognising facts, identifying main ideas, identifying sequences of events, making inferences and using contextual cues. This means using the linguistic context of the previous text as a context to interpret the meaning of a new word. For example, in the following sentence "Cheese can be considered a common food. In particular, France and Italy are producers of dairy products" we can infer that dairy products are related to cheese.

LODE (Gennari and Mich, 2007) is a web tool for children, primarily deaf children. It aims at stimulating children to globally reason on texts written in a verbal language, more specifically, Italian. As in Cornerstones, LODE adopts storytelling. In its current version, LODE focuses on a specific type of reasoning, namely, on global temporal reasoning. LODE narrates temporally rich stories for children and then stimulates children to create a coherent network of temporal relations out of each story through apt exercises. However, there is no adaptation feature in the tool.

Table 6 summarises these programmes according to the main interventions they focus on (e.g. inference making, language skills) and their target group of learners.

| Components | Reference | Suitable for children |
|--|--|-------------------------------|
| Language skills: sentence completion, word finding (words in context and synonyms) | <i>Stimolare le abilità percettivo-uditive: storie e script per bambini ipoacusici</i> (Basoli et al., 2008) | Deaf children No age range |
| Text structure | <i>Stimolare le abilità percettivo-uditive: storie e script per bambini</i> | Deaf children No age range |

| | | |
|------------------|---|---|
| | ipoacusici (Basoli et al., 2008) | |
| | Narrativa facile: semplificazione e adattamento di testi narrativi (Giustini, 2004) | Children with language and reading problems From 9 to 13 years old |
| | Recupero e sostegno linguistico (Beech and Townsend, 1987) | Children with language and reading problems From 6 to 12 year old |
| Inference making | Recupero e sostegno linguistico (Beech and Townsend, 1987) | Children with language and reading problems From 6 to 12 year old |
| | LODE (Gennari and Mich, 2007) | 8-13 year-old deaf children |

Table 6. Paper and pencil programmes for poor comprehenders with language problems.

7.2.3.5 Other Relevant Interventions and Software Programmes for Children

Two review articles (Blok et al., 2002; MacArthur et al. 2001), provide lists of studies on reading interventions that employed computer assisted instructions, and details the evidence for the effectiveness of each intervention between 1984-2002. More recently in the English context appeared two software programmes that promote reading through visual aids and, as such, are relevant for TERENCE: i-Start and 3D-readers.

ISTART and the more recent *iSTART2* (Interactive Strategy Training for Active Reading and Thinking) (Rowe, 2009) are automated strategy trainers designed to help high-school students become better readers via multi-media technologies. The *iSTART* tool promotes the following text comprehension interventions with the assistance of pedagogical agents: comprehension monitoring; linguistic ones like paraphrasing; prediction; elaboration; bridging through inference making. The *iSTART2* tool uses games for promoting such interventions.

Into the Book (<http://reading.ecb.org/>) is a reading comprehension resource for K-4 students and teachers. It promotes eight text comprehension interventions through video-game-like exercises: using prior knowledge; making connections, questioning and, more generally, inferring; visualising; summarising; evaluating. It has a GUI for learners and a GUI for educators.

3D-Readers (Johnson-Glenberg, 2005) is a web-based application for training reading comprehenders through two metacognitive interventions, the first being a verbal strategy (generating questions) and the second a visual strategy (creating a model). This tool uses science-oriented texts with a mixed narrative-expository structure. Users, after reading a piece of text, have to formulate a question about what they read, or they have to build a graphical model of it connecting images proposed by the system. Johnson-Glenberg's research with twenty middle scholars with poor reading comprehension ability demonstrated that poor readers can improve their reading comprehension skills by working with 3D-Readers.

Currently, several running projects promote the use of games for learning. Albeit their games are not always for promoting reading, they deserve attention in TERENCE, in particular, for WP2, WP4 and WP5 of TERENCE. Hereby we mention 80DAYS (<http://www.eightydays.eu>) and EMAPPS (<http://www.emapps.com/>); others were already reviewed in the GA of TERENCE. The former project is a path-finding research initiative of FP7 to explore new frontiers in digital educational games which combine effective learning with fun and pleasure; note that educators have a GUI with predefined game elements (e.g., maps, avatars) for creating games for their learners. The latter project focuses on communities of creative, networking children within the 9-12 age range and promotes the use of computer games and mobile learning in schools.

7.2.3.6 Text Analysis Tools Useful for Story Comprehension in General

7.2.3.6.1 Readability measures and tools

Several readability metrics are around. At different levels, they consider the following measurable factors affecting reading comprehension: vocabulary; sentence and entire text structure; length; cohesion. However, few tools measure the coherence of a text, whereas research has clearly shown that young readers have less difficulty reading cohesive texts, in particular, temporally cohesive texts, e.g., see (Cain and Nash, *in press*). Notably, Coh-matrix is one of such tools that gives metrics for the concept of narrative coherence, in the style of Stein-Trabasso, e.g., (Goldman, 1999). In the following, we overview it.

Coh-Matrix (Graesser, 2002) is a computational tool that produces indices of the linguistic and discourse representations of a text. It has more than sixty readability metrics. Its metrics analyse the coherence of a text, as well as the vocabulary, the sentence and text structure. The tool also also analyses non-numeric values such as title, genre, and source, without associating them with any metrics.

This said, the main concepts defining the readability metrics used in Coh-matrix are described as follows.

Indices for word information and text information. These are standard indices like the number of words per text and sentence, number of sentences, number of paragraphs, syllables per words, frequency of content words (e.g., nouns, adverbs, adjectives, main verbs). Coh-matrix distinguishes words into concrete and abstract. A word is classified as concrete using the MRC database (Coltheart, 1981). The abstractness of a word is represented by the hypernym metric taken from Wordnet, that is, the the number of levels in a conceptual taxonomic hierarchy above (superordinate to) a word.

Syntactic indices. Syntactic complexity of a text can be measured by its number of modifiers. A modifier is an optional element that describes the property of a head of a phrase, for example, the noun-phrase “the lovely, little girl” has three modifiers: the, lovely and little.

Moreover, in Coh-Matrix connectives are classified along two dimensions.

1. On one dimension, the extension of the situation described by the text is determined. Positive connectives (e.g. and, after, because) extend events, whereas negative connectives (e.g., but, until, although) cease to extend the expected events.
2. On another dimension, connectives are classified and associated to a type of cohesion, namely additive (also, moreover, however, but), temporal, logical, and causal (see also below).

The mean number of higher level constituents per sentence, controlling for number of words and the number of words that appear before the main verb of the main clause in the sentences of a text is another metrics. Sentences that have many words before the main verb are taxing on working memory.

Other syntactic metrics include the logical operators (e.g, and, or, if, then) because texts with a high density of these logical operators are difficult for most readers as well as the sentence syntax similarity indices which compare the syntactic tree structures of sentences.

Referential and semantic indices. Referential cohesion occurs when a noun, pronoun, or noun phrase refers to another constituent in the text. For example, consider the sentence “When water is heated, it boils”. The word “it” refers to the word “water”. In addition to referential indices, there are semantic indices that assess the extent to which the content of sentences or paragraphs are similar semantically or conceptually. One index of semantic similarity is content word overlap, which is the proportion of content words in two excerpts that share common content words. Other indices are causal, temporal, spatial, intentional cohesion that reflect the extent to which sentences are related by causal, temporal, spatial, intentional cohesion relations relevant in the action plot and not relevant in texts that describe static scenes and texts that convey abstract logical arguments. They are measured using Wordnet characteristics, counting causal verbs, intentional verbs, spatial words.

Local and global indices. At the sentence level, Coh-Metrix's indices can be classified in local and global through the notion of “adjacent sentences”. Two sentences are adjacent if are successive sentences in a span of text. An index is local if it deals with information in the same sentence or in two adjacent sentences. Global instead involves non-adjacent sentences.

7.2.3.6.2 Temporal Analysis Language and Tools

A considerable line of current research in natural language processing focusses on systems for extracting temporal information from documents in various languages: coherent text understanding depends on the proper ordering of events in time, their sequences, and linking them to explicit and implicit time references in text or to the time of reading. TimeML emerges as the de-facto standard language for the automatic annotations of texts, mainly newspaper texts. It has tags related to events and temporal expressions, such as TIMEX3, EVENT, and TLINK. Syntactically, events are typically expressed as inflected verbs, although event nominals, such as “crash” in “...killed by the crash”, should also be annotated as EVENTS. TIMEX tags refer to quantitative or quantifiable temporal expressions, such as times, dates, durations. Such information is usually expressed in English by adverbial or prepositional phrases, like “on Thursday” or “yesterday morning”. Several semi-automatic annotation tools are available nowadays for English texts, and fewer for Italian text, see the GA of TERENCE. A preliminary review of some of them is in (Di Mascio et al., 2010).

8 Field Studies

In order to complete the analysis of the context of use, the TERENCE team designed a common strategy based on the analyses reported on in Chapter 7. This strategy produced:

- the choice of using (direct) user-based and (indirect) expert-based criteria, described in Section 6.2, for collecting and hereby classifying the data of the field studies; the need for expert-based criteria besides the user-based criteria is also due to the fact that the learners of the field studies in UK and Italy are all 7–11 year old children, and hence cannot always directly convey all the information that the TERENCE researchers were looking for;
- joint organisation and conduction of the experiments by the UCD experts and the cognitive psychologists, both in Italy and in UK, in order to optimise time, the available resources, and minimise the user stress;
- common aims for the field studies in Italy and in UK, namely:
 1. deepening the analysis concerning the characteristics of the learners of Chapter 7, in particular, the feeling they have with reading books, and what they appreciate of the stories they read;
 2. observing the feeling educators and learners have in relation to the main task of TERENCE, that is, teaching reading comprehension;
 3. finding the strategies, material, and methods educators and learners use in relation to the main task of TERENCE;
 4. investigating the status and the description of physical environments in which the main task of TERENCE takes place.

Albeit we set common criteria, aims, and a joint conduction of the experiments, we had also to cope with the fact that Italy and UK have different contexts and different bureaucratic procedures, as already emerged in the preparatory studies of Chapter 7, e.g., in Italy, the MT tests can be administered to an entire class, whereas in the UK, the YARC test must be administered to each child separately. Such differences constrained the TERENCE consortium to proceed in similar but not completely equal manners in each specific field study. In other words, the researchers had to adapt some of the common aims to specific local goals in UK and in Italy. Such an adaptation proved to be an enrichment for the results and the overall project. In fact the results of the field studies in the two countries are complementary and serve to obtain a rather complete and faithful description of the two contexts of use of TERENCE.

The fields studies analysed the following aspects separately, starting from the pertinent analyses of Chapter 7.

Analysis of the characteristics of the users. As for learners, we studied the characteristics of the learners in relation to aim (1) above. As for educators, we started investigating the experience of teachers with digital literacy and poor comprehenders.

Analysis of the user's tasks. As for learners and educators, we studied their tasks in relation to aims (2) and (3). For instance, with educators, we started investigating what strategies they follow in teaching reading

comprehension to 7-11 olds, in general, and to the TERENCE learners, in particular.

Analysis of the physical environment: in relation to aim (4), we studied the physical environments in which educators and learners read, and the satisfaction associated with it (e.g., school, house).

8.1 Field Studies in the UK

8.1.1.1 Learners

Two types of learners are involved in these studies: hearing learners and deaf learners. Notice that, since the reported analyses come from a small sample, in particular for deaf children, we do not clearly aim at inferring the results as valid for our population (learners or educators).

8.1.1.1.1 User-based field study

In what follows, learners are directly involved in experiments sessions.

Experiment Design – In order to reach the common aims, a number of specific assessment goals are formulated, both in Italy and in the UK. These goals are studied by making use of diaries and observational methods. Table 7 presents these assessment goals, and the diary and observation topics used to fulfil them. A complete overview of the (British) learners’ diary assignments can be found in Appendix 3.

| # Goal | Description of assessment goal | Diary topics used to assess learners’ characteristics | Observation topics used to assess learners’ characteristics |
|-----------|---|---|---|
| UK | | | |
| G1 | Description of the learners’ favourite stories and story characters | Assignment1 (Appendix 3): For the learners: What is your favourite story, and can you make a drawing of that story. For the parents: discuss with your child why this story is their favourite. Assignment 2 (Appendix 3): What is your favourite story character? Why do you like this character? | Observation of learners’ enthusiasm for particular types of stories used during a reading lesson. |
| G2 | Description of the learners’ likes and dislikes about reading | Assignment 3 (Appendix 3): What do you like/dislike about reading? | Observation of learners’ cooperation during a reading lesson. |
| G3 | Description of the learners’ ability to interpret a short story | Assignment 4 (Appendix 3): Make a drawing of a story | Observation of learners’ abilities to read and understand short stories in the classroom. |

Table 7. Assessment goals and methods used to fulfil these goals in the study of the learners’ characteristics

User description – Table 8 presents the users involved⁶. Three schools participated here: two deaf units of mainstream primary schools, and one mainstream primary school. Observations were done in two of these

⁶ Since all the British sessions were conducted together in a few days, all participants are presented here (not only the participants in the study of the learners’ characteristics). In the user description sections of the other studies (educators, tasks, environment), we will refer to this table.

schools; diaries were also collected in two schools.

| City | School | Method | # Learners | # Educators |
|---------|---------------------------------|--------------------|--|-------------|
| London | Hacton Primary School | Diaries | 4 deaf children (2 girls, 2 boys) (year 3 to year 5) and their parents | -- |
| | | Contextual inquiry | -- | 2 |
| | | Observation | 3 deaf children (year 5) | 1 |
| London | Laycock Primary School | Diaries | 6 ⁷ deaf children and their parents | -- |
| | | Contextual inquiry | -- | 2 |
| | | Observation | -- | -- |
| Chorley | Clayton-le-Woods Primary School | Diaries | 5 hearing children (4 girls, 1 boy) and their parents | -- |
| | | Contextual inquiry | -- | 2 |
| | | Observation | 15 hearing children (year 4) | 1 |

Table 8. Learners participating in the UK field study.

User teaching – The researcher conducting the field study in the UK site first asked for ethical approval of the project, and for a Criminal Record Bureau approval, in order to be allowed to do observations with children. Schools in the UK were contacted by the UoS partner. When schools accepted to participate in the field study, diaries were sent to them by UoS, together with a letter of informed consent for the learners' parents. When experiments sessions' dates arrived, the researcher discussed the local organisation with the Head of the schools.

Experiment execution – Table 9 presents the periods in which the British experiment sessions were conducted in the different schools. Table 10 presents an overview of the procedure of all the methods used in the British field study⁸. In case of the users' characteristics study, only a learners' diary study and observations were done.

| School (or school ID) | Period | Class | Learners' diaries | Teachers' diaries | Contextual inquiry | Observation |
|--------------------------|------------|------------|-------------------|-------------------|--------------------|-------------|
| UK | | | | | | |
| Hacton Primary | 08-02-2011 | Year 3 - 5 | 4 | 1 | 2 | 1 |
| Laycock Primary | 09-02-2011 | Year 3 - 5 | -- | -- | 2 | -- |
| Clayton-le-Woods Primary | 11-02-2011 | Year 3 - 5 | 5 | 4 | 2 | 1 |

Table 9. Dates of field study execution in British schools.

| Method | Procedure |
|--------------------|--|
| Diaries (learners) | Diaries were sent to the schools about two weeks before the date of the experiment session, in order to allow learners and their parents to fill in the diaries. Learners and parents filled in the diaries (during one week), without the interaction of the researchers. The diaries were collected at the school by the researcher on the day of the experiment sessions ⁹ . |
| Diaries (teachers) | Diaries were sent to the schools about two weeks before the date of the experiment session, in order to allow teachers to fill in the diaries. Teachers (during one week), without |

⁷ The diaries of these learners were not sent to us yet; they will be added to the data set in a later stage.

⁸ Since all the British sessions were conducted together in a few days, all methods are discussed here (not only the methods used for the study of the learners' characteristics). In the experiment execution sections of the other studies (educators, tasks, environment), we will refer to these tables.

⁹ Although the diaries from Laycock Primary School will be sent in a later stage of the research.

| | |
|--------------------|---|
| | the interaction of the researchers. The diaries were collected at the school by the researcher on the day of the experiment sessions ¹⁰ . |
| Contextual inquiry | These sessions were conducted at the schools, by one researcher. In the UK, the researcher briefly presented the project's goals to the educators, and started the interview. During the interviews, teachers were sometimes asked to show particular tasks, and some of their teaching material was photographed during or after the interviews. The interviews were recorded with an audio recorder, in order to allow a more precise analysis. The length of interviews varies from a minimum of 10 minutes to a maximum of 1 hour. |
| Observation | These sessions were conducted in the schools, by one researcher. In the UK, the researcher was seated in the classroom with the learners, making notes. The time spent for each session was 1 hour (the duration of a reading lesson). |

Table 10. Procedure of methods used in the British field study.

Results – This section presents the results of the learners' characteristics experiment sessions per assessment goal. These results are obtained from the diary study and from observations¹¹ of reading lessons.

G1 - Learners' favourite stories and story characters

This section¹² mainly presents a description of the learners' favourite books and stories and the reasons why they like these stories/books. In addition, the learners' favourite story characters (and the reasons why they like these) are listed and discussed.

The **favourite books and stories** that the learners picked are listed in Table 11. The books and stories that the deaf learners chose in the visited schools have slightly lower appropriate age levels than the books and stories the hearing learners chose in the visited schools. However, some of the hearing learners also picked books that are meant for much younger children. From the observations of reading lessons, it could be noted that the same age group (9 year old learners) read different stories in hearing versus deaf schools: whereas the hearing learners read and discussed a Harry Potter story with a lot of rich vocabulary describing the story's scenery, the deaf learners read the story "Horrid Henry" (Appendix 4) in an adapted version (with adjusted vocabulary and sentence structures). Both groups of children loved these stories.

| Hearing children | | Deaf children | |
|-------------------------------------|-----------------|------------------------|-----------------|
| Title | Appropriate age | Title | Appropriate age |
| Shuffle the Shoemaker | 6+ | Can't You Sleep Dotty? | 3+ |
| Harry Potter and the Goblet of Fire | 8+ | The Little Red Hen | 4+ |
| We're going on a Bear Hunt | 5+ | The Three Little Pigs | 4+ |
| Fat Alphonse in Love | 4+ | Lullabyhullabaloo | 5+ |
| The Gingerbread Man | 4+ | | |

Table 11. The children's favourite books and stories.

¹⁰ Although the diaries from Laycock Primary School will be sent in a later stage of the research.

¹¹ A summative transcript of the observations can be found in Appendix 4.

¹² Results are obtained mainly from a diary assignment (the numbers of learners presented in the text refer to the learners that made the diary assignment). Findings coming from the observations are explicitly mentioned in the text.

Aspects that made the learners mention these books and stories as their favourite ones were related to adventure, action, magic (spells, wizards), funny events (jokes, characters getting wet) or fantasy (fairies, princesses, dragons). Aspects added by the parents include the presence of pictures, being able to relate to the story (“*Because it is about a dog who can’t sleep and we have a dog!*”), and fun (“*This book makes her laugh.*”). Two of the learners (one hearing and one deaf child) seem to like their favourite story or book because they watched a video or film of it. The latter aspect was also found during the observation of hearing learners: many of these children love a story because they know the film. Most of them even seem to prefer the film over the book.

The learners’ **favourite characters** are listed in Table 12. Some children chose more than one character. Most of the choices for characters were based on attractive character qualities, cleverness, or adventures related to the character.

Not many differences were found between hearing and deaf children in the British sample. They seem to have similar preferences with respect to character liking.

| Hearing learners | | Deaf learners | |
|---|--|---------------------------------------|---|
| Character | Reason for choosing | Character | Reason for choosing |
| Catherine the caterpillar | She’s helpful | Dotty the dog | I like dogs, sometimes I can’t sleep too, I could go for long walks, play ball, eat biscuits, people like petting and cuddling dogs |
| Hermione Granger | She’s clever, knows everything about magic, looks like me, easy to get on with, I could go on adventures, I could do magic | The wolf (from The Three Little Pigs) | He’s clever |
| The little girl (from We’re Going on a Bear Hunt) | Cute, she’s seen a real bear | The princess | She’s kind, pretty, has a comfy bed, a big castle and nice clothes and things |
| Fat Alphie | Cute, cuddly, funny, naughty, he eats cake, nice, happy | The Monster | I could scare people |
| Character from 2 nd World War | <i>No explanation provided</i> | | |

Table 12. The children's favourite characters.

G2 - Learners’ likes and dislikes about reading

This section presents a description of the things that learners like and dislike about reading. This assessment goal was studied with the use of a diary assignment and with observations of reading lessons. This section mainly presents results coming from the diary assignment. Findings coming from the observations are explicitly mentioned in the text.

Likes about reading

Table 13 presents the top five elements that make reading fun according to the learners. Every element is illustrated by some quotes from the diaries.

| What makes reading fun? | Number of times mentioned | Quotes |
|-------------------------|---------------------------|--------|
|-------------------------|---------------------------|--------|

| Adventure & fantasy elements, stories that stimulate imagination | <ul style="list-style-type: none"> • 9 relevant likes by hearing learners • 3 relevant likes by deaf learners | "Magic, fairies and wizards." "Exiting things" "Fairy books" "Imaginary things" |
|---|---|--|
| Being able to learn from the book or story (content & language related) | <ul style="list-style-type: none"> • 4 relevant likes by hearing learners • 7 relevant likes by deaf learners | "It helps me to learn things and words." |
| Funny stories/events/characters | a) 2 relevant likes by hearing learners b) 3 relevant likes by deaf learners | "I like funny stories!" |
| Presence of pictures | <ul style="list-style-type: none"> • 3 relevant likes by hearing learners • 1 relevant like by deaf learners | "I like books with some pictures. I like to look at them." |
| Immersive stories & being able to relate to character | <ul style="list-style-type: none"> • 4 relevant likes by hearing learners • 1 relevant like by deaf learners | "A good book makes you want to keep reading so you find out the story." "When it feels you are actually there with the characters." |

Table 13. Learners' top five elements that make reading fun.

Learning was especially mentioned by deaf children. They seem very much aware that reading is good for their language skills, their vocabulary especially. Also, two of the deaf children's parents added notes about the importance of reading for their child's language skills. From the observations, however, it can be seen that deaf learners do not prefer stories that have the explicit intention of having them learn vocabulary or other language skills. Their enthusiasm and cooperation while reading a story about an adventure was much greater than while reading a story that was written purposely to teach them inference skills.

Another finding that stands out is that **adventure and fantasy elements** were mentioned more by hearing children than by deaf children. However, not many differences were found between the genres of books that children like. Perhaps this activity was interpreted differently by both groups of children (the deaf children seem to have focused more on aspects related to why reading is good for them). From the observations also, it is clear that children love adventure stories (e.g. Harry Potter stories).

Dislikes about reading

Two elements stand out that may discourage children from reading. First, some children mention that reading can be a **boring** activity (6 relevant dislikes were mentioned, 2 by deaf children): *"Sometimes, school reading books are a bit boring."* The second negative aspect that is mentioned quite a few times by the children is related to the **language** used, which is too difficult sometimes (4 relevant dislikes were mentioned, 3 by deaf children): *"I don't like reading if it's too difficult for me."*, *"I don't like to read books that are hard for me."* So again, language-related elements were mentioned more often by deaf children than by hearing children. This was also seen during the observations of the deaf learners' reading lesson:

they were far less enthusiastic to read a story that was written intentionally to teach them inference skills. They found the story too difficult and soon lost interest.

G3 - Learners' ability to interpret a short story

This section presents a description of learners' ability to interpret a short story. This description was made based on their ability to make a drawing of a short story¹³ (which essential elements of the story did they include into the drawing, providing an indication of how well they understood the meaning of the story), and on observations during the learners' interpretation of short stories during a reading lesson. The results of these methods are described separately.

Drawing of Three Billy Goats Gruff story

Table 14 shows the elements that were included in the drawing by both the hearing (5) and the deaf learners (3). The essential elements from the story (bridge, river, goats, monster) were present in all drawings. Four of the five drawings from hearing learners were very detailed, including differences between the amount of grass on each side of the bridge, movements of the goats or the monster, or specific events from the story. Of the deaf learners' drawings, one was highly detailed (e.g. mean facial expression of goat, creative monster), while the other two were more simplistic. In total, hearing learners included essential elements in about 70% of the cases, whereas deaf learners included them in almost 50%. It thus seems that the deaf learners of our study have more difficulties with grasping the essential elements and meanings of a story.

| Elements from story | Hearing learners | Deaf learners |
|---------------------------------------|-----------------------|-----------------------|
| 3 goats | 5 of 5 (all) | 2 of 3 |
| Bridge | 5 of 5 (all) | 3 of 3 (all) |
| River | 5 of 5 (all) | 2 of 3 |
| Grass on one side of river | 5 of 5 (all) | |
| Monster living under bridge | 3 of 5 | 2 of 3 |
| Goat(s) crossing bridge | 2 of 5 | 1 of 3 |
| Monster on bridge wanting to eat goat | 1 of 5 | 1 of 3 |
| Monster falling in river | 2 of 5 | 1 of 3 |
| Text | | 1 of 3 |
| Arrows indicating movement | 1 of 5 | 1 of 3 |
| Total: | 29 of 40 (72%) | 14 of 30 (46%) |

Table 14. Elements from the story drawn by the learners (5 hearing learners and 3 deaf learners).

Observation of the learners' interpretation of short stories during a reading lesson

From the observations of the reading lesson with hearing learners, no apparent difficulties with reading or interpreting texts could be observed. Hearing the children's answers to the teacher's questions and looking at the drawings they made of a (written) story scene, it can be observed that they understood the descriptions in the text.

During the observations of the reading lesson with deaf learners, the difficulties presented in Table 15

¹³ This story is presented in the diary assignments in Appendix 3. The drawings made by the learners are presented in Appendix 8.

(illustrated with some quotes or examples noted during the lesson) were observed.

| Difficulty | Quote/example |
|---------------------------------------|--|
| Understanding homographs | The learners only know one meaning of the word “star”. Other meanings are explained by the teacher. The learners do not immediately understand or recall this meaning. |
| Explaining a word | To the question “what is a star?”, a child answers: “Jesus” (because a star was shining on Jesus when he was born). |
| Making sentences | To the question “make a sentence with the word star”, a child answers: “A star in the sky”. |
| Past tense | To the question “why is the girl dizzy?”, a child answers: “because she <i>spinned</i> round and round”. |
| Inference | To the question “is Charlie a boy or a girl?” in the story “Charlie at home” (Appendix 4), a child answers “a girl”, because the next sentence contains the pronoun “she”. |
| Looking for hidden meanings in a text | To the question “why did dad paint the room yellow?” in the story “Charlie at home” (Appendix 4), no one knows the answer. |
| Understanding vocabulary | To the question “what does a tulip look like?” children don’t know the answer. The teacher searches for pictures to show them. |

Table 15. Deaf learners’ difficulties with the interpretation of text, observed during a reading lesson.

8.1.1.1.2 Expert-based field study

The main research goal of the experiment sessions described in this section is the characterisation of the learners by the “experts”, namely their educators. The learners are considered here as the object of our study. In fact, educators, both teachers and parents, are singled out to tell us about their “own” learners.

Experiment design - In order to reach this general research aim, a number of specific assessment goals are formulated, both in Italy and in the UK. These goals are studied by making use of diaries and contextual inquiries (which were theoretically described in previous sections of this document). Table 16 presents these assessment goals, and the diary and contextual inquiry topics used to fulfil them. Diaries were filled in by the parents; interviews were conducted with the teachers. A complete overview of the (British) parents’ diary assignments can be found in Appendix 3.

| # Goal | Description of assessment goal | Diary topics used to assess experts’ opinions | Contextual inquiry topics used to assess teachers’ opinions |
|-----------|---|--|---|
| UK | | | |
| G1 | Description of educators’ knowledge of reading comprehension problems | Assignment 4 in teachers’ diary (Appendix 5): Create a mind map representing topics you associate with reading comprehension. Assignment 5 in teachers’ diary (Appendix 5): List the likes, dislikes and problems of good and poor comprehenders. | Describe a good comprehender and a poor comprehender in your classroom. What are the differences? |
| G2 | Description of parents’ thoughts on their child’s reading behaviour. | Assignment 1 – 3 in the learners/parents diaries (Appendix 3). | -- |

Table 16. Assessment goals in the study of the experts' (parents and teachers) opinions.

Expert description – In the UK, experts involved in these experiment sessions were parents and teachers (see section 8.1.1.1.1). The parents are the parents of the learners who filled in the diaries.

Experiment execution – The same of the user-based field study (see section 8.1.1.1.1).

Results – Results are presented according to the assessment goals.

G1 – Educators' knowledge of reading comprehension problems

This assessment goal refers to (a) educators' general associations with the concept "reading comprehension", and to their descriptions of (b) good comprehenders and (c) poor comprehenders. These aspects are described separately in this section.

- **Associations with the concept "reading comprehension"**

Appendix 7 shows a compiled mind map of four educators' (of hearing learners) associations with the concept "reading comprehension". From this mind map, it is obvious that these educators mainly associate this concept with positive aspects, such as fun, excitement, interaction, escaping from reality etc. This might not be the case for educators of deaf learners. However, the assignment was only completed by the educators of hearing learners, making it difficult to derive these kinds of conclusions.

- **Knowledge of good comprehenders**

Hearing good comprehenders are described by all educators as good word decoders. They are able to understand what the author means and why the author uses certain types of words. When you ask these pupils questions about a text, they immediately know where to look for the answers.

- **Knowledge of poor comprehenders**

Table 17 displays the difficulties of hearing and deaf poor comprehenders, as described by their educators. More difficulties are mentioned by educators of deaf learners than by educators of hearing learners. This might indicate, on the one hand, that educators of deaf learners are more aware of the problem than educators of hearing learners. On the other hand, it might also indicate that a hearing poor comprehender does not have entirely the same reading comprehension difficulties as a deaf poor comprehender may have.

| Difficulties/problems with | Example/quote given by the educator |
|--|--|
| Hearing poor comprehenders | |
| Decoding words | – |
| Phonetic strategies | – |
| Reading fluency | The text is read as a sequence of separate words. |
| Unability to understand the whole of a sentences, paragraphs and texts | When discussing verbs in a text, poor comprehenders first need more guidance about the significance of "a verb". Teachers first discuss with them what a verb is. |
| Deaf poor comprehenders | |
| Understanding passive tense | – |
| Understanding passive phrases | "The cow kicks the dog" = "the dog was kicked by the cow", but deaf children will easily turn "the dog was kicked by the cow" into "dog kicked cow", and thus into "the dog kicks the cow". The children put |

| | |
|---|---|
| | things together incorrectly. They take little bits from the text and just put them together, often resulting in wrong meanings. |
| Understanding colloquialisms | “To run a shop”: this doesn’t mean anything in sign language. These kinds of expressions have to be explained using drawings. |
| Delayed thinking skills and language acquisition | – |
| Poor vocabulary | Use of keywords instead of phrases. No use of “the little words” in a language that give clues to the meaning. The sentence “soft and silent, she swooped through the trees” is signed as “flying” (moving the arms like a bird). This doesn’t give any vocabulary at all, it is a very iconic vision of something, like painting a picture, but it does not give any extra words, the alliteration is lost, etc. |
| Recognising word categories (e.g. homographs, colloquialisms, imagery) | When you ask the children “What is the difference between a tent and a house?” they will not have an answer, since they don’t have the categories and the vocabulary to explain that a tent is made of fabric and a house is made of stone. |
| Recognising specific text structures (e.g. prepositions, past tenses, plurals, nouns, pronouns, contractions) | In the sentence “There is a cup. Give me <u>it</u> .” The children do not immediately understand that “it” refers to the cup. |
| Understanding the whole of a text | “These children’s focus is on reading the words; that is all they think about. They read the content, but cannot work anything out based on the context.” |
| Speed of language processing | “A lot of time is needed to process all the language offered to the children. They need small chunks, otherwise they get confused.” |

Table 17. Deaf poor comprehenders’ difficulties with reading comprehension, as described by the educators.

G2 – Parents’ thoughts on their child’s reading behaviour

Parents mainly gave their ideas about the importance of reading, their children’s preferred genres and their children’s favourite types of stories.

Two of the deaf children’s parents added notes about the **importance of reading** for their child’s language skills. One of these parents seemed to feel that he/she should encourage his/her child to read more. The other parent mentioned that he/she constantly stimulates his/her child to read and to reward the child when she is reading well.

The parents listed many **genres** that are preferred by their children. Many children prefer fiction over factual books. The most popular genres include:

- Adventure (7 relevant genres were mentioned, 4 by parents of a deaf child)
- Fantasy including fairy tales (4 relevant genres were mentioned, 1 by parents of a deaf child)
- Factual books (4 relevant genres were mentioned, 2 by parents of a deaf child)
- Comics (3 relevant genres were mentioned, 2 by parents of a deaf child)

Regarding the aspects that make a **good story**, parents think their children like the following aspects: the presence of pictures, being able to relate to the story (“*Because it is about a dog who can’t sleep and we have a dog!*”), and fun (“*This book makes her laugh.*”).

8.1.1.2 Educators

In order to rich the common aims, in the UK bureaucratic issues constraint researchers to only run the following experiments with classroom teachers.

Experiment design – The main research aim of the experiment sessions described below is the characterisation of educators. In order to reach such an aim, a number of specific assessment goals are formulated. These goals are studied by making use of diaries, contextual inquiry (interviews) and observational methods. Table 18 presents the assessment goal and the contextual inquiry used to describe it. A complete overview of educators’ diary assignments can be found in Appendix 5. A list of the interview topics and questions is presented in Appendix 6.

| # Goal | Description of assessment goal | Contextual inquiry topics used to assess educators’ characteristics |
|--------|---|--|
| G1 | Description of educators’ personal data | Questions about educators’ personal data, such as age, year they teach, are they classroom teachers etc. |

Table 18. Assessment goals and methods used to fulfil these goals in the study of the educators’ characteristics.

User description – The users involved in the British sessions (teachers) were presented in Paragraph 8.1.1.1.1.

User teaching – The user instruction is as presented in Paragraph 8.1.1.1.1.

Experiment execution – The British field study execution periods, together with participants and methods, are presented in Paragraph 8.1.1.1.1.

Results – The results of the field study describing the educators’ characteristics are described for the single assessment goal.

G1 – Educators’ personal data

All educators (6) involved in the British field study were classroom teachers. All of them are female. Their age ranges between 25 and 55.

The educators of deaf learners are actually teachers in the deaf unit of a mainstream school. In each school, two educators were interviewed. Of each of these, one was a teacher of Year 3, the other one was a teacher of Year 5.

All of these educators were very enthusiastic about their job as a teacher.

8.1.2 Tasks

The main research goal of the experiment sessions described below is the characterisation of the users’ tasks, starting from the common aims.

Experiment design – In order to reach this general research aim, a number of specific assessment goals are formulated. These goals are studied by making use of diaries, contextual inquiry (interviews) and observational methods (which were theoretically described in previous sections of this document). Table 19 presents these assessment goals, and the diary, contextual inquiry and observation topics used to describe them. A complete overview of teachers’ diary assignments can be found in Appendix 5. A list of the interview topics and questions is presented in Appendix 6.

| # Goal | Description of assessment goal | Diary topics used to assess educators' tasks | Contextual inquiry topics used to assess educators' tasks | Observation topics used to assess educators' tasks |
|-----------|--|---|--|---|
| UK | | | | |
| G1 | Educators' working strategies | -- | What is the course of a reading lesson? | Observation of the course of a reading lesson. |
| G2 | Educators' teaching materials | Assignment 2: list the characteristics of good stories. Assignment 6: list the computer programmes you use to prepare and teach your lessons. Assignment 3: how do you assess learners' comprehension of a story? | Which stories and books do you use during your reading lessons? Which reading comprehension instruction models do you make use of? Do you make use of a computer to prepare and teach your lessons? Do you use a lot of pictures? Do you make use of dictionaries? | Observation of materials used during a reading lesson. |
| G3 | Educators' strategies to support reading | Assignment 1: write a letter of advice to a colleague who needs help with some students with typical reading comprehension problems. | Which questions do you pose in relation to comprehending a story? How do you deal with poor comprehenders? | Observation of educators' methods to teach/support reading comprehension. |
| G4 | Educators' methods to motivate learners to read. | -- | How do you motivate your pupils to read? | Observation of educators' methods to motivate the learners. |

Table 19. Assessment goals and methods used to fulfil these goals in the study of the educators' characteristics .

User description – The participants (teachers) of the British sessions were presented in Paragraph 8.1.1.1.1.

User teaching – For this part of the British field study, the user instructions as presented in Paragraph 8.1.1.1.1 were used.

Experiment execution – The British experiment execution periods are presented in Paragraph 8.1.1.1.1.

Results – Below, we present the results of the educators' tasks' experiment sessions per assessment goal. These results were obtained from the diary study, contextual inquiry and observations¹⁴ of reading lessons.

G1 – Educators' working strategies

This section thus presents the educators' working strategies, i.e. how they generally work in the classroom and what the **general course of a reading lesson** is.

The educators (of both hearing and deaf learners) all mentioned that they do not really speak of "reading lessons". Instead, they teach the following lessons:

¹⁴ A summative transcript of the observations can be found in Appendix 4.

- **Guided reading lessons**

Children are split up into groups according to their reading level or they get a guided reading lesson alone with the teacher. Together with the teacher, they work through a level-appropriate book. They start by reading a chapter, and afterwards they discuss this together with the teacher and/or the group. During this discussion, the teacher asks questions like: what happened in this chapter, what do you think will happen next, etc.

- **Literacy lessons**

These lessons involve all sorts of topics related to literacy: language, vocabulary, spelling, grammar, reading, writing, etc. The literacy lessons are mostly taught in the context of a topic. Besides that, each session has a focus. All educators agree that there is no such thing as a standard, “routine” literacy lesson, but most often, a lesson consists of a sequence of short and rather diverse activities. For the hearing learners especially, these activities are strongly connected and linked to each other. For the deaf learners, too, lessons are sometimes focused on a specific topic, but other times, they are a sequence of rather separate and detached activities. Table 20 presents an example of some literacy lessons’ schemes, both for hearing and deaf learners. The differences between these schemes suggest that hearing learners’ lessons are more advanced, whereas literacy lessons for deaf learners demand more explanation and more basic exercises, in our sample.

| Literacy lessons’ schemes | |
|---|---|
| Hearing learners | |
| <p><i>Topic: story openings</i></p> <p>Read a story together. Looking at the different parts and the structure of the story. Studying adjectives, similes etc. Writing the first sentence of a story, and discussing what good story openings look like.</p> | <p><i>Topic: descriptions in stories</i></p> <p>Reading an extract of a story. Make a drawing of the scene described in this story. Reading the story again. Discussing the adjectives used by the author to describe the scene. Colouring the drawing. Watching the scene from the film (based on the written story). Discussing the differences between story and film. Writing down the answers to some questions about the story.</p> |
| Deaf learners | |
| <p><i>No specific topic</i></p> <p>Practicing homographs: discussing a word (“star”) that can have different meanings. Making sentences: adding words to a sentence, maintaining a correct meaning of that sentence. Reading a story and looking for hidden meanings in that story (inference exercise). Reading an extract of another short story to learn vocabulary.</p> | <p><i>Topic: following instructions</i></p> <p>The day before, children were asked to come into class and put some extra clothes on, in the wrong order. During this activity, words related to instructions were used: first, last, next, then, after ... They did a vocabulary exercise about this activity: they were shown a number of pictures of clothes, and had to connect these pictures to the names of the clothing. The day afterwards, teacher and children talked and signed about this activity: children tried to remember what they did. They write sentences about the activity on the whiteboard. In these sentences, they have to use important words in relation to instructions: first,</p> |

| | |
|--|--|
| | last, next, then, after. The goal is to become familiar with these words, and to start using them. |
|--|--|

Table 20. Literacy lessons' schemes, for hearing learners and deaf learners.

G2 – Educators' teaching materials

This section describes results separately for the following teaching materials: (a) stories and books (including the characteristics of these stories that make them appropriate for use during reading lessons) – (b) reading comprehension instruction models – (c) computer and other technology – (d) pictures and (e) dictionaries.

(a) Stories and books

Table 21 presents examples of **stories and books** used during literacy lessons and during guided reading lessons, for both hearing and deaf learners. The age-appropriate levels of the books and stories used for hearing learners are higher than the ones used for deaf learners. In addition, deaf learners' books are often especially adapted (changing vocabulary and sentences, adding pictures) to further support the learners' needs. Furthermore, educators often write stories (intentionally written to teach specific language aspects, such as inference) themselves or make picture books together with their pupils.

| Hearing learners | | Deaf learners | |
|-------------------------------------|-----------------------|---|--|
| Book/story | Age-appropriate level | Book/story | Age-appropriate level |
| The Iron Man (Ted Hughes) | 7+ / 9+ | Harry Potter stories with adapted vocabulary and pictures added | ? |
| Street Child (Berlie Doherty) | 8+ | Daisy books, e.g. "Eat your peas" (Kes Gray & Nick Sharatt) | 5+ / 7+ |
| Alice in Wonderland (Lewis Carroll) | 9+ | Horrid Henry stories (Francesca Simon), with pictures added to explain vocabulary | 5+ |
| The silver chair (C.S. Lewis) | 7+ | Educators write the stories themselves | Especially adapted to learners' needs and difficulties |
| | | Educators make picture and sentence books with the learners | Especially adapted to learners' needs and difficulties |

Table 21. Books and stories used during literacy and guided reading lessons for hearing and deaf learners.

Table 22 presents the top five of **important characteristics of good stories**, illustrated with some quotes of educators. Characteristics such as appropriate language and illustrative pictures were mainly mentioned by the educators of the deaf learners. Educators of hearing learners put more focus on typical "fun" story elements such as the characters and elements of suspense.

| Story characteristic | Number of times mentioned | Quote |
|--|---------------------------------|--|
| Characters readers can relate with | 3 educators of hearing learners | "Interesting characters children can relate to." |
| Engaging, exciting stories encouraging imagination | 4 educators of hearing learners | "Engages children from the outset." "Imaginative, allows children's imagination to take off." |

| | | |
|--|--|---|
| Appropriate language – understandable but challenging to learn new words | 1 educator of hearing children, 2 educators of deaf learners | “It is written in a language that children understand, yet pushes the boundaries so that children can question vocabulary and learn the meaning and spelling of new and important key words.” |
| Elements of suspense, tension | 3 educators of hearing learners | “Contains exiting events that children want to read on for.” |
| Illustrative pictures | 1 educator of hearing learners, 2 educators of deaf learners | “Well illustrated.” |

Table 22. Good story characteristics described by educators of hearing and deaf learners.

(b) Reading comprehension instruction models

Educators of hearing learners try to work according to the National Strategies (<http://nationalstrategies.standards.dcsf.gov.uk/>), but they adapt a lot of this material. The language, for example, often has to be adjusted according to the children’s specific needs. Educators do go through the different phases of the National Strategies, but sometimes a lesson can be totally different from what was prescribed. These educators also make use of SAT reading comprehension tests (<http://majortests.com/sat/reading-comprehension.php>).



Figure 2. Oxford Reading Tree: story book and questions booklet.

Educators of deaf learners also make use of reading comprehension instruction models, but when they do, they have to adapt them. The materials can be used, but only with a high level of support. Whereas educators of hearing learners say something and then move on to the next subject, educators of deaf learners have to explain everything. Therefore, much material is made or adapted by the educators, according to the needs of every individual pupil. An example of this material is the Oxford Reading Tree (<http://www.oup.com/oxed/primary/oxfordreadingtree/>, example in Figure 2). The books and reading comprehension booklets are used, but only for showing where the child is in reading comprehension.

(c) Computer/technology use

All teachers make use of an interactive whiteboard (<http://smarttech.com/>, see Figure 3) for preparing

their lessons, and during lessons. Especially the educators of deaf learners mention that the use of the computer is extremely important, because they need to make everything very visual. Some of these educators do graphic or photographic work such as creating illustrations or displays. Some of them also make use of software to enrich reading material with sign language (ITV signed stories and MyBSL Books). Google Images was explicitly mentioned several times as a very rich source of information to support comprehension of stories.



Figure 3. Interactive whiteboard, used to prepare and to teach (literacy) lessons.

Besides the computer, the educators of deaf learners also use other technology, e.g. a **camera** to make photos of activities (and use these to explain language concepts and to make sentences), and a **video camera** to make analyses of the children's language progress.

(d) Pictures

The importance of pictures was mainly mentioned by the educators of deaf learners. For hearing learners, pictures are rather "illustrative" and "nice to have" features, whereas the deaf learners really need them to comprehend text. Pictures are used to:

1. describe the setting of a story, or an event,
2. show "the big picture" of a story,
3. relate to the children's environment and to their own life,
4. explain vocabulary (example in Figure 4),
5. visual comparing (to help develop language).



Figure 4. Linking pictures of clothing to the names of the clothing.

(e) Dictionaries

The use of dictionaries depends on the age of the learners – younger children do not use them yet. For the deaf learners of our sample, mostly visual dictionaries are used (example in Figure 5). However, with Google Image, dictionaries are less frequently used now in our samples.

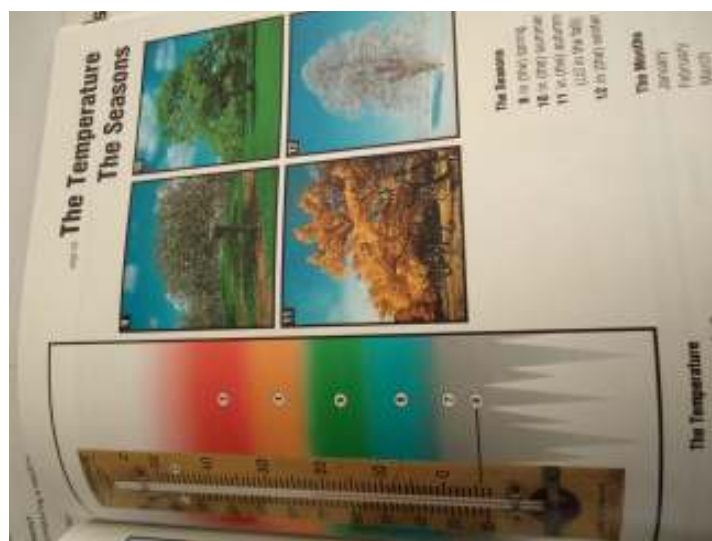


Figure 5. A visual dictionary.

G3 – Educators' strategies to support reading

This section first presents educators' most frequently used strategies to support reading comprehension, and then it describes one of these strategies (namely asking questions about a text/story) into some more detail.

Table 23 presents the most common **strategies used to support reading** in poor comprehenders. Results are shown for both educators of hearing learners and educators of deaf learners together, and for educators of hearing learners and deaf learners separately. Educators in deaf schools do not often mention any strategies used to foster **autonomous** reading comprehension. They prefer actions aimed at giving

direct support (e.g. teaching specific text elements) to the child or to explain the text. This is slightly different for the educators in hearing schools: they do suggest more strategies aimed at stimulating autonomous reading (e.g. searching for clues).

| Strategy | Number of times mentioned | Quote |
|---|--|---|
| General | | |
| Discussing texts together with the children | By all educators | “You could also take extracts from a story and look at these together as a class, discussing the structure, content, writer's opinion, character's feelings, etc.” “We promote discussion of what goes beyond the text.” |
| Asking a lot of questions to check the children's comprehension | 2 educators of hearing learners and 2 educators of deaf learners | “Read a small amount of story, then stop. Ask a few questions: What do you think happened there? Why do you think it happened? Which part of text tells you this? What do you think might happen next?” |
| Use drama exercises | 1 educator of hearing learners and 2 educators of deaf learners | “Children ask questions while one child assumes the role of a character from a story and answers questions according to how they think the character would think/feel/behave.” “Acting out the story could also help.” |
| Hearing | | |
| Writing exercises | | “Encourage children to write a book report on books they read, what the story was about, what was the plot, who were the characters, can they suggest alternative endings.” |
| Guided reading | | “If a child is struggling with this [answering specific questions about a text] it may be beneficial to go through with them to demonstrate how you find the answers.” |
| Searching for clues in texts | | “You could ask children to become detectives and look for clues which tell you what a person/character is feeling/thinking.” |
| Paired reading | | “You could also encourage paired reading where children read a chapter and then discuss together the main characters, events, etc.” |
| Deaf | | |
| Matching texts to individual children's language levels | | “First of all we have to match text to individual children's receptive and expressive language levels. If children are at a one or two word level then the text must match this. Often we rewrite texts to match language levels.” |
| Adding lots of pictures to provide visual clues and to explain unknown vocabulary | | “We use Google Images to help explain unknown vocabulary. This resource is invaluable.” |
| Teaching specific text elements | | “We teach specific structures starting at single word level e.g. nouns; working through two word level etc towards more complex structures such as prepositions, past tenses, plurals, pronouns, contractions, relative clauses.” “We teach categories, homographs, colloquialisms, imagery. All of these things can impede understanding. For example “The boy lost his pencil. I wonder where it is.” Deaf children need to be taught that the pronoun “it” refers to the pencil.” |

Table 23. Educators' most commonly used strategies to support reading comprehension.

One of the strategies mentioned very often by educators, is asking **questions** about the text. Table 24 lists the types of questions (with some examples) that are posed for this purpose. Both in deaf and in hearing schools, educators mainly try to make use of more **abstract** questions, relating to feelings, opinions, reasons, and to the meaning of the text. Educators in deaf schools, however, apparently are obliged to also pose questions relating to more basic language aspects such as vocabulary and inference, since the deaf learners need a more detailed explanation of the text.

| Question type | Example |
|---|--|
| Hearing learners | |
| What might happen next? | – |
| Look at the cover of this story and describe what kind of story this could be. | – |
| Find verbs, adjectives. | Finding all adjectives in an extract of a Harry Potter story, and explaining what they mean. |
| Why is this character feeling sad, ...? | – |
| Questions relating to the prediction of a story event, to try to get into the mind of the author. | – |
| Have a student think about what another just said: do they agree with this? | “Do you agree with what ... just said? Why not?” |
| Questions are also based on things that were done in class before, for example make comparisons with other stories, and refer to other books. | After reading a Harry Potter story, the teacher asks the children if the descriptions in the story are similar to the descriptions in a story they read last week. |
| Deaf learners | |
| Retell the story. | – |
| Comment on the story. | “Do you like Horrid Henry?” (see story “Horrid Henry” in Appendix 4) |
| Who, what, where – questions about the story characters. | “Who is ‘she’?” (See story “Charlie at home” in Appendix 4). |
| When – these questions are harder than who, what, where because they are about the time, which is more abstract. | “What season is it?” (See story “Charlie at home” in Appendix 4) |
| Why – these questions are harder than who, what, where – questions because they are more abstract. | “Why did dad paint the room yellow?” (See story “Charlie at home” in Appendix 4). “It was a grey day and the boy was feeling blue.” – “Why does it say ‘grey’ here?” (Children do not make the inference to the emotion). |
| Pictures are also often a basis for questions. | “What is on this picture?” |
| Questions about the vocabulary: what does that word mean? | “What does “to shriek” mean? Show me what it means.” |
| Abstract questions: about feelings and emotions, what might happen next, what could have happened? | “Why is Horrid Henry so angry?” (See story Horrid Henry in Appendix 4). |

Table 24. Questions asked about a text to support reading comprehension.

G4 – Educators’ methods to motivate learners to read

All the educators agree that most children like to read. Some of them thus don’t have to be motivated to read. However, some motivation strategies were mentioned by teachers of hearing and deaf learners. These are presented in Table 25. Both of them mention that the books or stories should be fun. But in addition, teachers of deaf learners describe a lot of other methods to motivate the pupils, whereas teachers of hearing learners focus on the fact that the learners really like reading.

| Motivating hearing learners | Motivating deaf learners |
|--|--|
| <p>Make use of good stories and books ["Texts need to be chosen that really appeal to children. These should be "versatile" texts: they are not made up of just one dimension, but instead are able to create different ideas in different people. They should evoke senses and emotions. They have to be well written and challenging to the children, and they have to contain vocabulary that is not too difficult or too easy for the children. "Cross-curricular" books are also very interesting: these bring in ideas from other domains or courses, e.g. geography."]</p> | <p>The books and reading activities have to be interesting, fun and exciting. ["For example, at Easter, the teachers hide eggs, the children search for the eggs, they make photos of this, and then they create a book with the photos and sentences. The children's own experience is often used as the basis for reading, which is exciting to them."]</p> |
| | Teachers put books everywhere in the classroom. The children like looking at books. |
| | Technology makes the difference: if used in the right way, it has a big impact and it is very motivating. |
| | A lot of rewards are used: stickers, stars, team points. |
| | Teachers try to make the children realise that they have the power to search for meaning, that they can't give up. The children have to be taught to look for clues, and that these are sometimes difficult to find. Spontaneously, the children just read on, they don't stop and think. |
| | Literacy lessons are made as interesting and as natural as possible. For example, teachers don't spend an entire session on punctuation exercises, because that just doesn't work, the children do not take it in. Instead, they try to teach this more naturally: for example, the children are asked to use punctuation while they are writing. |

Table 25. Strategies to motivate learners to read.

8.1.3 Physical Environments

Since information about the second and the third environments are easily gathered from official documentations, they were reported in Chapter 7, only novel information about the physical environments is analysed here.

The goal of the experiment sessions presented in this section is the description of the physical environment in which learners read and improve reading comprehension in general, according to common aims described in the introduction of this chapter.

Experiment design – In order to reach this general research aim, a number of specific assessment goals are formulated. These goals are studied by making use of (educators') diaries, contextual inquiry and observational methods. Table 26 presents the studies' specific goals, and the diary, contextual inquiry and observation topics used to describe these goals. A complete overview of the educators' diary assignments can be found in Appendix 5. A list of the contextual inquiry (interview) topics and questions is presented in Appendix 6.

| # Goal | Description of assessment goal | Diary topics used to assess the physical | Interview topics used to assess the physical | Observation topics used to |
|--------|--------------------------------|--|--|----------------------------|
|--------|--------------------------------|--|--|----------------------------|

| | | environment | environment | assess the physical environment |
|-----------|--|---|--|---------------------------------------|
| UK | | | | |
| G1 | Places where learners prefer to read – persons that learners prefer to read with | Topics mentioned throughout all assignments | Description of places and persons by educators | -- |
| G2 | School environment | Topics mentioned throughout all assignments | Description of environments/materials by educators | Observation of schools and classrooms |

Table 26. Assessment goals and methods used to fulfil these goals in the study of the physical environment .

User description – The participants and methods used to describe the physical environment of learners and educators are the same as the ones presented in Paragraph 8.1.1.1.1.

User teaching – The users participating in these sessions are the same as the ones presented in Paragraph 8.1.1.1.1.

Experiment execution – For the British field study, the experiment execution periods are described in Paragraph 8.1.1.1.1.

Results – The results of the study of the learners’ and educators’ physical environment are described per goal.

G1 – Places where learners prefer to read – persons that learners prefer to read with

The environment where learners like reading, and the persons they like reading with, are mentioned by educators throughout several diary assignments and interview questions. In general, the educators agree that most learners love going to school. Educators of deaf learners all emphasise that, although they do sometimes, learners do not like reading by themselves. When they read alone, they have much more difficulties to focus on the text. They do not spontaneously ask themselves questions about the meaning of the text, and thus easily lose both their attention and their ability to grasp the meaning of a story. When reading with an educator, they get a lot of individual attention, which they like, and they are able to discuss the text. The educator constantly asks them questions about the story, enabling them to keep track of the meaning of the story. Learners also read together with their parents. Their favourite books and stories are usually read to them multiple times (ranging from 3-4 times to even 50 times).

G2 – Educators’ and learners’ school environment

In all of the schools, classrooms were pleasant, and putting a lot of emphasis on stories and on reading: walls decorated with story characters, posters, maps, words and pictures; and books available all around. All classrooms were provided with an interactive whiteboard, which was used throughout the lessons. Class activities are often done at different “locations” in the classroom; for example sitting on the ground, sitting at the table, sitting at the computer table, walking around in the classroom.

8.2 Field Studies in Italy

In Italy, the TERENCE team (UniPD, UniVR, and UniAQ) conducted these field studies in three different

schools in three cities, two in the North and one in the Centre of Italy. Notice that, since the reported analyses come from a small sample, in particular for deaf children, we do not clearly aim at inferring the results as valid for our population (learners or educators).

8.2.1 Users' Characteristics

The first interaction between the TERENCE WP1 Italian researchers and the system's learners and educators aimed at deepening the analysis of their characteristics, in particular, how they perceive reading.

8.2.1.1 Learners

We consider three type of learners: hearing poor comprehenders (**HPC**), deaf poor comprehenders (**DPC**), and good comprehenders (**GC**).

8.2.1.1.1 User-based criteria

In this section, GCs, HPCs and DPCs are the actors of our study since they are directly involved in the experiment sessions with diaries and observations.

Experiment Design – Starting from the common aim, the Italian team fixed the following assessment goals:

- G1 – Interest for book reading;
- G2 – Interest for game consoles;
- G3 – Interest for cartoons.

To assess these goals, the TERENCE team used diaries and observational methods. Diaries were designed to be compiled at home with parents, observations were conducted at school (Table 27).

| Italy |
|---|
| <p>Diaries (see Appendix 8) are used for G1, G2, and G3;</p> <p style="padding-left: 20px;">Page 3 for G2 (e.g., “put here a picture of your favourite videogame!”);</p> <p style="padding-left: 20px;">Page 4 for G1 (e.g., “draw the last story you read!”);</p> <p style="padding-left: 20px;">Page 6 for G3 (e.g., “tell us the last episode of your preferred cartoon”);</p> |
| <p>Observations are used for G1, G2, and G3;</p> <p style="padding-left: 20px;">G1 – e.g., we observe how learners draw their favourite story;</p> <p style="padding-left: 20px;">G2 – e.g., we observe the drawing made by the learners about the request “please draw your favourite cartoon”.</p> <p style="padding-left: 20px;">G3 – e.g., we observe the satisfaction/unsatisfaction in response to the requests “do you have any videogame console?”</p> |

Table 27. Italian learners, goals of user-based field study.

User Description – Users involved in these experiment sessions are learners coming from several schools (Table 28). In the first three columns we list the schools and the classrooms, in the last six columns, we list: the number of learners involved (# L), the number of deaf learners (# D), the number of hearing learners (# H), the number of good comprehenders (#GC), the number of deaf poor comprehenders (# DPC), and the number of hearing poor comprehenders (#HPC).

| ID | City | School Name | # L | # D | # H | #GC | #DPC | #HPC |
|----|------|-------------|-----|-----|-----|-----|------|------|
|----|------|-------------|-----|-----|-----|-----|------|------|

| | | | | | | | | |
|----|----------|------------------------|----|---|----|----|---|---|
| AZ | Avezzano | Istituto Mazzini (3A) | 22 | 2 | 20 | 12 | 2 | 8 |
| AZ | Avezzano | Istituto Mazzini (4B) | 21 | 1 | 20 | 15 | 1 | 5 |
| CA | Campalto | Scuola G. Pascoli (3A) | 21 | 1 | 20 | 14 | 1 | 6 |

Table 28. Learners participating in the diary study and the observations (Italy).

Two classrooms of the Istituto Mazzini in Avezzano (L'Aquila) and one classroom of the Scuola G.Pascoli in Campalto (Venezia) were involved in these experiment sessions. Only 13 diaries were collected, all of them came from the Avezzano schools, belonged to hearing learners, none of them was a poor comprehender. Please note that the assessment of poor comprehension came from the MT test. The percentages of HPC (40%, 25% and 25%) are in line with the figures reported in Chapter 6.

User Teaching – Before performing the experiments' sessions, the TERENCE WP1 Italian team contacted the schools and sent them the TERENCE brochure explaining the project goals. When the schools accepted to be involved in the project, the team contacted personally one coordinator per school, explained the protocol of the experiments, and submitted the informed consent for learners. The team agreed with them the organisational issues (e.g., meeting time, sequence and nature of inquiries), discussed and gave them the diaries. Moreover, the team asked teachers to let the parents sign the informed consent. When the experiments' sessions dates arrived, the team met the involved educators and, with them, decided the local organisation (e.g., the sequence of sessions, MT test organisation, etc.) and their respective roles.

Experiment Execution – The TERENCE WP1 Italian team conducted the experiments' sessions in different dates (see Table 29).

| ID | Period/Date | Classroom | # Diary | # Observation | #Learners |
|----|--------------------------|-----------|---------|---------------|-----------|
| AZ | 15 December – 6 January | 3 A | 10 | 1 | 22 |
| AZ | 15 December – 6 January | 4B | 3 | 1 | 21 |
| CA | 20 December – 20 January | 3A | 0 | 1 | 21 |

Table 29. Dates of users' characteristics sessions in Italian schools.

As highlighted in the third column of Table 29, the period was very long. It depended on the fact that, in the first date, the team explained the diaries, and left them at school. Then, in the last date, the team went to the school for observations, and collected the compiled diaries.

Moreover, observing Table 29, please note that there are two different sets of experiments' sessions, detailed below:

- Set A: experiments sessions of diaries collection – rows 1 and 2. Generally, learners compiled diaries at their own houses with their parents. When the team collected the diaries, they archived them. The analysis of the diaries was made when the collection ended. The time spent for compiling the questionnaires was estimated in 10 minutes per day for 7 days.
- Set B: experiments sessions of observations – rows 1, 2 and 3. All these sessions were performed at schools. Only one member of the team made these experiments sessions. Generally, before starting, the team member asked teachers to manage the informed consent for learners. Then, to minimise the stress for children, the team member participated as a “special” teacher in the lesson, took care of the MT tests, asked to draw, and took notes. The time spent for each session was of 5 hours (a normal school day).

Result Analysis – To describe the results of these experiments sessions, we present them set per set.

Afterwards we analyse the data. In particular:

- Set A: since diaries deal with goals G1, G2, and G3, in the following table we summarise the results for each goal. Note that only GCs (and their parents) were involved in these experiments sessions. Let us explain the acronyms: LL = low level of interest, ML = medium level of interest, and HL = high level of interest.

| School | Learners' ID | Class-room | G1 | G2 | G3 |
|--------|--------------|------------|----------|-----------|-----------|
| AZ | 1 | 3A | ML | HL | HL |
| AZ | 2 | 3A | ML | HL | HL |
| AZ | 3 | 3A | LL | HL | HL |
| AZ | 4 | 3A | LL | HL | HL |
| AZ | 5 | 3A | ML | HL | HL |
| AZ | 6 | 3A | HL | HL | HL |
| AZ | 7 | 3A | ML | HL | HL |
| AZ | 8 | 3A | LL | HL | HL |
| AZ | 9 | 3A | LL | HL | HL |
| AZ | 10 | 3A | HL | HL | HL |
| AZ | 11 | 4B | ML | HL | HL |
| AZ | 12 | 4B | LL | HL | HL |
| AZ | 13 | 4B | ML | HL | HL |
| | | | LL = 38% | LL = 0% | LL = 0% |
| | | | ML = 46% | ML = 0% | ML = 0% |
| | | | HL = 16% | HL = 100% | HL = 100% |

Table 30. Assessment of G1, G2 and G3, using diaries.

- (1) Set B: since observations deal with goals G1, G2, and G3, in the table we report on the data analysis goal per goal, considering the users' types. In details, since all deaf children are DPCs, the types of users we consider are GC, HPC and DPC. HL, ML and LL have the same meaning as in Set A, while S = Schools' City and C = Classroom.

| S | C | G1 | | |
|---------|----|--|---|--------------------------------------|
| | | GC | HPC | DPC |
| AZ | 3A | 16.6% LL, 50.1% ML, 33.3% HL | 12,5%LL, 37,5% ML, 50% HL | 0%LL, 33,3% ML, 77.7% HL |
| AZ | 4B | 13.3% LL, 60.1% ML, 26.6% HL | 20%LL, 40% ML, 40% HL | 0%LL, 0% ML, 100% HL |
| CA | 3A | 21.4% LL, 50% ML, 28.6% HL | 16,6%LL, 33,3% ML, 50% HL | 0%LL, 0% ML, 100% HL |
| Average | | LL = 17.1% ML = 53.3% HL = 29.6% | LL = 16.5% ML = 36.9% HL = 46.6 % | LL = 0% ML = 11.1% HL = 88.9 % |
| S | C | G2 | | |
| | | GC | HPC | DPC |
| AZ | 3A | 8.3% LL, 58.3% ML, 33.4% HL | 12.5%LL, 12.5% ML, 75% HL | 0%LL, 0% ML, 100% HL |
| AZ | 4B | 16.6% LL, 50.1% ML, 33.3% HL | 20%LL, 0% ML, 80% HL | 0%LL, 0% ML, 100% HL |
| CA | 3A | 14.3% LL, 57.1% ML, 28.6% HL | 16,6%LL, 16.6% ML, 66.8% 6HL | 0%LL, 0% ML, 100% HL |
| Average | | LL = 13% ML = 55.2% HL = 31.8% | LL = 16.4% ML = 9.7% HL = 73.9% | LL = 0% ML = 0% HL = 100% |
| S | C | G3 | | |

| | | GC | HPC | DPC |
|---------|----|--|--------------------------------------|----------------------------------|
| AZ | 3A | 0% LL, 16.6% ML, 83.4% HL | 0% LL, 25% ML, 75% HL | 0%LL, 0% ML, 100% HL |
| AZ | 4B | 6.6% LL, 26.6% ML, 66.8% HL | 0%LL, 0% ML, 100% HL | 0%LL, 0% ML, 100% HL |
| CA | 3A | 0% LL, 14.3% ML, 85.7% HL | 0%LL, 33.3% ML, 77.7% HL | 0%LL, 0% ML, 100 % HL |
| Average | | LL = 2.2% ML = 19.2% HL = 78.6 % | LL = 0% ML = 19.4% HL = 80.6 % | LL = 0% ML = 0% HL = 100 % |

Table 31. Assessment of G1, G2 and G3, using observations.

Starting from the aforementioned tables, we introduce several graphs. In what follows, we specify our considerations, goal per goal, considering the diverse types of users.

G1 – Interest for book reading (Figure 6): in our sample, reading books is not the first interest of GCs. When they compiled diaries, the percentage of interest was higher than the percentage given by observations (i.e. 38% vs. 17.1%), probably due to the fact that GCs compiled diaries in presence of their parents. The other percentages follow a similar behaviour, i.e. 46% vs. 53.3%, 16% vs. 29.6%, highlighting that, in our sample, GCs do not seem very motivated in reading books.

When learners are HPCs or DPCs, in our sample, the HL in reading increases: HL for HPC is 46.6% vs. ML of HPC that is 36.9% (blue and the pink lines in Figure 6). Moreover, in our sample, we notice the same behaviour for DPCs: HL = 88.9% vs. ML = 11.1% (see yellow line of Figure 6). This might suggest that these types of learners are attracted to reading by their educators.

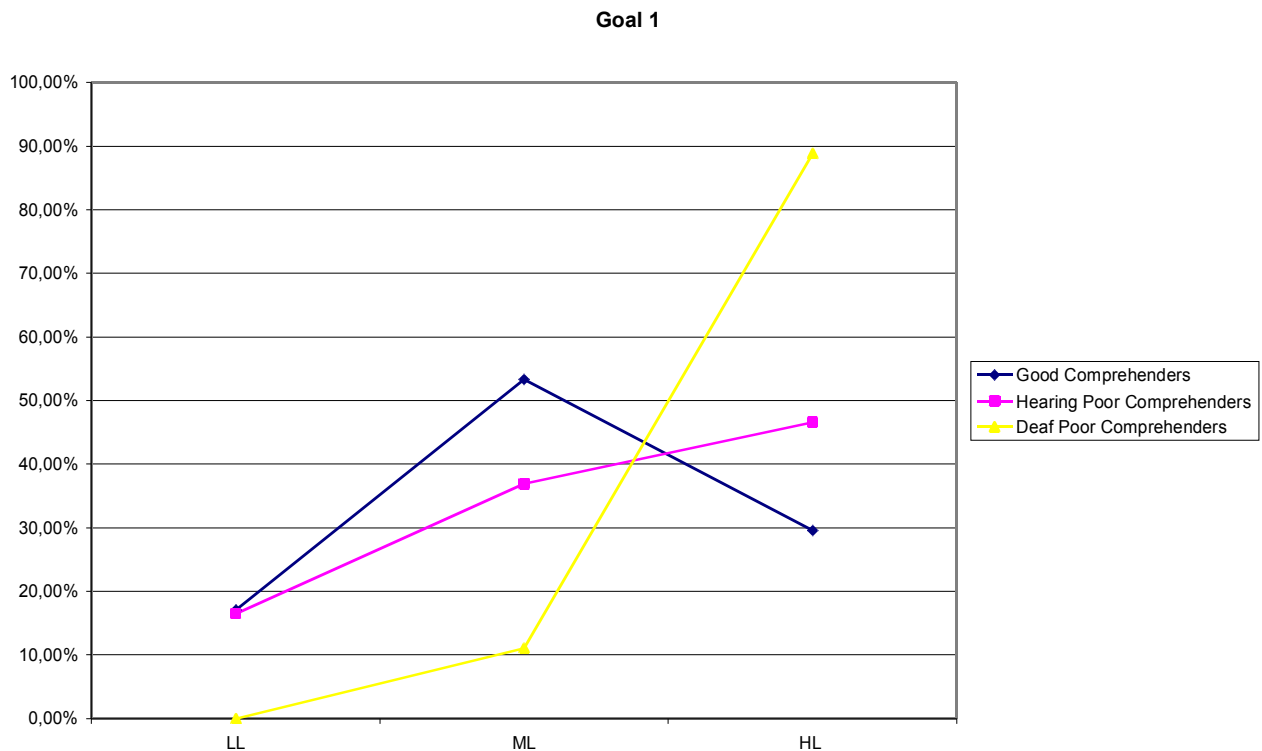


Figure 6. Results of Goal 1.



Figure 7. Results of Goal 2.

G2 – Interest for game consoles (Figure 7). In this case, diaries and observations depict the same situation: all learners collect DVDs and diverse types of gadgets of their preferred videogame heroes. In particular, when learners are PC (HPC and DPC) the percentages of HL increase: 31.8% for GC, 73.9% for HPC and 100% for DPC (last points of Figure 7). Moreover, in our sample, all learners have videogame consoles.



Figure 8. Results of Goal 3.

G3 – Interest for cartoons: the analysis of this goal is similar to the previous one. In our sample, the percentages increase and show that our learners prefer cartoons to videogames. Moreover, we also observe that this aspect does not depend on the degree of poor comprehension in our sample (Figure 8).

8.2.1.1.2 Expert-based criteria

Hereby, we consider GCs, HPCs and DPCs as the object of our study. The team asked educators, both teachers and parents, to report on the interests of their learners. These experiment sessions were performed by using diaries and contextual inquiries.

Experiment Design – For these experiments sessions , the team fixed the following goals (see for details Table 28.), according to the common aims described in the introduction of this chapter:

- G1 – Interest for book reading;
- G2 – Interest for game consoles;
- G3 – Interest for cartoons;
- G4 – Interest for the Web;
- G5 – Reasons of text poor comprehension;
- G6 – Characteristics of poor comprehenders;
- G7 – Preferred stories' kind.

| Italy |
|---|
| Diaries, (see Appendix 9) are used to G1, G2, and G3; Page 5 for G1 (e.g., “place here explanations about stories drawn by your son/daughter”); Page 7 for G2, G3, and G4 (e.g., “How long does your son/ daughter watch tv?”, “How long does |

your son/daughter play with videogames?”, “Tell us about the interaction that your son/daughter has with the Web”);

Page 9 for G7 (e.g., “Tell us about the kind of stories that your son/daughter prefers”).

Contextual Inquiries are used to G1, G2, and G3;

G5 – e.g., “in your opinion why is a child a poor comprehenders”

G6 – e.g., “in your opinion when is a child a poor comprehenders”

G7 – e.g., “what kind of stories are preferred by your learners?”

Table 32. Italian learners, goals of expert-based field study.

Expert Description – Experts involved in these experiments sessions are educators, i.e. teachers and parents. Similarly to Paragraph 8.2.1.1.1, in this case, parents compiled diaries. Differently from Paragraph 8.2.1.1.1, teachers were involved in contextual inquiries. In particular:

- Parents came from Avezzano (L’Aquila); 10 of them have children attending the 3A, 3 of them have children attending the 4B. All of them have GC children and have a medium/high level of education.
- Teachers involved in these experiments sessions came from Avezzano, Verona, Torre di Mosto, Campo San Pietro, Rustega, Noventa di Piave, Campalto, as described in Subsection 8.2.1.

Experiment Execution – The TERENCE Italian team conducted the experiments' sessions in different dates (see Table 33).

| # | ID | Period/Date | Classroom | # Diary | # Con.Inquiry |
|---|----|-------------------------|---------------|---------|---------------|
| 1 | AZ | 15 December – 6 January | 3 A,B – 4 A,B | 13 | 4 |
| 2 | VR | 12 January | 4C | 0 | 3 |
| 3 | TM | 13 January | 3A,B,C | 0 | 5 |
| 4 | CP | 18 January | 4C | 0 | 2 |
| 5 | RU | 18 January | 5A | 0 | 2 |
| 6 | NP | 19 January | 1C – 2C m | 0 | 5 |
| 7 | CA | 20 January | 3A | 0 | 5 |

Table 33. Expert sessions execution in Italy.

As highlighted in the fourth column of Table 33, at the Avezzano school, the execution period was very long.

Moreover, by further observing Table 33, please note that there are two different sets of experiments sessions, detailed below.

- Set A: experiments sessions of diaries collection – row 1. When the team collected diaries, they were signed by parents for the informed consent. The diaries' collection, archiving and the time spent in compiling them are the same as in Paragraph 8.2.1.1.1.
- Set B: experiments sessions of contextual inquiries – rows 1–7. At schools, only one member of the team conducted these experiments' sessions. In particular, Magali Boureaux made sessions of rows 2 -- 7 of Table 33 and Tania Di Mascio made sessions of row 1 of Table 33. Before starting, the team interviewer asked teachers to sign the informed consent. After that, the traditional interview started, interrupted by the team interviewer only when teachers told about interesting arguments; the team interviewer proceeded to watching documents and materials that educators showed (e.g., children's drawings) and the team interviewer concluded summarising to educators the data collected. All the interviews were recorded to allow for a more precise analysis. The length of interviews varies from a minimum of 20 minutes to a maximum of 1 hour.

Result Analysis – To describe the results of these experiments sessions, we present them set per set. In particular:

- Set A: since diaries deal with goals G1, G2, G3, G4 and G7, in the following table we summarise results for each goal. Note that only GCs' parents were involved in these experiments' sessions. Other acronyms are used to individuate the stories genre: Ca = cartoons, An = Animals, Ad = adventures Sp = Sport, Fa = Fantasy, and Go = Gothic.

| S. | P.ID | C.Cr | G1 | G2 | G3 | G3 | G7 |
|---------|------|------|----------------------------------|---------------------------------|---------------------------------|--------------------------------------|--|
| AZ | 1 | 3A | ML | HL | HL | HL | Ca |
| AZ | 2 | 3A | ML | HL | HL | ML | An |
| AZ | 3 | 3A | LL | ML | HL | HL | Ad |
| AZ | 4 | 3A | LL | HL | HL | HL | Sp |
| AZ | 5 | 3A | ML | HL | HL | ML | Ca |
| AZ | 6 | 3A | HL | ML | HL | ML | Fa |
| AZ | 7 | 3A | ML | HL | HL | HL | Fa |
| AZ | 8 | 3A | LL | HL | HL | ML | Ad |
| AZ | 9 | 3A | LL | HL | HL | HL | Fa |
| AZ | 10 | 3A | HL | HL | HL | LL | Go |
| AZ | 11 | 4B | ML | HL | HL | LL | Ad |
| AZ | 12 | 4B | LL | ML | HL | HL | Go |
| AZ | 13 | 4B | ML | HL | HL | HL | Ad |
| Average | | | LL = 38% ML = 46% HL = 16% | LL = 0% ML = 23% HL = 77% | LL = 0% ML = 0% HL = 100% | LL = 30.7% ML = 15.3% HL = 54% | Ca = 15.4% An = 7.6% Ad = 30.8% Sp = 7.7% Fa = 23.2% Go = 15.3% |

Table 34. Experts' results, using parents' diaries.

- Set B: since contextual inquiries deal with goals G5, G6 and G7, in the following table we summarise the results for each goal. The used acronyms are: B = Behaviour, Q = Question response, R = expressive reading, Cg = cognitive reasons, Cu = cultural reasons; Ca = cartoons, An = Animals, Ad = adventures, Sp = Sport, Fa = Fantasy, and Go = Gothic.

| School | Educator | Class-room | G6 | G5 | G7 |
|--------|----------|------------|---------|----|----|
| AZ | Prof A | 3A | B, Q, R | Cu | Ca |
| AZ | Prof B | 3A | B, Q | Cg | An |
| AZ | Prof C | 4A | B, Q, R | Cu | Ad |
| AZ | Prof D | 4A | Q | Cg | Ca |
| VR | Prof E | 4C | B, Q, R | Cu | Ca |
| VR | Prof F | 4C | Q | Cu | Fa |
| VR | Prof G | 4C | B, Q | Cu | Ca |
| TM | Prof H | 3A | B, Q, R | Cu | Ad |
| TM | Prof I | 3A | B | Cg | Fa |
| TM | Prof L | 3B | B, Q, R | Cg | Go |
| TM | Prof M | 3B | B | Cu | Ad |
| TM | Prof N | 3C | B, R | Cu | Go |
| CP | Prof O | 4C | B, Q, R | Cg | Ad |

| | | | | | |
|----------------|--------|------|-------------------------------------|--------------------------|--|
| CP | Prof P | 4C | B | Cg | Go |
| RU | Prof Q | 5A | B, R | Cu | Ca |
| RU | Prof R | 5A | B | Cu | Ad |
| NP | Prof S | 1C m | B, Q, R | Cu | An |
| NP | Prof T | 1C m | B, R | Cg | Ad |
| NP | Prof U | 2C m | B | Cu | Ad |
| NP | Prof V | 2C m | Q | Cg | Sp |
| NP | Prof W | 2C m | R | Cu | Go |
| CA | Prof X | 3A | B, Q, R | Cu | Ca |
| CA | Prof Z | 3A | Q | Cg | Fa |
| Average | | | B = 40%, Q = 31.8%, R = 28.18 | Cg = 39.2% Cu = 60.8% | Ca = 26% An = 8.7% Ad = 30.4% Sp = 4.3% Fa = 13% Go = 17.6% |

Table 35. Experts' results, using observations.

As in the user-based field study, we analysed data, goal per goal, considering the diverse types of users.

G1 – Interest for book reading of CGs: this analysis is similar to the analysis made using the user-based criteria. In fact, parents of GCs compiled diaries with learners. The diaries show that the percentages are LL = 38%, ML = 46%, and HL = 16%, which seem to mean that, in our sample, GCs are not very motivated in reading books.

G2 and G3 – Interest for game consoles/ cartoons of GCs. Also in these cases, the analysis is similar to the analysis coming from the user-based criteria: learners are mainly interested in cartoons (HL = 100%) more than in videogames (HL = 77%).

G4 – Interest for the Web: in our sample, the interest for the Web and the Internet word in general is high (HL 54% vs. ML = 15.3 and LL = 30.7). It is worth noting that these results come from parents of GCs' learners, and that the education level of parents is medium/high.

G5 – Reasons of text poor comprehension: in our sample, teachers consider the reading comprehension difficulties as a problem linked to the education of the parents (60.8% of teachers define a learner, who have reading comprehension problem, as a learner with a family “poorly culturally educated”). Few of them classify this problem as a cognitive nature (39.2% of teachers define a learner, who have reading comprehension problem, as a learner with cognitive problems).

G6 – Characteristics of poor comprehenders: in our sample, these results are very interesting. Teachers tend to consider as poor comprehenders the learners who:

- (For the 40%) assume different behaviour during the story reading (e.g., the learner often calling the teacher, disturbing the lesson, doing other things, etc.);
- (For the 31.8%) do not respond, or erroneously respond, to questions asked after the reading activity (e.g., which is the main character of the story, when the main characters arrive at home, where is the main character while the princess is sleeping, etc.);
- (For the 28.18%) do not read expressively (e.g., the learners use always the same tone, or the learners do not respect commas, etc.);

G7 – Preferred stories' kind: the results of diaries and contextual inquiries are similar (see Figure 9).

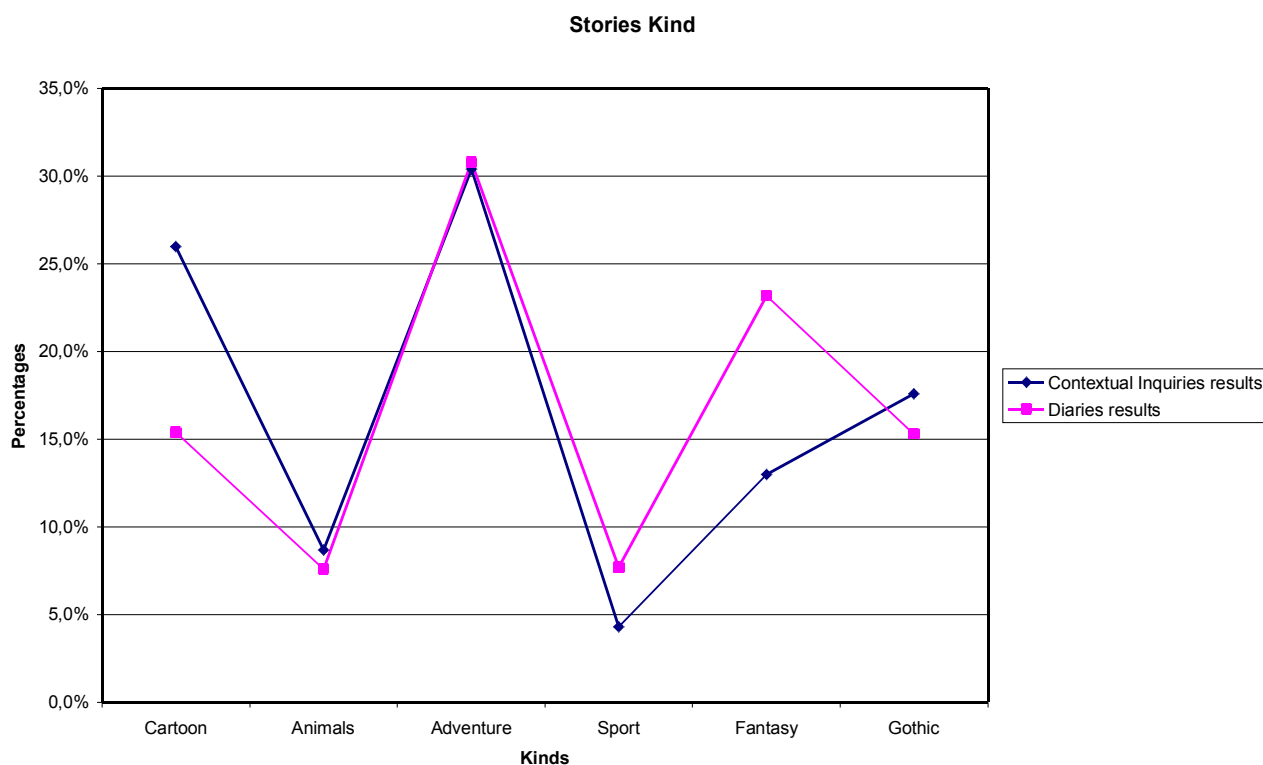


Figure 9. Preferred types of stories according to diary study and observations.

8.2.1.2 Educators

The Italian team started from two types of educators (teachers and parents) and tried to reach the common aims described in the introduction of this chapter. Since educators are adults, the team used only direct (user-based) criteria to collect the data. The details are described in what follows.

Experiment Design – Starting from the common aims, the team fixed the following goals:

- G1 – Personal data, e.g., gender, age, education experiences, type (e.g., parents, classroom teachers, special education needs teachers, etc.);
- G2 – Enthusiasm for one's own job/occupation, e.g., degree of satisfaction or stress;
- G3 – Reading comprehension's expertise, e.g., studied material about reading comprehension;
- G4 – Computer science skill, e.g., type of application used in preparing one's own lessons;
- G5 – Interaction with learners.

In order to assess these goals, the team uses different methods, for details, see Table 36.

| Italy |
|---|
| Diaries (see Appendix 8 for teachers and Appendix 7 for parents) are used for G1, G2, G3, G5 and G5: Page 2 for G1 of both diaries (e.g., “Please tell me all about your experiences in education”); Page 3 for G2 of both diaries (e.g., “Please tell me about your job – you are satisfied for ...”); |

| |
|---|
| <p>Page 3 and Page 11 of teachers’ diary for G3 (e.g., “Hereby we review my knowledge about reading comprehension”, “This is the structure I use to store information about my learners that are poor comprehenders”);</p> <p>Page 12 of teachers’ diary for G4 (e.g., “Me and my PC”); “This is the structure I use to store information about my learners that are poor comprehenders”);</p> <p>Page 9 of parents diary for G5 (e.g., “When you read stories with your son/daughter, does s/he love it?”)</p> |
| <p>Contextual inquiries are used to G3 and G4;</p> <p>G3 – e.g., “You perhaps know some of the issues related to poor reading comprehension?”</p> <p>G4 – e.g., “What applications do you use to prepare you lessons?”</p> |
| <p>Observational method is used to G2 and G5;</p> <p>G2 – e.g., we observe the facial expressions of educators;</p> <p>G5 – e.g., we observe the behaviour of educators during the lesson.</p> |

Table 36. Italian Educators, goals of user-based field study.

User Description – Users involved in these experiment sessions were teachers (classroom teachers and special education needs teachers) of several schools, and parents (these latter only from Avezzano), as described in Table 37.

| ID | City | Province | School Name | # Teachers | # Parents |
|----|------------------|----------|-----------------------|------------|-----------|
| AZ | Avezzano | L’Aquila | Istituto Mazzini | 7 | 13 |
| CH | Chieti | Chieti | III Circolo Didattico | 8 | 0 |
| VR | Verona | Verona | Scuola Rita Rosani | 3 | 0 |
| TM | Torre di Mosto | Venezia | Scuola E. Filiberto | 5 | 0 |
| CP | Campo San Pietro | Padova | Ist. Comprensivo | 2 | 0 |
| RU | Rustega | Padova | Ist. Comprensivo | 2 | 0 |
| NP | Noventa di Piave | Venezia | Ist. Comprensivo | 5 | 0 |
| CA | Campalto | Venezia | Scuola G. Pascoli | 2 | 0 |

Table 37. Educators participating in the study of the educators’ characteristics (Italy).

User Teaching – The procedure of user teaching in this case is similar to the corresponding one in Paragraph 8.1.1.1.1. Differently, the diaries were sent also to teachers and then collected by the team later on.

Experiment Execution – The experiments sessions dates are reported in Table 33. Similarly to the case of the expert-based field studies of learners, also in this case the periods was very long.

| | ID | Period/Date | Classroom | # Diary | # Con.Inquiry | # Observation |
|---|----|--------------------------|---------------|---------|---------------|---------------|
| 1 | AZ | 15 December – 6 January | 3 A,B – 4 A,B | 4; 13 | 7 | 2 |
| 2 | CH | 7 January – 15 February | 3 A, 4C | 8 | 0 | 0 |
| 3 | VR | 20 December – 12 January | 4C | 1 | 3 | 0 |
| 4 | TM | 20 December – 13 January | 3A,B,C | 1 | 5 | 0 |
| 5 | CP | 18 January | 4C | 0 | 2 | 0 |
| 6 | RU | 18 January | 5A | 0 | 2 | 0 |
| 7 | NP | 20 December – 19 January | 1C – 2C m | 3 | 5 | 0 |

| | | | | | | |
|---|----|--------------------------|----|---|---|---|
| 8 | CA | 20 December – 20 January | 3A | 0 | 5 | 2 |
|---|----|--------------------------|----|---|---|---|

Table 38. Experiment sessions' execution in Italian schools.

By observing Table 33, please note that there are three different sets of experiments sessions, detailed below:

- Set A: experimentss sessions of diaries collection – rows 1, 2, 3, 4, and 7. Collection, storage and times spent for diaries are the same of Paragraph 8.1.1.1.1. Note that, in this case, in row 1, we report on both teachers' diaries (4) and parents' diaries (13).
- Set B: experiments' sessions of contextual inquiries – rows 1, 3, 4, 5, 6, 7, and 8. Magali Boureaux made sessions of rows 3, 4, 5, and 6; Tania Di Mascio made sessions of rows 1, 7, and 8 (see Table 33). Contextual inquiries were performed using the same modality of the learners' expert-based field studies.
- Set C: experiments sessions of observations – rows 1 and 8. Observations were performed using the same modality of the learners' expert-based field studies.

Result Analysis – To describe the results of these experiments sessions, we present the results set per set.

In particular:

- Set A: since diaries deal with goals G1, G2, G3, G4, and G5, Table 39 summarises the results for each goal. Note that only parents' diaries contain activities for G5; for teachers, G5 is assessed by observational method. Let us explain the acronyms.
 - P/CT/ST = Parents, Classroom Teacher, Special education needs Teacher,
 - M/F = Male/Female;
 - HA/MA/LA = High/Medium/Low Aged;
 - HE/ME/LE = High/Medium/Low Expert in own job;
 - HL/ML/LL = High/Medium/Low Level;

| School | Name | C | G1 | G2 | G3 | G4 | G5 |
|----------------|--------|------|------------------|-------------------------------|----------------------------------|----------------------------------|----|
| AZ | Prof A | 3A | CT – M – HA – HE | HL | HL | HL | - |
| AZ | Prof B | 3A | CT – F – MA – HE | HL | HL | HL | - |
| AZ | Prof C | 4A | CT – F – MA – ME | ML | ML | ML | - |
| AZ | Prof D | 4A | CT – F – LA – ME | ML | ML | ML | - |
| CH | Prof E | 3A | CT – F – MA –HE | HL | ML | LL | - |
| CH | Prof F | 3A | CT – M – LA –ME | HL | ML | HL | - |
| CH | Prof G | 3A | CT – F – HA – HE | ML | ML | LL | - |
| CH | Prof H | 3A | CT – F – MA –HE | HL | HL | HL | - |
| CH | Prof I | 3A | ST – F – LA – LE | HL | ML | HL | - |
| CH | Prof L | 4C | CT – F – LA – LE | ML | LL | HL | - |
| CH | Prof M | 4C | ST – F – LA – ME | ML | HL | HL | - |
| CH | Prof N | 4C | CT – F – MA – LE | ML | LL | LL | - |
| VR | Prof O | 4C | CT – F – MA –HE | HL | HL | HL | - |
| TM | Prof P | 3B | CT – F – HA – HE | ML | HL | HL | - |
| NP | Prof Q | 2C m | ST – F – LA – LE | ML | LL | LL | - |
| NP | Prof R | 1C m | CT – F – MA –ME | HL | ML | ML | - |
| NP | Prof S | 1C m | ST – F – MA –LE | HL | LL | LL | - |
| Average | | | | LL=0% ML=35.3% HL=64.7% | LL=23.5% ML=41.2% HL=35.3% | LL=29.5% ML=17.6% HL=52.9% | - |

| | | | | | | | |
|----------------|-----------|----|-----------------|--------------------------------|-------------------------------|---------------------------------|-------------------------------|
| AZ | Parent 1 | 3A | P – F – MA – HE | HL | ML | HL | HL |
| AZ | Parent 2 | 3A | P – F – MA – ME | HL | ML | HL | HL |
| AZ | Parent 3 | 3A | P – F – MA – HE | ML | ML | ML | ML |
| AZ | Parent 4 | 3A | P – M – MA – HE | HL | LL | ML | ML |
| AZ | Parent 5 | 3A | P – F – MA – ME | HL | ML | LL | ML |
| AZ | Parent 6 | 3A | P – F – MA – ME | ML | LL | ML | ML |
| AZ | Parent 7 | 3A | P – M – LA – HE | LL | ML | ML | HL |
| AZ | Parent 8 | 3A | P – F – MA – ME | LL | ML | HL | HL |
| AZ | Parent 9 | 3A | P – M – MA – HE | ML | LL | HL | HL |
| AZ | Parent 10 | 3A | P – F – MA – ME | HL | ML | HL | HL |
| AZ | Parent 11 | 4A | P – F – LA – HE | HL | ML | ML | ML |
| AZ | Parent 12 | 4A | P – F – MA – ME | HL | LL | HL | HL |
| AZ | Parent 13 | 4A | P – F – LA – HE | HL | LL | HL | HL |
| Average | | | | LL=15.5% ML=23% HL=61.5% | LL=38.5% ML=61.5% HL=0% | LL=7.8% ML=38.4% HL=53.8% | LL=0% ML=38.5% HL=61.5% |

Table 39. Results of educators' characteristics, using diaries.

- Set B: since contextual inquiries deal with goals G3 and G4, Table 38 summarises the results for each goal.

| School | Educator | Class-room | G3 | G4 |
|--------|----------|------------|----|----|
| AZ | Prof 1 | 3A | HL | HL |
| AZ | Prof 2 | 3A | HL | HL |
| AZ | Prof 3 | 4A | ML | ML |
| AZ | Prof 4 | 4A | ML | ML |
| AZ | Prof 5 | 4B | AZ | AZ |
| AZ | Prof 6 | 4B | AZ | AZ |
| AZ | Prof 7 | 3B | AZ | AZ |
| VR | Prof 8 | 4C | HL | HL |
| VR | Prof 9 | 4C | HL | HL |
| VR | Prof 10 | 4C | LL | LL |
| TM | Prof 11 | 3A | ML | ML |
| TM | Prof 12 | 3A | HL | HL |
| TM | Prof 13 | 3B | HL | HL |
| TM | Prof 14 | 3B | LL | LL |
| TM | Prof 15 | 3C | ML | ML |
| CP | Prof 16 | 4C | LL | LL |
| CP | Prof 17 | 4C | LL | LL |
| RU | Prof 18 | 5A | LL | LL |
| RU | Prof 19 | 5A | ML | ML |
| NP | Prof 20 | 1C m | HL | HL |
| NP | Prof 21 | 1C m | HL | HL |
| NP | Prof 22 | 2C m | LL | LL |
| NP | Prof 23 | 2C m | ML | ML |
| NP | Prof 24 | 2C m | LL | LL |
| CA | Prof 25 | 3A | LL | LL |
| CA | Prof 26 | 3A | LL | LL |

Table 40. Results of educators' characteristics, using contextual inquiries.

(2) Set C: since observations deal with goals G2 and G5, Table 37 summarises results for each goal.

| School | Educator | Class-room | G2 | G5 |
|--------|----------|------------|----|----|
| CA | Prof Y | 3A | HL | HL |
| CA | Prof X | 3A | HL | HL |

Table 41. Results of educators' characteristics, using observations.

By starting from the tables listed above, we analyse data goal per goal, considering the diverse types of users as below.

G1 – Personal data: hereby we divide our data per teachers and parents.

- Teachers: data show that teachers who compiled diaries are in majority classroom teachers (#CT 13 vs. #ST 4), female teachers are more than male teachers (88% F vs. 12% M), 35.2% of teachers have age > 55 years (HA), 47% have age < 55 but >40 (MA), and 17.8% of teachers have age < 40 (LA). The degree of expertise in their own job is medium, in fact the percentages are LE (low level of expertise) 35.3%, ME (medium level of expertise) 29.4%, and HL (high level of expertise) 35.3%.
- In our sample, parents who compiled diaries are mainly females (76% F vs. 23% M), with a medium/high level of expertise in their own job and in educations (0% LL, 46.1% ML , and 53.9% HL); moreover they are predominantly young (no parent are aged > 50 years).

G2 – Enthusiasm of one's own job: in our sample, while teachers are enthusiastic of their own job (0%LL, 35.3%ML, and 64.7%HL), parents follow the same trend but the low level of interests/enthusiasm in their own occupation increases (15.5%LL, 23%ML, and 61.5%HL).

G3 – Reading comprehension expertise: in our sample, teachers generally are aware of reading comprehension problems (LL=23.5%, ML=41.2%, and HL=35.3%). On the other hand, parents have a medium/low level of knowledge about these issues (LL=38.5%, ML=61.5%, and HL=0%).

G4 – Computer science skill: in our sample, most of the parents have a good knowledge of technology and computers (7.8% LL, 38.4% ML, and 53.8% HL). Instead, the percentage of teachers who do not use technology is higher (29.5% LL vs. 7.8%); the other percentages are 17.6% ML, and 52.9% HL.

G5 – Interaction with learners: this is the case in which we studied just the interaction between parents and learners. Parents of our sample affirm that the quality of time spent with their children is high also if the quantity is low.

8.2.2 Tasks

In this section, we deal with the main task of the TERENCE project, by still referring to the common aims described in the introduction of Chapter 8.

Experiment Design – The experiment sessions have, as main aim, the characterisation of how educators deal with the main task of TERENCE, i.e. improving reading comprehension of learners. In particular, the Italian team fixed the following goals:

- G1 - story characteristics, that means what characteristics a story should have to help learners in reading comprehension;

- G2 - stories used by teachers to improve the reading comprehension of learners;
- G3 - strategies used by teachers to improve the reading comprehension of learners;
- G4 - techniques that educators use to improve the reading passion in learners.
- G5 - criteria that teachers use to evaluate the learners' improvement in reading comprehension.

Goals vs. methods are summarised in Table 42:

| Italy |
|---|
| <p>Diaries, are used for G1 and G2.</p> <p>Page 5 for G1 and G2 of teachers' diary (e.g., "Please tell me all about a good story for poor comprehenders", "please suggest me three stories you use for poor comprehenders");</p> <p>Page 4 of teachers' diary for G3 (e.g., "please tell me about a lesson you prepare in order to improve the reading comprehension of poor comrehenders");</p> <p>Page 8 of teachers' diary and Page 10 of parents' diary for G4 (e.g., "Please sketch a conceptual map to motivate learners in reading", "Please tell me about your strategies to motivate your children to read");</p> <p>Page 7 of teachers' diary for G5 (e.g., "How you evaluate the learners' improvements?")</p> |
| <p>Contextual inquiries are used for G3 and G4;</p> <p>G1 – e.g., "What are the man characteristics that a story must possess to be a good story for improving reading comprehension?"</p> <p>G3 – e.g., "Please tell me about your strategies to improve the reading comprehension."</p> |

Table 42. Tasks, Italian goals of user-based field study.

User Description – Users involved in these experiment sessions were the same of the educators' user-based field study (see Table 37).

User Teaching – User Teaching was the same of the educators user-based field study.

Experiment Execution – Dates and modality of these experiments sessions were the same of the educators' user-based field study, see Table 38. Differently, in this case there are only two different sets of experiments sessions: Set A, experiments sessions of diaries collection; Set B, experiments sessions of contextual inquiries.

Result Analysis – In what follows, the results set per set are listed.

1. Set A: since diaries deal with goals G1, G2, G3, G4, and G5, in the following tables, we summarise results for each goal except for G2; in fact for this goal, we just list the more significant titles of stories. Moreover, since parents' diaries were used just for G4, hereby we use a different table. Let us explain the acronyms.
 - Pe – text regarding Personal Experiences of learners;
 - Na – Narrative text;
 - En – text that are Engaging for learners;
 - Id – text that allows learners to Identify themselves with the characters of the text;
 - RA – Reading Aloud;
 - Q – Question Response;
 - B – Brainstorming;
 - D – Drawing the read story;
 - RT – Reading together;
 - IA – Improving Attention;
 - IQ – Improving responses to Questions.

| School | Name | C | G1 | G3 | G4 | G5 |
|----------------|--------|------|---|--|-------------------------|------------------------|
| AZ | Prof A | 3A | Na – Pe – En – Id | RA – Q – B – D | RA – RT | IA – IQ |
| AZ | Prof B | 3A | Na – Pe – En – Id | RA – Q – B – D | RA – RT | IA – IQ |
| AZ | Prof C | 4A | Na – Pe – Id | RA – Q – B | RA – RT | IA – IQ |
| AZ | Prof D | 4A | Na – Pe – En – Id | RA – Q – D | RA – RT | IA – IQ |
| CH | Prof E | 3A | Pe – En – Id | RA – Q – B | RA – RT | IA – IQ |
| CH | Prof F | 3A | Na – Pe – En – Id | RA – Q – D | RA | IA – IQ |
| CH | Prof G | 3A | Na – Pe – En | RA – Q – B | RA – RT | IQ |
| CH | Prof H | 3A | Na – En – Id | RA – Q – B | RA | IA – IQ |
| CH | Prof I | 3A | Na – Pe – En – Id | RA – Q – D | RA – RT | IA – IQ |
| CH | Prof L | 4C | En – Id | RA – Q | RA – RT | IA – IQ |
| CH | Prof M | 4C | Na – Pe – En – Id | RA – Q – B – D | RA – RT | IA – IQ |
| CH | Prof N | 4C | Na – Pe – En – Id | RA – Q – D | RA – RT | IQ |
| VR | Prof O | 4C | Na – En – Id | RA – Q | RA | IA – IQ |
| TM | Prof P | 3B | Na – Pe – En – Id | RA – Q – B | RA – RT | IA – IQ |
| NP | Prof Q | 2C m | Na – Pe – En | RA – Q – B | RA | IA – IQ |
| NP | Prof R | 1C m | Na – Pe – En | RA – Q – D | RA | IQ |
| NP | Prof S | 1C m | Na – Pe | RA – Q – B | RA – RT | IQ |
| Average | | | Na = 88.2% Pe = 82.35% En = 64.70% Id = 76.47% | RA = 100% Q = 100% B = 58.82 D = 47 | RA = 100% RT = 70.58 | IA = 76.5 IQ = 100% |

Table 43. Results of the tasks' study, using teachers' diaries (Italy).

| School | Name | C | G4 |
|----------------|-----------|----|----------------------|
| AZ | Parent 1 | 3A | RT |
| AZ | Parent 2 | 3A | RT |
| AZ | Parent 3 | 3A | RA – RT |
| AZ | Parent 4 | 3A | RT |
| AZ | Parent 5 | 3A | RA – RT |
| AZ | Parent 6 | 3A | RA – RT |
| AZ | Parent 7 | 3A | RA – RT |
| AZ | Parent 8 | 3A | RA |
| AZ | Parent 9 | 3A | RT |
| AZ | Parent 10 | 3A | RA – RT |
| AZ | Parent 11 | 4A | RA |
| AZ | Parent 12 | 4A | RT |
| AZ | Parent 13 | 4A | RT |
| Average | | | RA=53.8% RT=84.6% |

Table 44. Results of task' study, using parents' diaries (Italy).

2. Set B: since contextual inquiries deal with goals G1 and G3, in the following table, we summarise results for each goal. The acronyms of Set B are the same of the Set A.

| School | Educator | Class-room | G1 | G3 |
|--------|----------|------------|-------------------|----------------|
| AZ | Prof 1 | 4B | Na – Pe – En – Id | RA – Q – B – D |
| AZ | Prof 2 | 4B | Na – Pe – En – Id | RA – Q – B |
| AZ | Prof 3 | 3B | Na – Pe – En – Id | RA – Q – B – D |
| VR | Prof 4 | 4C | Na – En – Id | RA – Q – B – D |

| | | | | |
|----------------|---------|------|--|--|
| VR | Prof 5 | 4C | Na – Pe – En | RA – Q – D |
| TM | Prof 6 | 3A | Na – Pe – En – Id | RA – Q – B – D |
| TM | Prof 7 | 3A | Na – Pe – En | Q– D |
| TM | Prof 8 | 3B | Na – Pe – En – Id | RA – Q – B – D |
| TM | Prof 9 | 3C | Pe – En | RA – Q – B – D |
| CP | Prof 10 | 4C | Na – Pe – En – Id | RA – Q – B – D |
| CP | Prof 11 | 4C | Na – En – Id | RA – Q – D |
| RU | Prof 12 | 5A | Na – Pe – En – Id | RA – Q – B |
| RU | Prof 13 | 5A | Pe – En – Id | RA – Q – B |
| NP | Prof 14 | 1C m | Na – Pe – Id | RA – Q – B – D |
| NP | Prof 15 | 2C m | Na – Pe – En | RA – Q – B – D |
| NP | Prof 16 | 2C m | Na – Pe – En – Id | RA – Q – D |
| CA | Prof 17 | 3A | Na – Pe | RA – Q – B |
| CA | Prof 18 | 3A | Pe – En – Id | RA – Q – B |
| Average | | | Na = 83.3% Pe = 88.8% En = 83.3% Id = 72.2% | RA = 94.4% Q = 100% B = 77.7% D = 66.6% |

Table 45. Results of tasks' study, using contextual inquiries (Italy).

Starting from the tables listed above, we analyse data goal per goal, considering the diverse types of users:

G1 - Story characteristics: as in diaries as during interviews, the collected data show that, according to the teachers of our sample, a text should be a narrative text; for some, a text should have a low number of descriptions, and a reduced number of dialogues. Teachers of our sample also pointed out that the length of the narrative text should be short, or, if long, it should be divided into episodes. All agree that the text should appeal to the personal experiences of the learner, i.e. by using words or situations that the learner lived. Teachers reported that learners should be engaged in the stories (82.2% and 83.3%), and shall identify with the characters of the stories (76.47% and 72.2%).

G2 - Stories used by teachers to improve the reading comprehension of learners: several titles have been collected during these experiments sessions. The most suggested are: "La gabbianella ed il Gatto", "Le avventure di Pinocchio", "Il ragazzo con il casco d'argento" "L'isola del Tesoro", "Fiabe moderne".

G3 - Strategies used by teachers to improve the reading comprehension of learners: in our sample, teachers mostly prepare lesson at home. At classrooms, they read aloud a narrative story (or a piece of narrative story), then they ask question about characters, time/causal relation between events, description of main characters, etc. In some cases teachers made a brainstorming about the read text and ask learner for draws. Percentages are in tables.

G4 - Techniques that educators use to improve the reading passion in learners. In our sample, most of the parents/teachers use the technique of reading aloud and together with the learners; teacher prefer RA (100% vs. 53.8%), parents RT (84.6 vs. 70.58).

G5 - Criteria that teachers use to evaluate the learners' improvement in reading comprehension: in our sample, criteria used by teachers are improved attention and improved responses to questions (IA for 76.5% and IQ for 100%).

8.2.3 Physical Environments

In the TERENCE context, we can consider, as physical environments, schools, houses, gardens and all the

places where learners improve their reading comprehensions. In order to gather information about that, the TERENCE team decided to directly ask users. Results are described in what follows.

Experiment Design – The experiments' sessions we describe hereby has the following specific goals, formulated according to the common aims explained in the introduction of this chapter:

- G1 – Location where learners love reading, e.g., at school, at home, at the friend's home, etc.;
- G2 – How learners love reading, e.g., alone, with friends, etc.;
- G3 – Location where learners improve reading comprehension e.g., at school, at home, at the friend's home, etc.;
- G4 – How learners improve reading comprehension, e.g., alone, with friends, etc.;
- G5 – Physical status of classrooms e.g., capacity, number of pictures, etc.

Goals vs. methods are in the following Table 46

| Italy |
|---|
| Diaries are used for G1, G2, G3 and G4; Page 8 for G1 and G2 (e.g., “What is the place where you love reading”); Page 9 for G3 and G4 (e.g., “Please, tell us about the location where you son/daughter improves his/her reading comprehension”); |
| Observations are used to G1,G2, G3 and G4; G1 and G2 – e.g., we observe drawings that children made in response to “ Please draw the place where you love reading ”; G3 and G4 – e.g., we observe if educators spent time in improving reading comprehension. G5 – e.g., we observe classrooms. |

Table 46. Physical Environments, Italian goals of user-based field study.

User Description – Users involved in these experiment sessions are learners and educators; the teachers and parents of the learners as described in Table 47.

| ID | City | Province | School Name | # Learners | # Parents | # Teachers |
|----|----------|----------|-------------------|------------|-----------|------------|
| AZ | Avezzano | L’Aquila | Istituto Mazzini | 43 | 13 | 2 |
| CA | Campalto | Venezia | Scuola G. Pascoli | 21 | 0 | 2 |

Table 47. Educators and parents involved in the study of the physical environment.

The two classrooms of the Istituto Mazzini in Avezzano (L’Aquila) were the 3A and the 4B. The number of parents involved is 1, the same as for the learners' expert-based field study. The involved classroom of the Scuola G.Pascoli in Campalto (Venezia) was the 3A.

User Teaching – User Teaching was the same as for the educators' user-based field study.

Experiment Execution – The TERENCE team conducted the experiments sessions in different dates (see Table 48).

| ID | Period/Date | Classroom | # Diary | # Observation | #Learners |
|----|--------------------------|-----------|---------|---------------|-----------|
| AZ | 15 December – 6 January | 3 A – 4B | 13 | 2 | 43 |
| CA | 20 December – 20 January | 3A | 0 | 1 | 21 |

Table 48. Physical environment study session: execution periods.

As in all the previous studies, also in these experiments' sessions, by observing Table 48, we note that there are two different sets of experiments sessions:

1. Set A: experiment sessions of diaries collection – row 1;
2. Set B: experiment sessions of observations – rows 1 and 2.

Result Analysis – Hereby we report data, set per set ,and try analysing them.

- Set A: since diaries deal with goals G1, G2, G3, and G4, Table 49 summarises results for each goal. Let us explain the acronyms: S =at school, H= at home, B = At library, A = alone, F=with friends, P= with parents, and T=with teachers.

| School | Educator | Class-room | G1 | G2 | G3 | G4 |
|--------|----------|------------|------------------------------|--|-------------------|--------------------|
| AZ | Prof A | 3A | S | A | S | A |
| AZ | Prof B | 3A | S | F | S | P |
| AZ | Prof C | 3A | S | F | S | P |
| AZ | Prof D | 3A | H | F | H | P |
| AZ | Prof E | 3A | S | P | S | P |
| AZ | Prof F | 3A | H | P | S | T |
| AZ | Prof G | 3A | H | A | H | T |
| AZ | Prof H | 3A | S | A | S | T |
| AZ | Prof I | 3A | S | P | S | P |
| AZ | Prof L | 3A | S | T | S | T |
| AZ | Prof M | 4B | S | T | S | T |
| AZ | Prof N | 4B | B | A | H | P |
| AZ | Prof O | 4B | S | T | S | T |
| | | | S = 69% H = 23% B = 8% | A = 31% F = 23% P = 23% T = 23% | S = 69% H =31% | P = 38% T = 62% |

Table 49. Results of G1, 2, 3 and 4, based on diaries.

- Set B: observations deal with goals G1, G2, G3, G4, and G5, Table 48 summarises results which are directly obtained from the observations. The percentage into the columns of G1 and G2 are the results of the interpretation by the team of the learners' drawings. The acronyms are the same as those for the Set A, except for HL that here means High Level.

| School | Educator | G1 | G2 | G3 | G4 | G5 |
|--------|----------|------------------|-------------------------------|-------------------|-------------------|-----------|
| AZ | Prof 1 | 35% S, 65% H | 2%T, 80% F, 18%P | 65%S, 35% H | 65%S, 35% H | HL |
| AZ | Prof 2 | 32%S, 67% H | 25% F, 45%P, 30%T | 65%S, 35% H | 65%S, 35% H | HL |
| CA | Prof 3 | 52%S, 48% H | 5%F, 65% P, 30%T | 70%S, 30% H | 70%S, 30% H | HL |
| | Prof 4 | S =40% H =60% | F = 36% P = 42% T = 22% | S = 67% H =33% | S = 67% H =33% | HI = 100% |

Table 50. Results of G1 to G5, based on observations.

G1 – Location where learners love reading in our sample. In our sample, while parents believe that their

children prefer reading at school or at the library (69%S, 23%H, 8%B), we observe that learners appreciate reading with parents at home (average values: 40% S, 60% H); in fact, there are drawings where learners show parents telling stories to children.

G2 – How learners love reading: in our sample, in percentage, 31% of parents affirm that their children prefer reading alone, 23% with friends, 23 % with teachers, and only 23% with them. These percentages change when learners report their opinion: 36% with friends, 42% with parents and 22% with teachers. Also in this case, learners show more they prefer reading with parents. It is interesting that in our sample no learners draw themselves reading alone.

G3 – Location where learners improve their reading comprehension: in this case, the team asked parents and teachers for the locations. In our sample, their responses mostly agreed; in our sample, parents affirm that their own children improve reading comprehension better at school than at home (69% vs. 31%), and teachers affirm that school is better than home, although home is considered important as well (67% vs. 33 %).

G4 – How learners improve reading comprehension: in our sample, we observe that there is an agreement between this assessment and the previous one.

G5 – Physical status of classrooms: the TERENCE team think that the classrooms of the sample have a high level of quality. The classrooms have a good capacity, are correctly enlightened, and are full of maps and posters showing the analyses of stories done at school. Learners and educators positively reported about classrooms.

9 Conclusions

This chapter specifies the following parts of the context of use, analysed in Part II: users' characteristics, tasks and environments. More precisely, Section 9.1 summarises and specifies the learners' characteristics, Section 9.2 reports on the users' tasks, and finally Section 9.3 describes the users' environments.

It is worth recalling that the TERENCE system will be developed as an adaptive learning system tailored on the specific learning needs of poor comprehenders, hearing and deaf. According to (Santos et al., 2003), an adaptive learning system is so composed:

1. it has models describing the learner's relevant information (student model), the repository of the material (domain model), the description of the user hardware/software capabilities (environment model), the inferential rules that, given the previous models, provide the actual adaptation (adaptation model), and
2. it has engines that actually personalise the learning process by selecting the adequate material for the adequate learner by means of its conceptual model and properly assessed metrics (adaptation engine).

The whole chapter aims at supporting the definition of the models summarised in (1) and of the metrics discussed in (2). More in general, this chapter is specifically written so as to provide inputs for the pertaining tasks of the following WPs: WP2, WP3, WP5, WP7. See also Figure 10.

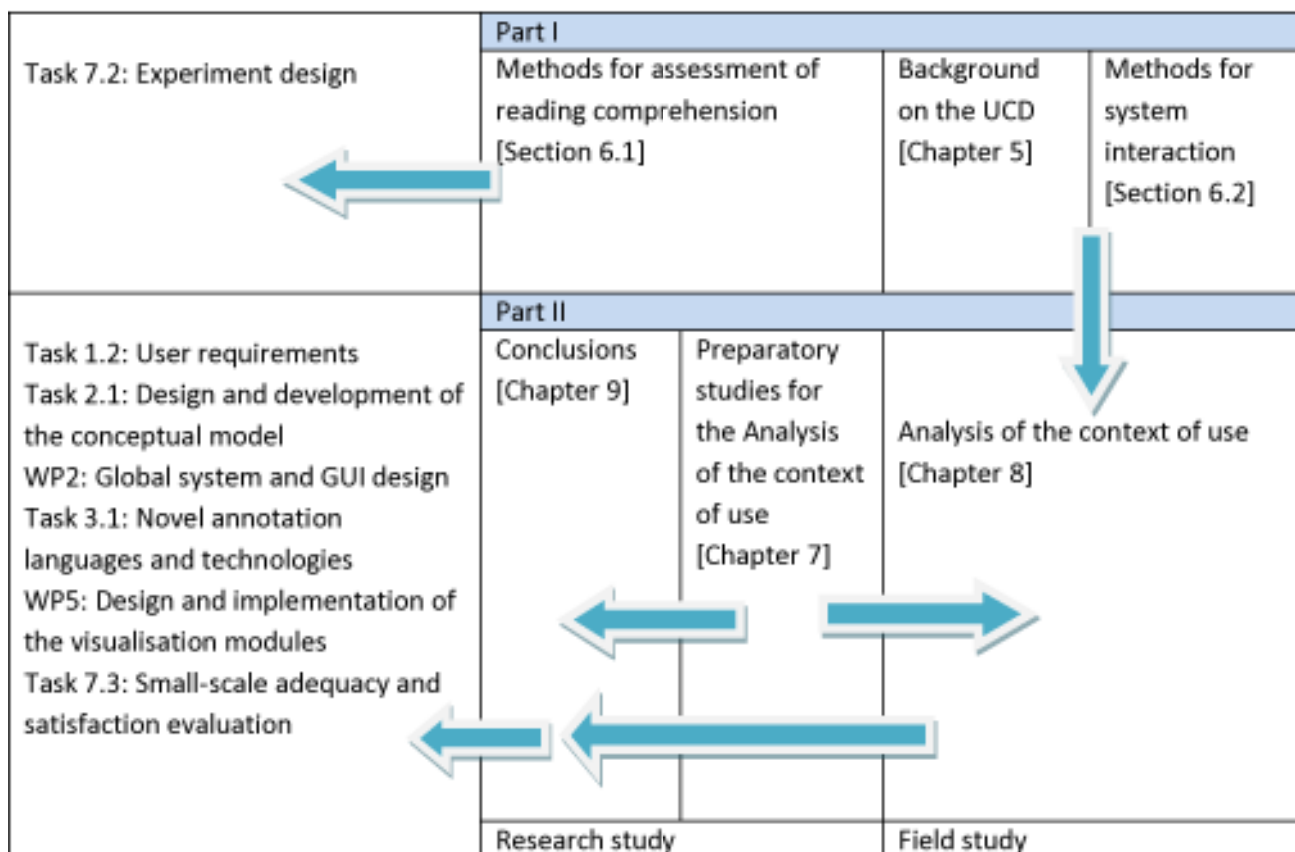


Figure 10. UCD analysis phase in TERENCE and interdependencies between the research activities and results in D1.1 and other project tasks.

9.1 Users' Characteristics

In the following, we introduce two extensive tables that come from the analysis of the characteristics of the learners, in relation to reading comprehension, and more precisely from the studies reported in Chapter 7 and confirmed during the field studies of Chapter 8. See Subsection 9.1.1.

Additional qualitative observations that result from the field studies are reported in Subsection 9.1.2. Subsection 9.1.3 conclude with remarks concerning the impact of the material of this section on the WPs of TERENCE.

9.1.1 Expert-based Specification of the Users' Characteristics

The tables represent a first comprehensive concept scheme of the main skills that are evaluated by the assessment tools used by the psychologists, and thus stimulated by their educators. The analysed characteristics of the TERENCE learners were specified in such a tabular format so as to be more easily translated into the concept scheme of the student model of TERENCE, and still be comprehensible for the psychologists of the TERENCE consortium.

The two tables focus on hearing and deaf poor comprehenders, respectively, and are organised as follows. The comprehension skills are divided into four coarse-grained levels of comprehension, i.e. **sub-lexical level**, **word level**, **sentence level** and **entire-text level**, that is, starting from the easiest to the most complex skill to gain. Each of them is divided into finer-grained levels of comprehension, by reporting whether there are evidences of difficulties or not. The accompanying notes comment on the problematic aspects and give examples whenever needed. The coarse-grained division adopted in the tables aim at resolving some of the ambiguities of the conceptual models of Section 7.1, whose practical usage for classifying interventions is quite difficult. For instance, the three inferential concepts/processes and sub-concepts mentioned in Subsection 7.1.2 (i.e. logic information inferences, logic explanatory inferences, and pragmatic inferences) are not clearly separable; more than one of them can be jointly activated by a learner which makes it difficult to classify interventions as “only” information, explanatory, pragmatic. In the following tables, thus, they are all considered within the inference-making skill, and included in a single row of the tables. However, the notes in that row stresses whether there is evidence of problems (or not) with reasoning with specific connectives or markers, e.g., temporal, qualitative.

Both tables analyse the same classes of difficulties. However, the two tables have different sources of evidence for what is problematic or not, different remarks and different motivations for difficulties, or not, in the notes.

| HEARING POOR COMPREHENDERS' DIFFICULTIES AT DIFFERENT READING LEVELS | | | |
|---|-----------------------------------|---|--|
| SUBLEXICAL LEVEL | | | |
| | YES: evidences of difficulties | NO: no difficulties | Notes |
| Phonological knowledge The child's knowledge and sensitivity to phonological structure of words (e.g. rhymes, phonemic structure, etc.) | X Shankweiler, 1989 | X Cain, Oakhill & Bryant, 2000; Catts, Adlof & Weismer, 2006; Leong et al., 2007; Lesaux, Lipka & Siegel, 2006; | Poor comprehenders develop phonological awareness. The majority of literature does not consider phonological knowledge a major difficulty |

| | | | |
|--|---|--|--|
| | | Nation et al., 2010; Ricketts et al., 2008; Stothard & Hulme, 1996; Swanson, Howard & Saez, 2006 | for poor comprehenders |
| Morphological knowledge | X | | |
| The child's recognition and comprehension of inflectional and derivational word markers (e.g. -ed past tense, -ava imperfetto) | Nation, Snowling & Clarke, 2005 | | Poor comprehenders perform as well as control children when asked to inflect novel verbs and regular verbs. In contrast, poor comprehenders are less skilled than controls at inflecting both high frequency and low frequency irregular verbs. |
| WORD LEVEL | | | |
| | YES: evidences of difficulties | NO: no difficulties | Notes |
| Decoding | X | X | |
| Ability to read aloud new words and pseudowords. | Ricketts, Bishop & Nation, 2008 | e.g. Nation, Adam, Bowyer-Crane & Snowling, 1999; Nation, Clarke & Snowling, 2002; Nation, Marshall & Snowling, 2001; Nation & Snowling, 1998; Oakhill, Cain & Lemmon, 2005a; Oakhill, Hartt & Samols, 2005b; Pimperton & Nation, 2010; Ricketts, Bishop & Nation, 2008; Spooner, Gathercole & Baddeley, 2006; Yuill, Oakhill & Parkin, 1989 | Decoding is not the primary cause of reading comprehension failure. However it is to note that the accuracy in reading is broadly used to match poor comprehenders to good/average readers. |
| | | | |
| Lexical knowledge | X | X | |
| Ability to understand (and to use) the meaning of spoken/written words | RECEPTIVE VOCABULARY (understand the meaning) Cain & Oakhill, 2006; Catts et al, 2006; Nation & Snowling, 1998 X | RECEPTIVE VOCABULARY e.g. Cain, 2006; Cain et al., 2000; Ehrlich, Remond & Tardieu, 1999; Oakhill et al., 2005a; Oakhill et al., 2005b; Yuill, Oakhill & Parkin, 1989 | There is no consensus on the role of vocabulary for poor comprehenders' problems. For some researchers, poor vocabulary is among major causes of poor reading comprehension. Another source of confusion is the fact that receptive vocabulary is often used as matching criterion in studies by Cain & Oakhill. |

| | | | |
|---|---|--|---|
| | <p>EXPRESSIVE VOCABULARY (define the meaning of words) Nation et al., 2010; Nation & Snowling, 1998; Nation & Snowling, 2002; Ricketts et al., 2008</p> | | <p>Unfamiliar and abstract words (cfr. the hypernym concept of Coh-metrix/WordNet) tend to be more difficult.</p> |
| SENTENCE LEVEL | | | |
| | YES: evidences of difficulties | NO: no difficulties | Notes |
| <p>Syntactic knowledge Ability to understand (and produce) syntactic structures (e.g. causal, temporal clauses, coordinate and subordinate clauses)</p> | <p>X Nation et al., 2004; Nation et al., 2010</p> | <p>X Cain & Oakhill, 2006</p> | <p>The results are not consistent. There are studies suggesting that poor comprehenders are impaired in their ability to correct sentences with incorrect word order or grammatical errors. Therefore poor comprehenders have low syntactic awareness.</p> |
| ENTIRE-TEXT LEVEL | | | |
| | YES: evidences of difficulties | NO: no difficulties | Notes |
| <p>Inference making and integration</p> | <p>X i.e. Cain & Oakhill, 1999; Cain & Oakhill, 2006; Cain, Oakhill, & Elbro, 2003; Oakhill, 1984; Cain, & Oakhill, 1999. Cain, Oakhill, Barnes & Bryant, 2001; Catts et al., 2006; Long & Chong, 2001; Oakhill et al., 2004; Spooner et al., 2006</p> | | <p>This ability emerged as particularly important in the definition of the nature of poor comprehenders' failure.</p> <p>A lack in general knowledge is not the source of poor comprehenders inference-making difficulties.</p> <p>Poor comprehenders have problems with instantiations, i.e. infer the specific meaning of a common word from the sentence context.</p> <p>For example they do not infer that "fish" is most likely a "shark" in the following sentence: The fish frightened the swimmer".</p> <p>Poor comprehenders generate fewer:</p> |

| | | | |
|--|--|--|--|
| | | | <p>1. constructive inferences, i.e. inferences which require the reader to integrate information from two different sources</p> <p>2. they are poor at incorporating general knowledge with information in the text to generate simple inferences.</p> <p>Example for constructive inferences (from Cain & Oakhill, 1999): Debbie was going out for the afternoon with her friend Michael. By the time they got there they were very thirsty. Michael got some drink out of his bag and they shared that. The orange juice was very refreshing.</p> <p>When required to answer to this question: <i>where did Michael get the orange juice from?</i></p> <p>Poor comprehenders are not able to globally connect the two information.</p> |
| Knowledge of story grammar (see Section 7.3) | X Cragg & Nation, 2006; Cain, 2006; Nation et al., 2004; Yuill & Oakhill, 1991 | | <p>Poor comprehenders are poor at selecting the main point, the main setting, the main event of a story.</p> <p>Poor comprehenders also demonstrate weakness with elements that make the story well structured and integrated.</p> <p>Poor comprehenders have poor declarative knowledge about the sorts of information provided by particular story features: e.g. what is the function of story titles, story beginnings and story endings.</p> |

| | | | |
|---|---|--|--|
| <p>Cohesive devices, e.g., resolving anaphors, understanding the role of conjunctions</p> | <p>X e.g. Ehrlich & Remond, 1997; Ehrlich et al., 1999; Oakhill & Yuill, 1986; Yuill & Oakhill, 1988</p> | | <p>Poor comprehenders have problems in resolving anaphora, particularly when there is intervening text between the anaphora and its antecedent. Probably because of their low working memory capacity (see below).</p> <p>Example of anaphora (by van den Broek, 1994):</p> <ol style="list-style-type: none"> 1. Rachel and Rich were editing a book. 2. <i>She</i> was having trouble thinking of worthy contributors. <p>Poor comprehenders do not automatically connect the pronoun to the antecedent.</p> <p>Poor comprehenders have problems in understanding the semantic relations expressed by conjunctions, in particular when they express temporal and causal meaning.</p> |
| <p>Use of context Idioms</p> | <p>X Cain, Oakhill & Lemmon, 2005; Nation et al., 2004; Nesi, Levorato, Roch & Cacciari, 2006; Oakhill, 1983</p> | | <p>Poor comprehenders experience particular difficulty with the use of sentence and story context to facilitate understanding of words and phrases in text.</p> <p>Poor comprehenders are impaired in understanding figurative language (such as idioms). Poor comprehenders are particularly impaired in their use of context to derive appropriate meanings of idiomatic expressions. They tend to rely on literal meaning.</p> |
| <p>Monitoring, as the ability to monitor the understanding of text and discourse</p> | <p>X e.g. Cain & Oakhill, 2006; Cataldo & Cornoldi, 1999; Cataldo & Oakhill,</p> | | <p>Poor comprehenders have difficulties at detecting inconsistencies. They do not use strategies to fix-up comprehension (i.e.</p> |

| | | | |
|--|---|--|---|
| | 2000; Erlich, Remond & Tardieu, 1999; Garner, 1988; Papetti et al., 1992; Oakhill et al., 2005 | | look-back strategies) |
| Working memory, i.e. the ability maintain and process simultaneously information | X e.g. Cain & Oakhill, 2006; Carretti, Borella, De Beni & Cornoldi, 2009; Carretti, Cornoldi, De Beni & Palladino, 2004; De Beni et al., 1998; Pimperton & Nation, 2010; Swanson et al., 2006 | | Many of the skills involved in reading comprehension are dependent on working memory capacity. As a consequence it has been suggested that some of the skill deficits of poor comprehenders are related to their poor working memory. |

Table 51. Cognitive skills and the evidences as problematic for hearing poor comprehenders

| DEAF POOR COMPREHENDERS' DIFFICULTIES AT DIFFERENT READING LEVELS | | | |
|--|--|---|--|
| SUBLEXICAL LEVEL | | | |
| | YES: this is a major problem | NO: this is not a major problem | Notes |
| Phonological knowledge The child's knowledge and sensitivity to phonological structure of words (e.g. rhymes, phonemic structure, etc.) | X Sterne & Goswami, 2000; Colombo et al., under review; Leybaert & Alegria, 1995 | X Miller, 2001; 2005; 2006 Harris & Moreno, 2005 | No agreement on whether this is a major difficulty in deaf children's reading comprehension. There relevance of phonological knowledge is very debated. |
| Morphological knowledge The child's recognition and comprehension of inflectional and derivational word markers | X Spencer et al., 2003; Caselli et al., 2006 | | Morphology is a major weakness in deaf readers. This is particularly true in a morphologically complex language such as Italian. Poor knowledge of |

| | | | |
|------------------------|--|--|---|
| (e.g. –ed, past tense) | | | <ul style="list-style-type: none"> – inflectional morphology, e.g. anda-va, anda-ti/ he go-es; signor-e; lad-ies; – free morphology, e.g.: li mangiano; they eat them (pronouns); then, why, thus, so etc. (conjunctions); up, down, besides, to, at, etc. (prepositions); . il/the, uno/an (articles). <p>Poor morphological knowledge affects reading comprehension at:</p> <ul style="list-style-type: none"> • sentential level, e.g. the child takes a candy from her, • inter-sentential level, e.g. the child was wary, but after we obtained her confidence she was cooperative and faithful. |
|------------------------|--|--|---|

WORD LEVEL

| | YES: this is a major weakness | NO: this is not a major weakness | Notes |
|---|---|---|---|
| <p>Word Recognition</p> <p>Automatic and fluent reading of familiar words + retrieval of their meaning</p> | X If multiple meanings | X If single meaning | <p>True for English and Italian</p> <p>This is not a major difficulty in reading comprehension where a single meaning is activated (Miller, 2006; Wauters et al., 2006).</p> <p>On the contrary, deaf children do not activate (or know) multiple word meanings for polysemic words, e.g., pupil (eye) and pupil (student), bat (implement) and bat (animal).</p> |
| <p>Decoding, as the ability to read aloud new words and pseudowords. This skill dwells on the child's knowledge of the language specific phonological and orthographic system</p> | <p>Arfé et al., in preparation Beech & Harris, 1997; Colin et al., 2007; Miller, 2005</p> | | <p>Albeit problematic, decoding does not seem to not be a primary cause of reading comprehension failure.</p> |
| <p>Lexical knowledge, as the ability to understand (and to use) the meaning of</p> | X Arfé et al., in | | <p>True for English and Italian.</p> <p>Deaf children tend to have a poor (not age-</p> |

| | | | |
|---|--|--|---|
| <p>spoken/written words in an oral/verbal language</p> <p>vs.</p> <p>Lexical knowledge in Sign language</p> | <p>preparatio n; Caselli et al., 2006; Duchesne et al., 2009; Geers et al., 2009; Moeller et al., 2007; Spencer et al., 2003; Spencer et Marschark, 2010</p> | | <p>appropriate) lexicon, i.e., a reduced number of words. In particular they have problems with:</p> <ol style="list-style-type: none"> 3. infrequent words, 4. unfamiliar words, 5. synonyms, 6. modifiers (i.e adverbs and adjectives). <p>Their lexicon is mainly based on:</p> <ul style="list-style-type: none"> • content words (i.e. nouns, verbs), • their lexical knowledge depends on the age of diagnosis, prothesization and implantation. <p>Poor (oral/sight) vocabulary is among major causes of poor reading comprehension.</p> |
|---|--|--|---|

SENTENCE LEVEL

| | YES: this is a major weakness | NO: this is not a major weakness | Notes |
|---|---|---|---|
| <p>Grammatical knowledg, as the ability to comprehend (produce) well formed phrases and clauses, to use word inflectional morphology, free morphology, and to grammatically relate words in phrases</p> | <p style="text-align: center;">X</p> <p>Moeller et al., 2007; Spencer et al., 2003</p> | | <p>True for English and Italian language. True for orally educated and signing deaf children.</p> <p>Major problems with:</p> <ul style="list-style-type: none"> • pronouns (e.g. he/she,lui/lo-le-gli); • gender and number inflectional agreement: e.g. la bambina/e; I bamibini mangia/no/The child eats ; • prepositions of place (e.g. on, between, beside), e.g. “and was looking down (in) the jar for the forg”(deaf native signer); • preposition of time (e.g. in, at, on); • direction prepositions (e.g. to, towards, etc.); • verb morphology (e.g. anda-va/to ; go-es ; form-ed). |
| <p>Syntactic knowledge, as the ability to understand (and produce) syntactic structures (e.g. causal, temporal clauses, coordinate and subordinate clauses)</p> | <p style="text-align: center;">X</p> <p>Arfé & Perondi, 2008; Moeller et al., 2007; Power & Leigh,</p> | | <p>True for English and Italian language. True for orally educated and signing deaf children</p> <p>Major problems with:</p> <ul style="list-style-type: none"> • encapsulate sentences: e.g. the boy, not |

| | | | |
|--|--|--|--|
| | 2000; Spencer et al., 2003; etc. | | <p>having fun, left the party</p> <ul style="list-style-type: none"> • subordinate sentences • some causal connectives (e.g. since or thus vs. because) • some temporal connectives (e.g. when vs. then) • relative clauses (e.g. the children who/se) • if-then clauses • conditional clauses (e.g. I would like to..) • tense agreement (“The child entered and discover/ed..”) • anaphoric expressions (e.g. anaphoric use of his/her): e.g. “He took a frog [..]. Then he put (it) in the jar” (deaf native signer) <p>In general, they denote lack of automatic relational processing among words in the sentence.</p> <p>Deaf signers mainly have:</p> <ul style="list-style-type: none"> • difficulties with word order in sentences; • poor syntactic knowledge severely disrupts reading comprehension. |
|--|--|--|--|

ENTIRE-TEXT LEVEL

| | | | |
|---|---|--|---|
| Inter-sentential links/ cohesive devices | <p style="text-align: center;">X</p> <p>Arfé & Perondi, 2008; Kelly, 1998; Moeller et al., 2007; Power & Leigh, 2000; Spencer et al., 2003., Arfé et al., in press</p> | | <p>There is evidence that deaf children have problems with processing inter-sentential anaphoric links, conjunctions and syntactic subordination, but little is known about their ability to comprehend specific linguistic connectives.</p> <p>Practitioners highlight problems with:</p> <ul style="list-style-type: none"> • some causal connectives (e.g. since/hence/thus vs. because) . • some temporal connectives (e.g. while/when vs. then; no clear inputs on before and after). • relative clauses (e.g. the children who/se) • if-then clauses. • tense agreement (“The child entered and discover/ed”) • anaphoric expressions (e.g. anaphoric use of his/her): e.g. “He took a frog [..]. Then he put (it) in the jar” (deaf native signer). <p>This in particular is due to limited pronominal knowledge and poor verbal working memory. E.g., he took a frog [..]. Then he put (it) in the jar”/ Prese la</p> |
|---|---|--|---|

| | | | |
|--|---|----------|---|
| | | | rana e la mise in un barattolo (deaf native signer). |
| | | | |
| Knowledge of story grammar (see Section 7.2) | X Banks et al., Yoshinaga-Itano & Downey, 1996 | X | <p>No agreement on whether this is a major problem in reading</p> <p>Some suggest that deaf readers tend to have poor genre knowledge and poor knowledge of the story grammar.</p> <p>Example. Once upon a time..there were three friends a boy, a dog and a frog (setting). One morning the frog disappeared (initiating episode). The boy and the dog were seriously concerned (culmination episode), and looked everywhere in the room for the frog, but did not find it (resolving episode). [...] He finally found his frog behind a tree and went home with him (conclusion).</p> <p>Others suggest that deaf children produce good discourse structures (in writing as well as in sign language) and have the conceptual understanding of narrative discourse (Marc Marschark personal communication).</p> <p>They have knowledge of the structure of single episodes and of their internal causal/temporal relations (Marschark et al., 1994; Arfé & Boscolo, 2006). Examples follow.</p> <ul style="list-style-type: none"> - "The frog was not there. Then he looked everywhere in the room. He did not find his frog". - "The dog fell from the window and the boy (was) scared" - "Mike went to the bike shop to buy a red bike" - "He looked under the bed , then he looked in his boots, he called it from the window, but nothing". - "There was a hole on the ground. He thought that the frog was inside. Instead inside is the squirrel. Then the dog itself was barking on the bees' house" (deaf student) <p>These local relations are not problematic. No agreement on whether this is a major problem in reading</p> |

| | | | |
|----------------------------------|--------------------|--------------------|---|
| | | | <p>Some suggest that deaf readers tend to have poor genre knowledge and poor knowledge of story structure. Typical story structure is defined as follows: a setting (SE) + an initiating event (IE)+ characters’ reactions and actions (and their outcomes) (RA-OUT) + a conclusion (CON).</p> <p>Example: Once upon a time..there were three friends a boy, a dog and a frog (SE). One morning the frog disappeared(IE). The boy and the dog were seriously concerned, and looked everywhere in the room for the frog, but did not find it (RA-OUT)) [..] He finally found his frog behind a tree and went home with him (CON)</p> <p>Others suggest that deaf children produce good discourse structures (in writing as well as in sign language) and have the conceptual understanding of narrative discourse (Marc Marschark personal communication).</p> <p>They have knowledge of the structure of single episodes and of their internal causal/temporal relations (Marschark et al., 1994; Arfé & Boscolo, 2006). Examples follow.</p> <ol style="list-style-type: none"> 1.“The frog was not there. Then he looked everywhere in the room. He did not find his frog”. 2.“The dog fell from the window and the boy (was) scared” 3.“Mike went to the bike shop to buy a red bike” 4.“He looked under the bed , then he looked in his boots, he called it from the window, but nothing “. 5.“There was a hole on the ground. He thought that the frog was inside. Instead inside is the squirrel. Then the dog itself was barking on the bees’ house” (deaf student). <p>These local relations are not problematic.</p> |
| | | | |
| Inference making and integration | X (unclear) | X (unclear) | <p>Lack of evidence at this level.</p> <p>Deaf readers are less efficient at drawing inferences.</p> <p>Poor background knowledge besides poor linguistic knowledge may limit their inferential skills (Davey et al., 1983; Doran, 2003).</p> |

| | | |
|--|--|--|
| | | <p>Deaf readers recall as much as hearing readers implicit information and textual inferences, after reading a story (Sarachan-Deily, 1985).</p> <p>Deaf readers tend to respond better to literal questions (where the requested information is fully given by the text) than to inferential questions like the following ones.</p> <ul style="list-style-type: none"> • “His pet frog escaped. The boy accused himself”. Why did the boy accuse himself? The child uses his/her background knowledge of human events to make this inference, rather than looking at the answer in the text: He accused himself because he forgot to cover the jar (where he put the frog) • Who accused the boy? Deaf children can meet problems in making such inference because of their difficulties with pronouns and anaphoric relations. • “He took a frog and put him in the jar” What does the child put in the jar? <p>Deaf writers tend to generate similar event structures as hearing writers, but are less concerned in connecting them at a global level, e.g.,</p> <ul style="list-style-type: none"> • “He looked everywhere in the room (but he did not find his frog)” may lead to the following: “He then decided to look for the frog outside”. <p>Deaf writers use causal links, although of a limited number (Arfé & Boscolo, 2006).</p> <p>Only 11% (7-9 olds) and 45% (10-12 olds) can connect events in temporal sequences (order events).</p> <p>Only 4% of 7-9 year old and 14% of 10-12 year old can connect events correlated by psychological causality. Examples follow.</p> <ul style="list-style-type: none"> • The frog was no more there. The child run out shouting. Inference for psychological causality: he was worried about his frog. <p>But, 27% of 7-9 old and 62% of 10-12 old can connect events correlated by physical causality.</p> |
|--|--|--|

| | | | |
|---|--|------------------------|--|
| | | | <ul style="list-style-type: none"> The dog hit the hive. The hive fell down. Inference: the hive fell down because the dog hit it (Yoshinaga-Itano & Downey, 1996). <p>Deaf children can make appropriate inferences according to their linguistic knowledge (Schirmer et al., 1997).</p> |
| | | | |
| Background knowledge, as the general world knowledge that the child brings to the reading task (e.g. knowledge of animals, human events, school setting, restaurants, etc.) | X Davey et al., 1983; Doran, 2003; Schirmer et al., 1997 | | <p>Deaf students may have poor background knowledge, depending on the content of the narrative (Doran, 2003; Schirmer et al., 1997).</p> <p>Deaf readers tend to instantiate their background knowledge, but this is not always appropriate to the ends of their comprehension (Schirmer et al., 1997).</p> <p>There are major problems at this level.</p> |
| | | | |
| Monitoring, as the ability to monitor the understanding of text and discourse | X Power and Leigh, 2000, Spencer and Marschark, 2010, Borgna et al, 2010 | | <p>Many deaf students tend to focus their reading at a local level (word, clause, sentence), monitoring their comprehension at this level (Power and Leigh, 2000).</p> <p>Deaf readers tend to be more passive readers and not to be always aware than hearing students when they do not comprehend what they read (Spencer & Marschark, 2010).</p> <p>Deaf students overestimate their comprehension (poor monitoring) significantly more than hearing students (Borgna et al., 2010).</p> <p>It is not clear whether there are major problems at this level.</p> |
| | | | |
| Narrative ability | | Crosson and Gees, 2001 | Crosson and Gees (2001) found that only deaf children who received above-average speech perception scores with a cochlear implant told narratives that were similar in structure to those of hearing peers. |
| Working memory, i.e., the ability to maintain and process simultaneously information | X Arfé et al., in press; Pisoni & | | Deaf children with cochlear implants show specific difficulties in sequential verbal working memory. |

| | | | |
|--|--|--|--|
| | Cleary, 2003; Pisoni & Geers, 2000 | | |
|--|--|--|--|

Table 52. Cognitive skills and the evidences as problematic for deaf poor comprehenders

9.1.2 Additional Qualitative Observations from the Field Studies

9.1.2.1 Learners' Interest in Books

In the samples of both countries, it is clear that children like books. In UK, many children said that they love a story because they know the film; most of them even seem to prefer the film over the book. Similarly, in Italy, children of the sample actually prefer watching cartoons and playing video games over reading books. Reading is sometimes called a boring activity, in particular, deaf children also mention that the language of the stories can be too difficult; they drop interest in reading if the language is not adequate to their level. Possibly due to this, books and stories read by the deaf learners of our samples have slightly lower appropriate age levels.

Whereas hearing children mainly mention adventure and fantasy elements as well as stories that stimulate imagination, deaf children emphasise that reading is important because it makes them learn new things. They seem (have been made) aware that reading is good for their knowledge, language skills, and especially their vocabulary. However, not many differences were found between the genres of books that children like.

In our samples, all children love and prefer adventure stories (e.g. Harry Potter stories) firstly and fantasy stories secondly than other genres (e.g., factual books). Their enthusiasm and cooperation while reading a story about an adventure was much greater than while reading a story that was written purposely to teach them inference skills.

Most of the learners of our samples, both hearing and deaf, read their favourite book independently, but most parents' also tend to read to them. A book is often read multiple times. From the Italian results, it also became clear that, although learners can read alone, they prefer reading with someone else, especially their parents. The children's favourite location for reading is their home. Deaf children of our samples like the possibility of discussing the text with their educators.

9.1.2.2 Educators' Assessment of Poor Reading Comprehension

A number of methods for the diagnosis or assessment of poor reading comprehension are described in Chapter 6. These methods, however, are not the ones used by class teachers at primary schools. Class teachers in hearing schools sometimes make use of standard testing tools such as the Assessment Focuses of APP (Assessing Pupils' Progress) or the SAT reading comprehension tests, or adopt other qualitative criteria. Common qualitative criteria for the evaluation of the learners' reading ability are:

1. the capacity of reading with expressivity,
2. the ability of immediately finding the portion of the text a question refers to
3. the ability of rewriting or retelling stories in their own words,
4. the capacity of breaking down the story into meaningful parts,
5. the ability of looking for specific clues in the story.

Class teachers in deaf schools of our samples agree that assessment techniques for hearing learners are not

appropriate for deaf learners because they do not match the children's language needs. Although these teachers sometimes help the learners by signing the test assignments, or have them do a standard test for a younger age group, they mostly create their own 'tests' or more informal methods to assess reading progress and reading difficulties (e.g. recording the learners' language progress with a video camera).

Regardless of the assessment method used, class teachers appear to be able to identify poor comprehenders in their classroom, although this seems more difficult for teachers of hearing poor comprehenders than for teachers of deaf learners. Class teachers in hearing schools often describe a poor comprehender by referring to word decoding difficulties, phonetic strategy difficulties and problems caused by reading fluency.

Teachers of deaf learners refer more often to difficulties related to the meaning of the text: understanding passive tense and passive phrases, colloquialisms, chunked phrases, recognising word categories (imagery) and specific text structures (e.g. prepositions, past tenses, plurals, nouns, pronouns, contractions). However, they all mention that other factors, such as cognitive abilities, might play an important role.

Overall, accuracy and fluency in reading is considered better for deaf learners than for hearing poor comprehenders by class teachers as well as by special educators and special education need teachers. Oral language production is considered similar for deaf learners and for hearing poor comprehenders, while written language production is considered dramatically better for deaf learners than for poor comprehenders.

9.1.3 Impact on the WPs of TERENCE

In TERENCE, the preliminary specifications of the users' characteristics and the additional qualitative observations above will help the design of the conceptual model of TERENCE. More precisely, they will

- enable the definition of at least the so-called cognitive part of the student model for **Task 2.1** (see the GRAPPLE user model, e.g., <http://grapple-project.org/>),
- point out, from a qualitative level, the type of interaction that learners and educators may have with the TERENCE system, which can be useful for **Tasks 5.3** and **5.4**,
- guide the definition of quantitative metrics for measuring the reading comprehension skills of the TERENCE learners.

The definition of the metrics for each of the fine-grained levels of comprehension will require a specific pilot study which is strongly suggested to be performed in **Tasks 1.2** and **7.2**. In fact they will represent an additional assessment tool about the learners' reading comprehension skills as the currently available tests (e.g. MT, YARC, see Section 6.1)

- need a **verbal** interaction with the learner, which is: of difficult implementation in TERENCE (or even infeasible) since it requires the analysis of the learners' speeches for demonstrating the actual comprehension of the text (e.g. fluency, intonation, correctness): it could be a further limitation for deaf poor comprehenders, and
- do not specifically measure specific inference-making skills (e.g., activated during temporal reasoning), which are instead a major focus of TERENCE.

In turn, these metrics will be directly useful for the design of the adaptation engine of the TERENCE system of **Task 2.6**.

9.2 Users' Tasks

The brainstorming meetings with educational psychologists and stake-holders plus the study of the state of the art outlined in Chapter 7 as well as the analyses of the field studies in Chapter 8 suggests that the most

common strategies for teaching reading comprehension by educators, and particularly in the Italian context, are based on an analysis of stories that closely follows the one reported in (Valeriani, 1986). See Subsection 9.2.1 for a summative table. Additional qualitative observations by teachers of the field studies and useful for TERENCE are summed up in Subsection 9.2.2. Instead, in Subsection 9.2.3, we try specifying, in tabular format, the common relevant features of a story for its analysis that emerge from Table 53 and the field studies.

9.2.1 Salient Moments in the Explanation of a Story by Teachers

The following table, adapted from the work of (Valeriani, 1986), summarises the salient moments of the explanation of a story that educators propose to their learners. For instance, let us refer to the first row of the table. Accordingly, the educators initially focus on the unknown vocabulary that the learners may have encountered, then they let their learners think about the hypothetical meaning, thus give the precise definitions, and finally read further sentences containing the new vocabulary (text paraphrasing).

| SALIENT MOMENTS IN THE EXPLANATION OF A STORY | | | | | |
|---|--|--|----------|--|--|
| 1 | Unknown vocabulary | Hypothetical meaning | | Precise definitions | Text paraphrasing |
| 2 | Macro-sequence: <ul style="list-style-type: none"> • setting • initiating episode • culminating episode • resolving episode • final episode | Sequences in a flow diagram: <ol style="list-style-type: none"> (1) setting (2) narrative sequences (3) descriptive sequences | | Sequence nominalisation | Test synthesis |
| 3 | <ul style="list-style-type: none"> • Scenes • Pauses • Summary | Characters and their communication: <ul style="list-style-type: none"> • speaking character • utterance • feeling • goals and over-goals | | Dialogues illustrated with comics strips | Synonyms of “to say” singled out in the text |
| 4 Spatial analysis | Location | Internal | External | Real or imaginary | Explicit and implicit characteristics of the locations |
| 5 Temporal analysis | Time of occurrence: <ul style="list-style-type: none"> • season • month • year • hour | Temporal markers and connectives in the text | | From the plot to the fabula | |
| 6 Linguistic analysis | Rhetorical tropes, e.g., metaphors | | | Morphosyntactic analysis | |
| 7 Characters' analysis | Characters in the story: <ol style="list-style-type: none"> 1. name 2. role 3. physical attributes 4. behavioural attributes 5. actions | | | Narration viewpoint | |

| | | |
|--|---------|--|
| | 6. goal | |
|--|---------|--|

Table 53. Salient moments of the explanatory events. Adapted from (Valeriani, 1986)

Furthermore, the macro-sequences reported as the first phase of the second explanatory moment correspond to the classical analysis of the stories used in the educational environments (called “story grammar” or “story schema”), outlined in Table 54.

| Story Grammar based on Stein and Glenn (1979)¹⁵ | | |
|---|--|---|
| Element | Definition | Example |
| <i>Setting</i> | Introduction | <i>Once upon a time there were three bears, the momma bear, the popa bear, and the baby bear. They all lived in a tiny house in a great big forest.</i> |
| <i>Initiating Episode</i> | An episode that sets up a problem or dilemma for the story | <i>One day a little girl named Goldilocks came by.</i> |
| <i>Change episode</i> | The turning episode | <i>She was surprised to see the house and noticed it was empty.</i> |
| <i>Resolving episode</i> | An action or plan of the protagonist to solve the problem | <i>She went inside to find the three bears gone and ate the baby bear's soup, broke the baby bear's chair, and fell asleep in the baby bear's bed.</i> |
| <i>Final episode</i> | | <i>Seeing the three bears, Goldilocks ran away.</i> |

Table 54. Common structure of a story as in as in (Valeriani, 1986)

9.2.2 Qualitative Observations from the Field Studies

Hereby we recap relevant working strategies of educators, resulting from the samples of our field studies.

9.2.2.1 General Course of Class Lessons for Reading Comprehension

Both in hearing schools and in deaf schools of our samples, teachers do not really speak of “reading” lessons. They teach general literacy lessons, involving all sorts of topics and aspects related to literacy: language, vocabulary, spelling, grammar, reading, writing etc.

Besides these, they also have guided reading lessons. Guided reading lessons are mostly done individually with the child or in small groups with learners of the same reading ability level. Literacy lessons are done in the classroom, and are mostly organised around a specific topic. There is no such thing as a “routine” literacy lesson, but most often, a lesson consists of a sequence of rather short and diverse activities. In the hearing schools especially, these activities are strongly connected and linked to each other (e.g. making a drawing of a story scene, talking about that story scene, writing about that story scene, watching the film version of that story scene). In the deaf schools, too, lessons are sometimes focused on a specific topic, but other times, they are a sequence of rather separate or detached activities (e.g. reading a story, reading an extract from a book, making sentences) not linked to one subject or topic.

¹⁵Other definitions of story grammar can be found at [http://red6747.pbworks.com/w/page/8523119/Story-Grammar from which we took the examples](http://red6747.pbworks.com/w/page/8523119/Story-Grammar+from+which+we+took+the+examples). Cfr. (Nicolopoulou, 2008) for a critical overview of the classical story models.

9.2.2.2 Teachers' Strategies to Support and Encourage Reading

Regarding appropriate questions to check learners' comprehension and to help them to understand the text, all teachers of our samples mainly try to make use of more abstract questions, relating to feelings, opinions, reasons, the meaning of the text. Teachers in deaf schools of our field studies, however, also pose questions relating to vocabulary and more literal questions, since deaf learners tend to need a more detailed explanation of the text.

In general, besides asking questions based on the reading comprehension models of Section 7.1, additional methods are provided by British and Italian teachers alike to encourage poor comprehenders in the classroom, that follow the methods reported in (Valeriani, 1986), see Subsection 9.2.1: (1) discussing the whole text with the learners, (2) using drama exercises to stimulate learners' empathy with the story's characters, (3) drawing.

In particular, teachers in deaf schools do not often mention any strategies used to foster autonomous reading comprehension. They prefer actions aimed at giving direct support to the child or to explain the text. Several educators reported that they constantly ask their deaf pupils questions about the story, enabling these pupils to keep track of the meaning of the story.

This is slightly different for the teachers in hearing schools: they do suggest some strategies aimed at stimulating autonomous reading (e.g. searching for clues).

Teachers also motivate their pupils to read. With deaf learners, this seems to be done more by using **rewards** (e.g., : stickers, stars, team points) than with hearing learners. Whereas for the teachers in hearing schools, a book or a story is mainly associated to something fun and exciting, teachers in deaf schools mainly try to make the learners realise that they have the power to search for meaning, and that they should not give up looking for clues.

9.2.2.3 Stories Used by Teachers

According to our samples, in the UK, sometimes, teachers make use of reading comprehension material, but when they do, they have to adapt the material.

All teachers of our samples stress that stories should **relate to the learners' personal experience** (e.g., environment) and should enable the identification of the reader with a story's character.

Teachers in deaf schools of our field studies do not really have favourite stories or books. They try to use stories or books related to other lessons or to specific topics, but they have to adapt almost all of the material they use during their lessons. These teachers do not start with a specific story, but rather work the other way around: if they want to do something and they cannot find the text to support this, they make it themselves. They describe a good story as a story that is

1. appropriate to the child's language,
2. contains descriptive pictures,
3. is appropriate to be signed to the child,
4. and matches the child's interests.

These story characteristics are complementary with the ones mentioned by teachers in hearing schools:

1. engaging,
2. exciting stories encouraging imagination, containing elements of suspense, tension,
3. and appealing to a broad range of readers.

Especially teachers in deaf schools stress the importance of adding pictures to a story. Good pictures describe the setting of a story, or an event; they show "the big picture" of a story.

9.2.3 Preliminary Specification of the Features of Stories for Their Analysis

The following Table 55 relates the explanatory moments listed in Table 53 to several concepts that come out from the analysis of Table 54, and introduces concepts emerging from the field studies reported on in Chapter 8 and summed up in Subsection 9.2.2 . As such, Table 55 has the clear objective of serving as guidance for the definition of the part of the domain model that focuses on stories and their analysis, and thus should be taken into account as a further input to **Tasks 2.1** and **3.1**.

| Main concepts for the story analysis | |
|--|--------------------------|
| Concepts | Ref. in Table 7.2 |
| Vocabulary: see the tables in Section 7.1 | 1 |
| Story has: <ul style="list-style-type: none"> • story genre, • story length, • illustrations, • vocabulary, • difficult linguistic expressions, • emotional appeal for the reader, e.g., relating to the reader's personal experiences, • story grammar, • main characters, • narrative sequence. | 2 |
| The narrative sequence is the sequence of episodes. Each episode “sums up” its events ¹⁶ . | 2 |
| An episode of a story has ¹⁷ : <ol style="list-style-type: none"> (1) space of occurrence with attributes: internal, external, real, unreal; (2) characters; (3) a relation to another via: <ol style="list-style-type: none"> a. qualitative temporal relations, e.g., TimeML TLINKS (Paragraph 7.2.3.6.2); <ol style="list-style-type: none"> i. the relation can be conveyed via a connective (before, after, meanwhile etc.) or not; ii. the relation can be between adjacent episodes or non-adjacent episodes (two are adjacent if they occur in the same sentence or in contiguous sentences; else they are not adjacent); b. causal (temporal) relations indicating whether an episode is a precondition/postcondition for the other; <ol style="list-style-type: none"> i. the relation can be conveyed via a connective (because, etc.) or not; ii. the relation can be between adjacent episodes or non-adjacent episodes (two are adjacent if they occur in the same | 4,5,7 |

¹⁶The definition of an episode in terms of its events is admittedly still vague. In the classical Stein-Trabasso episodic model, see (Goldman et al., 1999), an episode consists of an initiating event and a final event. However, in books for educators (e.g., Valeriani), an episode is conceived as the synthesis of its own events.

¹⁷A similar analysis holds for an event.

| | |
|---|--------------|
| <p>sentence or in contiguous sentences; else they are not adjacent);</p> <p>(4) time of occurrence, e.g., TimeML TIMEX3 (Paragraph 7.2.3.6.2);</p> <p>(5) emotional appeal (calm, peace, horrible) that it or its sub-concepts (e.g., locations) evoke</p> | |
| <p>An event of a story has:</p> <p>(6) space of occurrence with attributes: internal, external, real, unreal;</p> <p>(7) characters;</p> <p>(8) a relation to another via:</p> <p>a. qualitative temporal relations, e.g., TimeML TLINKS (Paragraph 7.2.3.6.2);</p> <p>i. the relation can be conveyed via a connective (before, after, meanwhile etc.) or not;</p> <p>ii. the relation can be between adjacent events or non-adjacent events (two are adjacent if they occur in the same sentence or in contiguous sentences; else they are not adjacent);</p> <p>b. causal (temporal) relations indicating whether an event is a precondition/postcondition for the other;</p> <p>i. the relation can be conveyed via a connective (because, etc.) or not;</p> <p>ii. the relation can be between adjacent events or non-adjacent events (two are adjacent if they occur in the same sentence or in contiguous sentences; else they are not adjacent);</p> <p>(9) time of occurrence, e.g., TimeML TIMEX3 (Paragraph 7.2.3.6.2);</p> <p>(10) emotional appeal (calm, peace, horrible) that it or its sub-concepts (e.g., locations) evoke.</p> | 4,5,7 |
| <p>A character has:</p> <p>a. name/id</p> <p>b. attributes in story/episode/event: moral (bad, good, etc.); physical (tall, small, etc.),</p> <p>c. relations to other characters in story/event/episode, e.g., opponent, friend, other,</p> <p>d. role in story, e.g., protagonist, antagonist, other,</p> <p>e. role in event/episode, e.g., subject, object, other</p> | 7 |
| <p>A difficult linguistic expression is</p> <ul style="list-style-type: none"> • anaphoric expression with distance from its resolving expressions, • attributes of characters, • see the tables in Section 7.1 | 6 |
| <p>Illustrations:</p> <ul style="list-style-type: none"> • describe the setting of a story, of an episode, of an event, • show “the big picture” of a story, • appeal to the children’s environment and to their own life, • explain the unknown or difficult vocabulary, • allow for visual comparing. | |

Table 55. Main concepts of a story

9.2.4 Impact on the WPs of TERENCE

Both Subsections 9.2.2 and 9.2.3 contain material that should help the TERENCE researchers in

1. choosing the stories of TERENCE (**Task 2.2**),
2. analysing the stories (**Task 3.1**),
3. creating the story sub-model of the conceptual model (**Tasks 2.1 and 2.3**),
4. illustrating the stories (**Task 5.2**),
5. and hence guiding the design of the TERENCE games (**Task 2.4**).

Moreover, as mentioned in the opening of this chapter, together with the models, also metrics are needed for the adaptive engine. In this specific context, these metrics are called **classification functions**, and compute the cluster in which a certain learning material should be assigned, according to properties that summarise when a cluster can be considered appropriate for a certain class of learners. It is thus clear that the definition of the classification function for the TERENCE domain is a further crucial task to pursue.

According to the literature, Coh-metrix gives an advanced tool and indices for measuring the readability of English texts (Paragraph 7.2.3.6.1), and thus seems a proper starting point for the definition of the classification function. However, the numbers that result from the application of the Coh-metrix indices to a certain text are of difficult interpretation, do not allow a direct and easy connection to the comprehension skills that the text stimulates or not (see Section 9.1), and are devised for English texts. Therefore, it is recommended to carry on a further pilot study that shall focus on defining the classification function for the stories, according to:

- the aforementioned tables (Table 53, Table 54 and Table 55) for the analysis of stories,
- the Coh-metrix tool (Paragraph 7.2.3.6.1) for the classification of the readability of a story and its porting to the Italian language, and
- the reading skills listed in Table 51 and Table 52, that shall guide the identification of the proper cluster in which a certain story shall be placed.

This pilot study can be scheduled within **Task 7.2** and possibly also **Task 2.3**.

9.3 Users' Environments

In this section, we recap the results concerning the users' environment. More specifically, Subsection 9.3.1.1 recap the observations concerning the physical context arising from the field studies in UK and Italy of Chapter 8; Subsection 9.3.1.2 recaps the analysis of the instructional context of Subsections 7.2.1 and 7.2.2 in light of the results of the field studies; similarly, Subsection 9.3.1.3 recaps the analyses of devices of Subsection 7.2.3 in light of the field studies. In conclusions, the impact of such results on the WPs of TERENCE is assessed.

9.3.1.1 Physical Context

In the context of the field studies, several primary schools were visited, including some mainstream schools with special deaf units attached. In all of these schools, classrooms were pleasant, putting a lot of emphasis on stories and on reading: walls decorated with story characters, posters, maps, words and pictures; and books available all around. Teachers also indicated that learners really like coming to school. Class activities

are often done at different “locations” in the classroom; for example sitting on the ground, sitting at the table, sitting at the computer table, walking around in the classroom.

The field studies also highlight that learners seem to prefer reading at school with the support of teachers. They also seem to appreciate reading when parents read them some stories before sleeping. In general, parents seem not to feel sufficiently prepared for teaching specific reading skills to their children with reading comprehension problems, and tend to delegate to teachers such a task. In our sample, parents mainly tend to follow the teachers' suggestions.

9.3.1.2 The Instructional Context

Different approaches are used for the education of deaf learners, in Italy as well as in the UK. Among these are the auditory-oral method (stimulating the production and understanding of spoken language), the bilingual method (sign language is the primary language) and total communication (combining spoken and signed languages). Deaf learners are mainly included in mainstream schools or in hearing impaired units within these schools, where they receive support from specialist teachers. This was also the case of the schools participating in our field study.

Regarding instructional and literacy policies, the situation is similar in Italy and in the UK. Policies focus on teaching learners how to read in terms of the skills needed for decoding and fluency (e.g. summarised in the UK National Literacy Strategy, which was also mentioned by the teachers in the field study), but there is not the same clarity in the criteria of developing pupils' reading comprehension. In addition, comprehension problems are not recognised as a specific learning difficulty, hence there is no specific provision for learners with reading comprehension difficulties. Indeed, from our field study it emerges that teachers are not aware of any specific policies regarding reading comprehension problems (especially for deaf learners). The teachers of our field studies assume that this is due to the fact that these learners' difficulties are so individual and so specific that matching provisions cannot easily be made for them.

9.3.1.3 Devices

9.3.1.3.1 Instructional programmes and software for text comprehension of hearing or poor deaf comprehenders

In the UK, four main programmes are used to develop reading comprehension skills. Three of these are computer-based. Most of them include work on phonemic awareness, word decoding and, importantly, comprehension. These programmes are used for hearing learners and for deaf learners. No specific tools for improving reading comprehension in deaf learners are available. In Italy, many instructional programmes for improving reading comprehension are available, consisting of paper-and-pencil activities, or computer-based. When possible, these programmes are also used with deaf learners. Besides these, a few programmes specifically addressed to deaf children, or more in general, to children with language difficulties, are available.

A number of small-scale training studies provide evidence that a combination of the interventions in Section 7.2.3.5 can improve reading comprehension of the TERENCE learners. In particular, Swanson (1999) highlights that interventions based on a metacognitive approach (where reflections on reading comprehension process and strategy instruction are promoted) produce larger effects on reading comprehension than other non-metacognitive interventions in groups of learning disabled children. Similarly, Lucangeli, Cornoldi and Galderisi (1995) report effects on reading comprehension after two different metacognitive trainings, one based on memory and the other on reading comprehension. In their

study, 166 3rd-5th graders with learning difficulties were divided into a meta-memory training group, a meta-comprehension training group, and a control group, who did not receive any training. The meta-memory training (Memoria e metacognizione: Cornoldi and Caponi, 1990) aimed at promoting children's knowledge of memory processes and of their regulation. The metacognitive reading intervention (Le Beni and Pazzaglia, 1991), focused on the child's awareness of reading comprehension process (i.e. goals of reading, characteristics of good readers), use of effective reading strategies and reading comprehension monitoring. After the training, the trained groups outperformed the control group in metacognitive knowledge, academic achievement and reading comprehension, measured at standardised tests. There is also consensus that interventions in small groups are more effective than interventions in larger groups or in individual settings. Clarke, Snowling, Truelove, and Hulme (2010) examined, for example, the efficacy of three interventions designed to improve reading comprehension in groups of poor comprehenders aged 8 to 9 years. These programmes were based on reciprocal teaching (Palincsar and Brown, 1984), an instructional activity that implies a continuous dialogue between children and a tutor whose support is gradually reduced as children's skills develop. The results demonstrated that these programmes were effective in bringing about significant gains in reading comprehension.

9.3.1.3.2 Teachers' material

However, none of the teachers and learners from the field study seemed to make use of any of the aforementioned programmes. They did however make a lot of use of a computer and of other ICT facilities to support reading comprehension, e.g., google images to find images illustrating difficult words for deaf learners.

In the sample from UK, all teachers use interactive whiteboards to prepare and teach their literacy lessons. Especially teachers in deaf schools find this an important evolution, since everything is so "visual" for deaf learners. A computer is thus mainly used as a visual aid for deaf learners of the English sample. These teachers also mention the use of computer programmes to enrich reading material with sign language. Besides the computer, other technology is used (in deaf schools), e.g. a camera to make photos of activities, and a video camera to make analyses of the learners' language progress.

In the visited Italian schools, educators and learners do not use technology for reading, and ICT facilities are usually few. However, the need for digitalising Italian schools is well perceived by educators, educational and political stake-holders, cfr. CM 16 of 10 Feb 2009.

9.3.2 Impact on the WPs of TERENCE

The data of the field studies highlights that teachers are usually prepared to deal with poor comprehenders, though they use only qualitative methods for the assessment of poor comprehension. This point suggests an in-depth analysis about the strategies that teachers use to assess poor comprehension, and how these are coherent with the assessments done by psychologists (**Task 7.2**).

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Appendix 1

Description of reading programmes that received effectiveness ratings with regards to comprehension although they don't train comprehension

Three computer-based reading programmes - A.R.R.O.W., Sound Discovery and Read Write Inc. - all received effectiveness ratings for comprehension, but appear not to specifically train comprehension. For example, A.R.R.O.W. "displays a piece of text at an appropriate level, anywhere from a single letter to a short paragraph. The child hears it spoken, then repeats it aloud and records it, then plays it back – repeating this process as often as wished until the result is satisfactory to the child. Each mini-exercise ends with the requirement that the child writes down the piece of text". Hence, although A.R.R.O.W. was rated as 'remarkable' for comprehension in Years 3-6, the programme itself does not appear to specifically train comprehension. Four further schemes (Phono-Graphic, THRASS, Reading Intervention and RAPID) are partly computer-based and partly 'paper and pencil'. That is, the schemes have a network and website support, or have a software component. Again, they do not appear to directly train comprehension.

Furthermore, in total there were 7 paper-and-pencil-based reading schemes that gave rise to effectiveness ratings for comprehension, yet, only one of these is described as training comprehension - Inference Training (I have more details of this scheme, with training materials. It is based on the reciprocal teaching study by Yuill & Oakhill). The others received effectiveness ratings for comprehension, but are not described as attempting to train comprehension: Better Reading Partnership utilises reading partners who are trained to prompt the pupil to problem-solve difficulties, and to develop independent reading strategies. Reading Recovery also involves specially trained teachers, who provide highly responsive instruction, based on daily diagnosis, tailored to the needs of each child.

'Catch Up Literacy', 'ENABLE' and 'Paired Reading' all revolve around tutor-pupil team work, with the tutor either talking through the text, providing key vocabulary and familiarising the child with the story, repeated practice using familiar text, and using skills via guided and shared reading. The final p&p reading programme, 'Personalised Learning', has, to date, been used specifically with those with ADHD, autism, dyslexia, or speech and language difficulties, so may not be suitable for mainstream use.

Lastly, there were 5 reading programmes, which were described on the website as having no impact on comprehension (i.e., they received no effectiveness ratings for comprehension), nor did their descriptions suggest that they train comprehension. These programmes only have effectiveness ratings for their impact on reading or spelling: FFT Wave 3, Toe By Toe and Interactive Assessment and Teaching are all p&p programmes. AcceleRead AcceleWrite is primarily p&p, but also includes a computer-based element. Finally, RITA (Reader's Intelligent Teaching Assistant), which I assume is a computer-based programme, is described as 'an interactive assessment and teaching tool', for children with SEN, which emphasises word-building and phonics skills in the broad reading context. To clarify, none of these particular schemes had effectiveness ratings for comprehension, nor did they train comprehension.

Appendix 2

Extracts from teachers' and children's diaries

Teachers

Assignment 1

You've received a small note from one of your new, young fellow teachers (see right). You decide to write her a letter. What would you write to Sue?



Dear colleague,

I would like to ask for your help. A few of my students clearly have difficulties with comprehending texts and stories. Although they seem to be able to read a text fluently, they don't really understand what the text is about. Could you give me some advice on how to help these students? How would you prepare reading lessons for students like mine?

Your help is much appreciated!

*Kind regards,
Sue Middleton*

Children

| | |
|--|---|
| <p>Please ask your child the following: What do you like about this story so much?</p> | <p>Please answer these questions:</p> <p>1.Does your child read this book/story on his/her own?</p> <p>2.Have you ever read this book/story to your child?</p> <p>3.How often do you think your child has read/heard this book/story?</p> <p>4.Why do you think your child likes this book/story so much?</p> |
|--|---|

Activity 1

What do you think is the best story or book ever? Can you draw the part of this story you like the most?



Appendix 3

Learners' diary assignments

- **Assignment 1: favourite stories and books**

- *Children's assignment*

What do you think is the best story or book ever? Can you draw the part of this story you like the most?

- *Parents' assignment*

Please ask your child the following: What do you like about this story so much? Does your child read this book/story on his/her own? Have you ever read this book/story to your child? How often do you think your child has read/heard this book/story? Why do you think your child likes this book/story so much?

• **Assignment 2: favourite story characters**

- *Children's assignment*

Who are your favourite story characters? Can you draw them here? You may also use photographs, stickers, pictures from the internet or from (old) magazines, whatever you like.

- *Parents' assignment*

Please discuss the following with your child: If you could be one of the characters you drew below for a day, who would it be? Why did you choose him/her?

• **Assignment 3: likes and dislikes about reading**

- *Children's assignment*

Can you, together with your mum or dad list things that you like about reading and things that you don't like about reading?

- *Parents' assignment*

Are there any other reasons you can think of that make your child like or dislike reading? Reasons that your child did not come up with? What type of books does your child like to read (for instance factual books, fiction, adventure stories, comic books, ...)? What type of books does your child not like to read at all?

• **Assignment 4: interpreting a short story**

- *Children's assignment*

On the next page you will find a short story. Please read it carefully and make a drawing of this story.

[The story:

The Three Billy Goats Gruff

Once upon a time there were three billy goats. Their names were all Gruff. The three billy goats Gruff were very hungry. They wanted to eat the green grass across the river. But an ugly monster lived under the bridge. So they were afraid to cross the bridge. "I'll try to cross the bridge," said the first billy goat Gruff. Trip! Trap! Trip! Trap! He started to cross the bridge. Then suddenly the monster jumped up onto the bridge. "Who's crossing my bridge?" he roared. "I'm the first billy goat Gruff," said the goat. "I'm going to eat you up!" said the monster. "Don't eat me. Wait until the second goat comes along. He's bigger than I am," said the goat. So the monster let him go. And the first billy goat Gruff crossed the bridge.

Then the second billy goat Gruff started to cross the bridge. Trip! Trap! Trip! Trap! When he was halfway down the bridge, the monster jumped up onto the bridge again. "Who's crossing my bridge?" he roared. "I'm the second billy goat Gruff," said the goat. "I'm going to eat you up!" said the monster. "Don't eat me. Wait until the third goat comes along. He's much bigger than I am," said the goat. So the monster let him go. And the second billy goat Gruff crossed the bridge. Finally the biggest, the third billy goat Gruff started to cross the bridge. Trip! Trap! Trip! Trap! Suddenly the monster jumped up onto the bridge. "Who's crossing my bridge?" he roared. "I'm the third billy goat Gruff," said the goat. And he ran over the monster. SPLASH! The monster fell into the deep water. Then the biggest billy goat Gruff safely crossed the bridge. Now all three billy goats Gruff could happily eat the green grass together.]

- Parents' assignment

None.

Appendix 4

Observations transcript

(a) Observation of hearing learners

The observation was done in year 3 (7-8 year old children), in a classroom with around 15 children.

At the start of this literacy lesson, children are all sitting on the ground, watching the teacher and the interactive whiteboard in front of the classroom. The teacher starts the lesson by referring to the content of yesterday's literacy lesson. Yesterday, they started reading an extract of a Harry Potter story, describing a big hall in a castle. Children read the description of this setting and were asked to imagine it in their head. They also each made a sketch of how they pictured the story scene. After this introduction, the teacher tells the children that they will read the extract again, and that they will add some colours to yesterday's drawings.

On the whiteboard, the extract from the Harry Potter story is shown. The children read it together, aloud, together with the teacher. The teacher reads the story again and asks the children to close their eyes and try to imagine the scene: "What do you see? Try to capture the picture in your mind." The teacher now asks the children which adjectives the writer uses to paint a picture of the scene. The following adjectives are mentioned: flickering – misty silver – velvety black – floating – glittering. Of each adjective, the teacher asks the children (one of) the following questions: "What is this? What do you see when you read this? What does it paint in your head? What does this describe?"

The children are now going to add colors to the drawing they made yesterday. They all sit around the table with their drawing, and work for ten minutes, coloring their drawing. Then they return to the ground with their drawing.

The teacher now shows them the scene (which was described in the extract) from the Harry Potter film. First they watch the whole scene, then they watch it again, but it is paused, and the children are asked to look together which description of the writer this particular part of the film refers to.

The children are then asked to talk to the person next to them to check whether the written description matches their drawing, which they like best and whether they prefer the film or the written description, and why. The teacher explains to the children what the learning objective of today is: "explain what you prefer, and why".

To finish the lesson, the teacher tells the children that they will do a writing exercise about the Harry Potter story tomorrow: writing down an answer to the following questions: "Which description did you prefer? - What was your favorite part of the written description? - What was your favorite part of the film version? - Did you think the film version was like the written description? - Was the film version as you had imagined it to be? Explain your answer. - What were the similarities and differences between the two versions?" As a preparation to this writing exercise, they will now sit in groups of two persons, and talk about these questions.

(b) Observation with deaf learners

Information provided by the teacher before the literacy lesson

- Three children in year 5 (9-10 year old children).
- All of them wear cochlear implants.

- Words have to be used about 150 times before the children recall them. Teachers still have to gesture a lot.
- Teachers do a language processing test every few months. Results hereof are put in graphs for each child and matched to age equivalent scores.
- The children's problems are also caused by thinking skills. For example, if you ask them "What is the difference between tent and house?", they will not have an answer, since they do not have the categories and the vocabulary to express for example that a tent is made of fabric, and a house is made of stone.

The teacher introduces the lesson. She says they will be doing some homographs first, then improving sentences, then some reading and looking for hidden meanings, and then "Horrid Henry".

Homographs

The word "star" is shown on the whiteboard. The children are asked what this is. Some of their answers:

- "Jesus" (because the star was shining on Jesus when he was born)
- "Jesus star baby". The teacher asks the boy who gave this answer to make a whole sentence of this.

The teacher explains that a star can also be someone who is very famous. A picture of Daniel Radcliffe/Harry Potter is shown on the whiteboard. The teacher now asks: "What do you think a star is?" When she gets no answers from the children, she explains what a star is: "A film star, he "starred" in Harry Potter. Do you know any other film stars? Give some other examples."

The teacher now asks the children to make a sentence with the word "star" in it. These were some of the answers:

- (3) "The sky were a star." The teacher asks the children whether this sentence makes sense.
- (4) "A star in the sky." The teacher asks the children to make a whole sentence of this.
- (5) "In the night there was a star in the sky." This sentence is written on the whiteboard.

Making sentences

A sentence is written on the white board: "Alexis walked SLOWLY along the LONG corridor BECAUSE JACK WANTED TO TALK TO HER. The goal is to change something to the sentence every day. The words in capitals were added yesterday. Today each child can make one other change. These were the changes made by the children:

- Put "ON MONDAY" in front of the sentence.
- "walked slowly AND DIZZILY". The teacher asks: "But do you think that the sentence makes sense now? It doesn't, we have to change it. Why is Alexis dizzy?". One of the children says: "Because she spinned round and round." The teacher asks: "Who is she? What is the past tense of to spin?"
- "WIDE corridor."

Then the children are asked to read the sentence out loud.

Reading and looking for hidden meanings

For this part of the lesson, the story and the questions in Figure 11 are used. The teacher wrote this story especially for the purpose of searching for meanings in a text, inference etc.

Charlie at home

Charlie wiped his nose with a tissue and tried to be brave. He saw the little suitcase in the hall and sniffed. "She'll only be gone for one night," said Dad. "You can visit her this evening."

Dad was very busy painting the small bedroom. He wasn't sure if he should paint it pink or blue so he had painted it yellow. The room looked lovely. Surely it would like it's new home.

Soon she had gone in dad's car and Charlie was left at home with Nanny. They curled up in front of the fire and had a story.

Tomorrow everything would change!

Questions:

- Is Charlie a boy or a girl?
- Who is she?
- Where do you think she is going?
- Why did dad paint the room yellow?
- What do you think will have a new home?
- What do you think the weather is like?
- Why will everything change tomorrow?

Figure 11. Story "Charlie at home", used to explain inference to the children.

First the teacher and the children read aloud part of the text. Then the teacher reads the whole story again. Then she hands out questions and reads the questions together with the children. Then she reads the story again, and the children get ten minutes to answer the questions. Then she discusses their answers with them, and highlights important clues in the text (e.g. "should paint it pink or blue").

These are some of the children's answers:

- To question 1:
Someone thinks Charlie is a girl because there is a "she" in the text. The others think Charlie is a boy. The teacher highlights pronouns to show that Charlie is a boy.
- To question 2:
Only one of the children knows that "she" is referring to mum.
- To question 3:
Only one of the children's knows that mum is going to the hospital. Another child thinks mum went to the shop to buy paint (because dad is painting the room).
- To question 4:
The children don't know the answer. The teacher asks them: "Who would have a pink room?"

Horrid Henry

For this part of the lesson, an extract from the story "Horrid Henry" (adapted from "Horrid Henry Tricks the Tooth Fairy" by Francesca Simon) was used.

The children each read small parts of the text aloud. After each part, the teacher asks them questions about that part. These are some examples of questions:

- "What is shrieked? Read it out loud."

- "What are pansies?"
- Teacher: "Can you name any other flowers?" Child: "A tulip." Teacher: "What does it look like?" She uses Google Images to find pictures of tulips to show to the children.
- "'Squashing' - show me how you would do this."
- "Henry says 'It's not fair'. Why is it not fair? What does Henry want to happen? Why is he shouting?"
- "'Scowled'- show me what this is."
- "'Better watch out' - what does this mean?" The children don't know, and the teacher explains: "You have to be careful. For example, when a child is walking very close to the river, mother says: 'Watch out! Be careful!'".
- "'Jaw dropped' - show me what this means."
- "'It looked like ... no, it couldn't be' - Why are the three points there?"
- "What does Henry say that Peter has done? Has he really lost the tooth?"
- "Is Henry really a volcano? Why does he say that? Show me."

Closure of the lesson

The teacher explains that they will be doing (talking about) words like shouting and screaming tomorrow. They will also read from a different book, and some Horrid Henry stories.

Appendix 5

Teachers' diary assignments

- **Assignment 1: dealing with poor comprehenders**
In the first assignment a letter of an imaginary teacher is presented. This teacher has a student with some difficulties with comprehending texts and stories. The participating teacher is asked to write down some advice on how to handle this situation.
- **Assignment 2: teaching material - stories**
Which stories do you really like to use for reading lessons? List your three favourite stories and briefly explain why you like them so much. What makes a story a good story to use in reading lessons? List as many characteristics of good stories as you can think of. Hint: try to think of common characteristics of the three stories you've mentioned above.
- **Assignment 3 – assessment of reading comprehension**
How do you assess your students' comprehension of stories? Can you give some examples of specific assessment methods/tools you've recently used? You can think of assignments, questions, games, tests, ...
- **Assignment 4 – motivation for reading**
Please make a mind map of your view on children's motivation regarding reading.
- **Assignment 5 – poor comprehenders**
Do you have children who you would classify as poor reading comprehenders? These are children who read well at the word level, but who do not seem to have a good understanding of, or memory for, the text they have read. Think of one of the best reading comprehenders in your class, and describe this student in the frame below. Do the same for one of the poorest reading comprehenders. If you are not sure whether you have poor comprehenders in your class, you may choose one of the poorest readers in general.
- **Assignment 6 – computer use**
Could you list the activities you usually use a computer for (in general, not only related to your job)? Please add the computer programmes you use for these activities. Circle the computer programmes you use for your lessons, either for preparing lessons, and during lessons. Could you describe how and why you use the computer programmes you've circled?

Appendix 6

Teacher interview topic list and script

Topic list

- **Preparing reading lessons**
 - Can you describe how you normally prepare a reading lesson?
 - Which materials do you use?
 - When do you prepare a lesson?
 - How long does it take to prepare a lesson?
 - Can you show the reading lesson you are preparing now? Or one you've recently prepared?
 - Can you give comments on this reading lesson?
 - Which sources of information do you use for preparing a reading lesson?
 - Which stories do you use, how do you select them?
 - Which assignments/questions do you use, how do you select them?

- **Reading lessons**
 - Describe one of your recent reading lessons.
 - What does the general course of a reading lesson look like? Can you give a description of the learning process?
 - Which stories did you use?
 - Which (or what kind of) exercises do you make use of?
 - Can you give some examples of typical questions you ask during a reading lesson? When and where in reading do you ask questions? Why do you ask these questions? What are they important for?
 - Which material do you use? Can you show me some examples of this material?
 - Can you describe good/bad experiences during a reading lesson? With the material, with the exercises, with the learning process?
 - During a reading lesson, do you work with individual activities, classical activities, or both? Can you describe the advantages/disadvantages or good/bad experiences with both kinds of activities?
 - What is the number of students in a reading class?

- **Teaching material for reading lessons**
 - Stories
 - Can you give some examples of stories you currently use in your classes?
 - Can children sometimes choose the stories they want to read?
 - Can you describe characteristics of good versus bad stories?
 - How many stories are available for each child during a reading lesson?
 - How many stories do you use over one year?
 - How long are the stories in average? Do you use many short stories or few long stories during the course of teaching?

- Questions/assignments
 - Can you give some examples of questions accompanying a story?
 - What is the purpose of these questions? Can you give examples of good/bad questions for this purpose?
 - How long does it usually take for a child to solve a task (read a story and answer the questions)?
- Tests
 - How many reading sessions do you need for the evaluation of a child's progress? How exactly do you evaluate a child's progress?
 - Do you make use of tests for the evaluation of children's reading comprehension?
 - What exactly are these tests aiming for?
 - What do these tests look like? Can you give an example?
 - How often do you use tests?
- Reading comprehension instruction models
 - Which comprehension instruction methods have you encountered?
 - What are the differences between these models?
 - Which are effective and which are not, in your experience? Does this depend on the age or skill level of the child? How? Does this depend on the cultural and/or linguistic background of the child? Or on other factors?
- Pictures
 - Do you make use of pictures/illustrations to help comprehension?
 - Which pictures? Those in the textbook? Or different pictures?
 - How do you choose these pictures? What is their added value?
 - What are, according to your opinion, the best tale illustrations for your age group? Can you give some examples? (Are there any cultural or other differences regarding the best tale illustrations?)
 - Is there special concern about illustration for reading comprehension? (e.g too much detail, additional visual information may take too much attention and work against learning, ...)
- Dictionaries/reference books
 - Do you make use of dictionaries or other reference books during a reading lesson?
 - Which books?
 - How do you use them during your lesson?
- Homework
 - Do you give your students homework for reading lessons?
 - Do these homework assignments differ from the work you do in class? What are the differences?
 - Can you give an example of an assignment?
 - How do you assess the performance of a child on a homework assignment?
- **Use of computer/technology**
 - Do you use a computer to prepare reading lessons?
 - Why? What do you use it for?

- If you don't use a computer, why not? Can you imagine computer tools that would be useful to help you prepare a reading lesson? What would such a tool look like?
 - Can you give an example of a preparation on the computer, or of topics the computer helped you with?
 - Can you comment on good/bad experiences you had with preparing reading lessons on the computer?
 - What could be improved?
 - Do you use Multimedia or Software to prepare reading lessons?
 - Why? What do you use it for?
 - If you don't use Multimedia or Software, why not? Can you imagine tools that would be useful to help you prepare a reading lesson? What would such a tool look like?
 - What could be improved?
 - Do you use a computer or other technology during your reading lessons?
 - What do you use it for?
 - Can you describe an example of computer usage during a reading lesson?
 - Can you describe good/bad experiences you had with the use of a computer during a reading lesson?
 - What could be improved here?
- **Motivating students to read**
 - How do you encourage reading?
 - Can you give some examples of strategies you use to stimulate children to read?
 - How do you support reading?
 - Can you give examples of strategies you use to support children while reading?
- **Interaction between students**
 - Is there a lot of interaction between students during a reading lesson? Can you describe an example of interactions between students during a lesson?
 - What is the interaction intended for? Do students help each other this way? Other purposes?
- **Poor versus good comprehenders**
 - Describe a good and a poor reader/comprehender in your class.
 - Can you think of a good reader and try to explain in what a student with poor reading skills differs from her/him, and in what they are alike?
 - What types of skills do you think are important for successful reading comprehension? Does this depend on the age of the child? Does this depend on the cultural and/or linguistic background of the child?
 - Do poor comprehenders easily read the stories you use in your reading lesson?
 - If not, why?
 - Are the stories too long/too short according to you?

- What are typical difficulties your students encounter?
 - Content?
 - Grammar?
 - ...?
 - Can you give an example of text that your students (poor comprehenders) find difficult to comprehend and an example of a text that your students can easily comprehend and explain why (e.g. showing the difficult passages, identifying elements in the text or in the reader etc.)
 - Different levels in class
 - How many levels of difficulty do you foresee in you classroom?
 - Can you describe the differences between these levels?
 - How do you deal with different levels in your reading lessons?
 - Do you take these differences into account while preparing a reading lesson, and how?
 - How do you address children with different reading lessons during a reading lesson?
 - How do you assess (different) comprehension levels?
 - Which characteristics of the student affect level of reading comprehension (age, gender, cultural background, ...)
 - What would help to better assess students' reading comprehension levels?
 - Which data would help you?
 - Would you prefer short term or long term assessment? What are the advantages and disadvantages of both?
- **Policies affecting reading comprehension lessons**
 - Which policies are in place that affect your work with respect to fostering comprehension?
 - Do they affect it positively/negatively?

Detailed script

First, the researcher introduces the purpose of the interview to the participant. An introduction such as suggested below could be used:

Thank you very much for participating in this project, we really appreciate it. First, I would like to explain the purpose of this interview. For the TERENCE project, it is very important that we understand the current situation of teachers and students with respect to reading comprehension. Therefore, we are talking to several teachers and asking them to tell us about their experiences with regard to reading lessons, reading comprehension, etc.

Then, the researcher will briefly explain the procedure of the interview:

So, the interview will take about two hours, if that is OK with you? We will discuss several topics. For each of the topics, I will ask you several questions. Also, I will ask you to give me some examples of your daily experience, and to show me some of the material you use for your reading lessons.

It is important to make sure that the participant feels at ease, and feels free to elaborate on topics that are important to them:

I would like to stress that there are not wrong answers to the questions I'm asking. This interview is all

about your experiences, YOU are the expert here, not me. Also, if there are any topics during the interview that are especially important to you, please feel free to mention that to me, or to elaborate on them. And if you have any questions to me, about the interview or about something else, you can interrupt me at all times. Is that OK?

Finally, the participant has to give permission to make audio recordings and photos:

I would like to ask you if it is OK for you that I make audio recordings. That will make it much easier for me to keep track of everything you tell me. I will only use the recordings to analyse the interview, I will not broadcast or publish anything of the recordings. Is that OK for you?

Also, I would like to take some photos of the material that you use for your lessons. Is that OK too?

After this introduction, the interview can start. The researcher should keep track of time and clearly introduce each topic before asking questions. First, the researcher will browse through the diary with the participant. This is to make sure everything that has been mentioned in the diary is clearly understood by the researcher. At the same time, the researcher now knows what is in the diary so he/she may refer to the diary during discussing the interview topics.

I would like to start with the diary we have asked you to keep. Did you like keeping the diary? Were there any assignments that you particularly liked? Or that you found particularly difficult? I will get back to what you've mentioned in the diary during the interview, but let's briefly walk through the assignments.

Before changing to a new topic, the researcher should ask the participant if they have anything to add that is relevant to the topic that was just discussed:

I would like to end this topic now. Is there anything else you would like to share about this topic that we have not discussed yet?

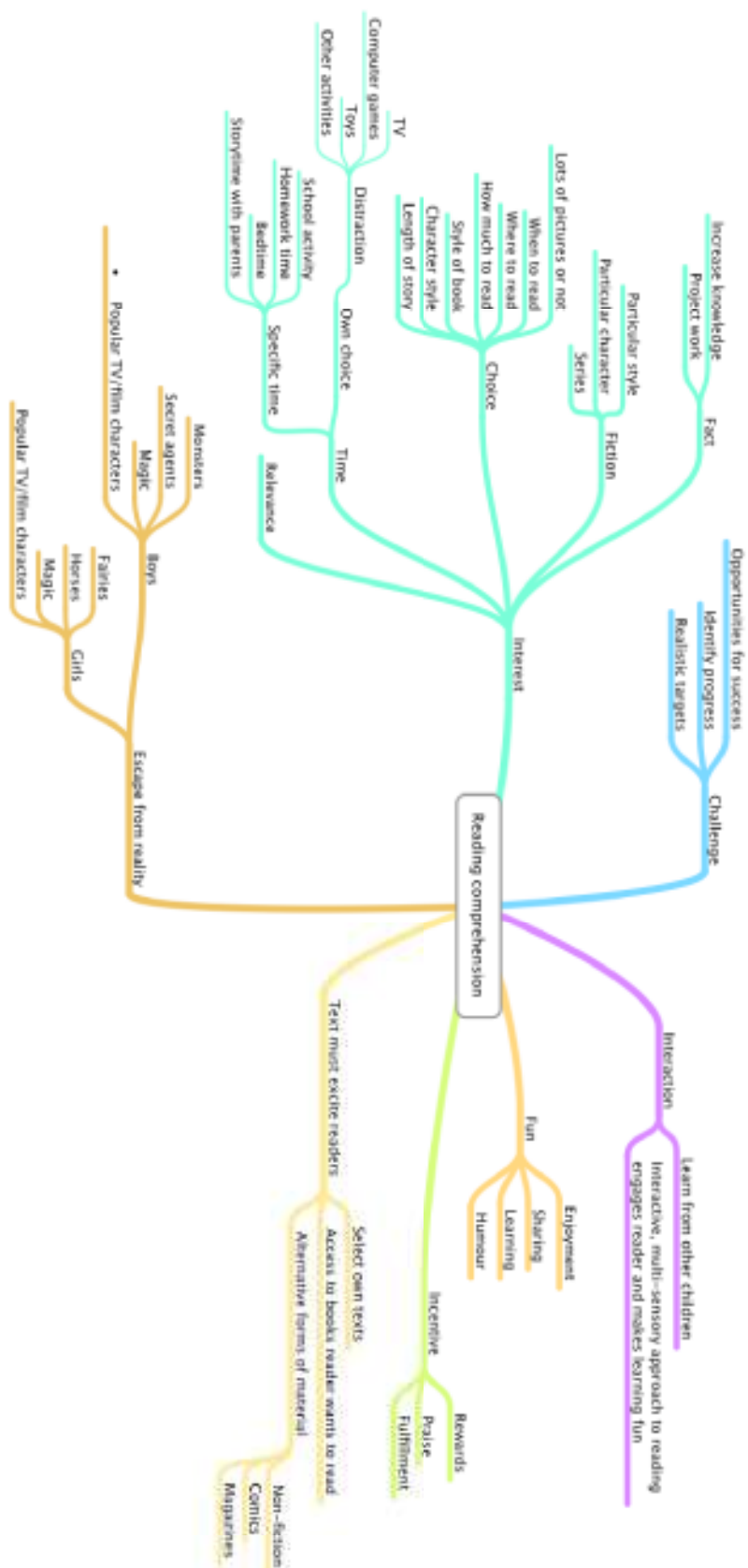
After the final topic, the researcher asks the participants whether they have anything to add about that topic or in general. And, of course, the research thanks the participants again for their time.

This was the last topic I wanted to discuss with you. Is there anything you would like to add about this topic? Or perhaps about the interview in general?

OK, then we're ready. I would like to thank you again for your time, and for sharing your experiences with us. I really appreciate it!

Appendix 7

Compiled mind map of four hearing school educators' association with the concept "reading comprehension"



Appendix 8

Examples of children's drawings in the diaries

Examples of hearing children's drawing of a story



Activity 4

On the next page you will find a short story. Please read it carefully and make a drawing of this story.

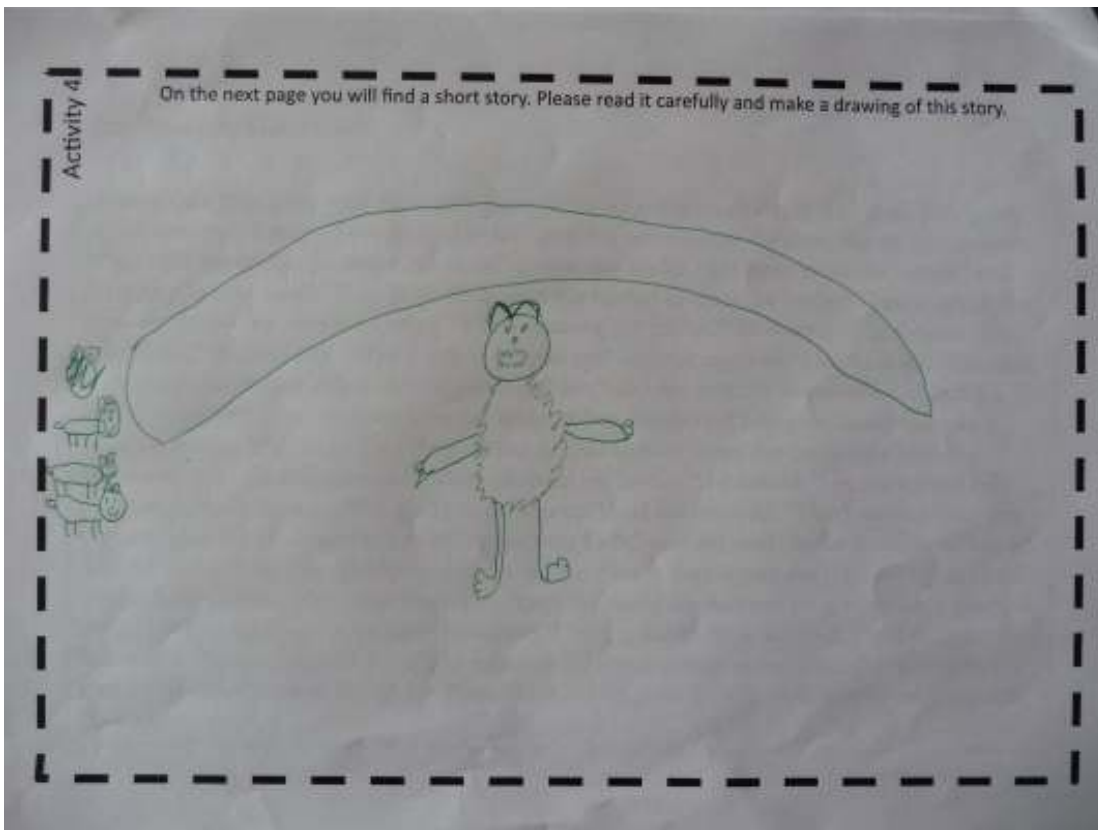


Activity 4

On the next page you will find a short story. Please read it carefully and make a drawing of this story.



Examples of a deaf children's drawing of a story



Appendix 9

Italian Diary for Parents and Learners



Figure 12. Page 1

Questo Diario è dedicato ai bambini ed ai loro genitori. I riquadri verdi sono per i piccini, quelli arancio sono per i grandi.

Caro Genitore,

Prima di ogni cosa, vorrei ringraziarLa per il supporto che sta offrendo al progetto TERENCE, il quale si propone di aiutare i bambini che hanno problemi di comprensione del testo.

Le chiedo di assistere suo figlio/a nella stesura di questo diario e di seguire le istruzioni nelle sezioni dedicate ai genitori, quelle di colore arancio.

I compiti che abbiamo pensato di assegnare a suo figlio/a sono pochi e semplici; è comunque bene che lo assista.

Se lo desidera, può anche riportare un breve giudizio sulle attività proposte dal diario o note sulla sua compilazione

Per domande e delucidazioni non esiti a contattarmi:

Tania Di Mascio

DIEI Università L'Aquila

67100 L'Aquila

Tel: 349-3137223

Buon lavoro e grazie ancora.

Ciao,

è bello conoscerti! Siamo contenti che terrai il diario con te e che farai disegni per noi!

Questo Diario è tuo e solo tuo, custodiscilo gelosamente e divertiti ad attaccare foto e disegni.

Buon divertimento!

Figure 13. Page 2

Qui, se ti va, puoi appiccicare una bella immagine del personaggio dei cartoni animati o dei videogiochi che ti piace di più.

Figure 14. Page 3

Prova a disegnare la storia che ti piace di più, tra quelle che ti hanno raccontato la mamma ed il papà.

Figure 15. Page 4

Provi a sintetizzare i commenti che suo figlio fa rispondendo alle domande riportate nei rettangoli in questa pagina che Lei porrà a suo figlio/a.

Perchè hai scelto questa storia?

Cosa ti piace di questa storia?

Perchè, della storia, hai disegnato...? (quello che ha disegnato suo figlio/a)? In sintesi provi a chiedere spiegazioni sul disegno e annoti qui le risposte.

Figure 16. Page 5

*Prova a raccontarmi un'avventure del cartone animato
o del tuo videogioco preferito...fatti aiutare da mamma o da papà*

Figure 17. Page 6

Risponda alle domande relative a suo figlio/a riportate nei rettangoli in questa pagina.

Suo figlio/a preferisce leggere, giocare ai videogame oppure guardare la tv? Ci descriva le attività che suo figlio/a svolge al di fuori del mondo scolastico.

Ci racconta cosa Lei fa con suo figlio/a? Lo/a aiuta nei compiti, lo/la accompagna a fare sport? Ci descriva una sua giornata tipo con suo figlio/a.

A suo figlio/a interessa INTERNET? Lei naviga con suo figlio/a? Ci descriva il rapporto di suo figlio/a con il Web.

Figure 18. Page 7

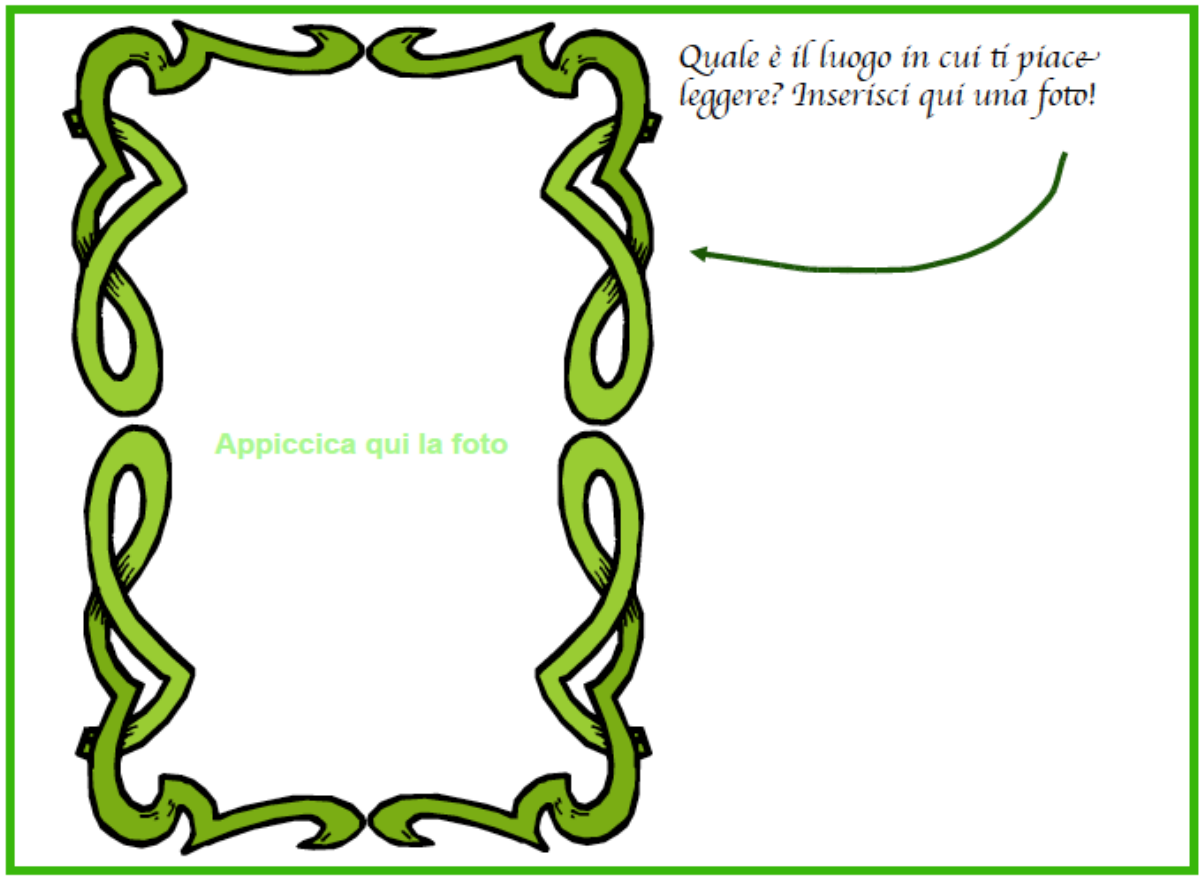


Figure 19. Page 8

Quando suo figlio/a legge, lo fa con piacere? Ci racconti cosa suo figlio/a legge: favole, racconti, storie di avventure? Preferisce storie brevi o lunghe? Storie con tante descrizioni di luoghi e di personaggi, oppure storie con tante azioni e/o pochi personaggi.

Quando suo figlio/a legge, trova qualche difficoltà? Si stanca? Si annoia? Ha difficoltà nel leggere alcune parole? Gli piace disegnare degli episodi o dei personaggi di una storia dopo aver letto?

Lei aiuta suo figlio/a nella lettura? Lo/a stimola? Gli/Le legge favole? Storie? Libri? O altro ancora? Vi soffermate a commentare le illustrazioni o non interessano più di tanto a suo figlio?

Figure 20. Page 9

Appendix 10

Italian Diary for Teachers



Figure 21. Page 1

INTRODUZIONE AL LAVORO

... della serie, come aiutarci a capire...

Salve,

Scopo del progetto TERENCE è quello di offrire la facilitazione di percorsi didattici alternativi per aiutare i bambini che hanno problemi nella comprensione del testo.

Desideriamo, perciò, ringraziarti per la collaborazione che hai deciso di assicurare al progetto.

Apprezziamo enormemente il tuo contributo, per noi tanto più prezioso perché derivato da concreta esperienza sul campo.

Ti chiediamo, perciò di raccontarci le tue esperienze, soprattutto le tue opinioni in relazione al problema oggetto della ricerca.

Quanto alle modalità, si tratta di tenere questo diario **per 1 settimana**, compilandolo con il metodo che ritieni più idoneo alla comunicazione dell'esperienza.

Figure 22. Page 2

PRIMA DI INIZIARE
RACCONTACI QUALCOSA IN
PIU' SU DI TE E SUL TUO
LAVORO:

(Nome, cognome, studi, interessi...)

...E QUI SE VUOI UNA BELLA
FOTO CHE TI RAPPRESENTA
A LAVORO!

Figure 23. Page 3

PRIMO PASSO

Istruzioni per la compilazione...ed un po' di numeri!


Questo diario contiene 7 compiti, uno per ogni giorno della settimana...ma chiaramente si possono fare anche tutti in un giorno!

Ogni compito può essere svolto in 5 10 minuti circa...ma si può spendere anche più tempo, quello che si ritiene necessario!

In ogni caso, si può certamente riempire e compilare questo diario come meglio si crede, usando disegni, fotografie e qualsiasi cosa possa aiutare!

Per qualsiasi domanda non esitare a contattarmi ai seguenti riferimenti:
Tania Di Mascio 349-3137223,
tania.dimascio@univaq.it

I lati positivi e negativi del mio lavoro:

| | |
|---|--|
|  |  |
|---|--|

Le mie letture sulla comprensione del testo:

Figure 24. Page 4

GIORNO 1 - PREPARO LA LEZIONE

Una tua ex allieva e giovane collega, Maria, ha appena iniziato a lavorare a Bolzano; Maria ti ha scritto una lettera (riportata a lato) per chiederti qualche consiglio su come preparare una lezione. Cosa e come le risponderesti?

Cara Maria,

.....

*Carissima prof,
ti scrivo per chiederti aiuto; alcuni dei miei studenti di terza elementare hanno chiare difficoltà di comprensione del testo e delle storie. In realtà questi bambini leggono anche in modo strumentalmente corretto, ma non comprendono il contenuto di quanto letto. Potresti darmi qualche consiglio per aiutarmi a preparare una lezione di lettura per questi studenti? Grazie mille, Maria*

Figure 25. Page 5

GIORNO 2 - SCELGO LE STORIE

Dopo aver risposto alla tua collega, pensi sia meglio darle delle dritte anche sulle storie da far leggere ai bambini:

1. Le scrivi 3 titoli ed i riferimenti biblio, spiegandole brevemente perchè ti piacciono queste tre.
2. Fai una lista di caratteristiche che rendono le storie, adatte ad una lezione di lettura
3. Collega con delle linee le storie alle caratteristiche che credi ... come in un gioco.

The diagram consists of three rectangular boxes on the left, each labeled 'Storia 1', 'Storia 2', and 'Storia 3' respectively. To the right of these boxes is a larger rectangular box titled 'Caratteristiche di una "buona storia"'. Inside this box is a numbered list from 1 to 11, followed by an ellipsis. A red line starts from the top right corner of the 'Storia 1' box and curves to connect to the first item in the list.

Figure 26. Page 6

GIORNO 3 - VALUTO IL PROBLEMA

...poi ti ricordi che Maria è davvero alle prime armi e ti senti quasi in dovere di dirle quali sono le tue tecniche I tuoi segreti per capire se I bambini comprendono oppure no il testo...visto che hai il sentore che Maria possa aver sbagliato a giudicare i suoi alunni.

*Maria,
Questi sono i metodi, gli strumenti, le tecniche che ho usato e che adesso uso per comprendere se i bambini hanno problemi con la comprensione del testo e delle storie*

Figure 27. Page 7

GIORNO 4 - VALUTO I MIGLIORAMENTI

...visto che le hai dato dei buoni consigli, Maria ti scrive nuovamente chiedendoti come fai a valutare se un bambino migliora oppure no: usi dei test? Degli esercizi? Dei giochi?
Tu, pazientemente Le rispondi facendo anche dei personali commenti sui metodi.

| | |
|--|--|
| <p><i>I metodi, gli strumenti, le tecniche di valutazione dei miglioramenti che ho ottenuto</i></p> <p>1.</p> <p>2.</p> <p>3.</p> <p>....</p> | <p><i>I miei commenti positivi e negativi sui metodi</i></p> <p>1. pos</p> <p>neg</p> <p>2.</p> <p>3.</p> <p>....</p> |
|--|--|

Figure 28. Page 8

GIORNO 5 - SPRONARE I BAMBINI A LEGGERE

...poi ti ricordi che quando eri una giovane prof, ti piaceva leggere e spronavi i bambini alla lettura, con tutti i metodi possibili; prepari quindi per Maria, una mappa concettuale* sulle motivazioni che un bambino deve avere per leggere. Ti diverti a farlo, usi tutta la tua fantasia e la tua esperienza per disegnarla...

La mia mappa:

Motivare alla lettura

*) Una mappa concettuale è un diagramma usato per rappresentare parole, idee e tutto ciò che è legato al concetto centrale, nel nostro caso la lettura. Per qualche esempio, guarda la pagina successiva

Figure 29. Page 9

GIORNO 6 - STRUTTURARE IL LAVORO

... la lettera di Maria ti ha fatto davvero lavorare molto, ma la cosa ti è piaciuta e ti è servita per mettere a posto un pò di materiale che avevi sparso qua e là. Nel cercare, hai ritrovato anche delle schede che hai usato in passato per strutturare il lavoro. Le compili con dei dati reali per farle vedere come si fa...

| Bambino/a "buona comprensione" | | Bambino/a "cattiva comprensione" | |
|--|------------------------------|--|------------------------------|
| Nome: | | Nome: | |
| Letture sgradite al bambino/a | Letture gradite al bambino/a | Letture sgradite al bambino/a | Letture gradite al bambino/a |
| Principali problemi di lettura: | | Principali problemi di lettura: | |
| l'ho aiutato il bambino/a usando... | | l'ho aiutato il bambino/a usando... | |
| Ho valutato i miglioramenti usando ... | | Ho valutato i miglioramenti usando ... | |

Figure 30. Page 10

GIORNO 7 - IO ED IL COMPUTER

... che fatica con Maria! Adesso puoi aiutarci a capire se il computer potrebbe in qualche modo aiutare te nel tuo lavoro di preparazione, intervento e valutazione relativi alla comprensione del testo. Descrivici quindi il tuo rapporto con il computer seguendo i punti da 1 a 3.

| | | |
|---|------------------------|--|
| Elenca le attività quotidiane che comportano l'uso del computer e accanto che programmi usi (se non usi il computer scrivilo liberamente) | | Evidenzia nella lista del punto 1 quei programmi, se ci sono, che usi per preparare la lezione e che usi per la didattica. |
| Attività | Programmi del Computer | Potresti spiegarci come e perchè usi i programmi che hai evidenziato in 1 e quali sono gli aspetti positivi e negativi che riscontri nel loro uso? |
| | | |

Figure 31. Page 11