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1 Executive Summary

The Deliverable D6.3 presents an overview of NEXT-TELL’s design-based research progress in its first half of the second project year. This report is mainly divided into three parts which are (1) the outline of the research structure, (2) the description and results of baseline studies and requirement analyses with new teachers as well as a report on a new type of project presentation, and (3) the descriptions and results of the Researcher-led Design studies cycle 1 (RDS1) which were implemented in classes and teacher workshops. This report will end with conclusions from the research in RDS1 and recommendations for the next cycle of Researcher-led Design studies (RDS2).

Following the purpose and scope of this report in chapter 2, the outline of the research structure is presented. In order to monitor how the different research activities going on in NEXT-TELL fit together the project is presented in three dimensions: (i) the five basic processes and their relation to NEXT-TELL tools which are illustrated in a formative e-assessment cycle 2.0, (ii) the three levels of an integrated school framework (students’ learning, teachers’ learning, and school development), and (iii) five (partially re-iterative) phases within a design-based research (DBR) approach. Finally, it illustrates a research grid which combines the dimensions and helps to sort the research activities.

Chapter 4 presents the results of new baseline studies and requirement analysis. These activities took place in (1) Austria (BS, RA, project presentation), (2) Denmark (ICT use, project presentation), (3) Norway (SPICE interviews), and (4) Germany (project presentation and design-based research). In Austria, a 2-day-workshop was conducted in December 2011 to serve both purposes. It reached a total of 22 teachers. The baseline results from Austria are consistent with previous ones (see D6.2). In Denmark, we got into contact with different stakeholders and intensified our collaboration with teachers. Apart from that we interviewed students about use of ICT. A SPICE interview was conducted in Norway with a school leader of an Upper Secondary School. That school understands itself as a learning organisation [Senge, 1994]. In Germany, a DBR workshop was implemented to serve different purposes: make new teachers familiar with NEXT-TELL but also explain them the participatory co-design process of DBR within the project.

Chapter 5 presents the Researcher-led Design studies in cycle 1. The chapter is divided into two parts, that is (i) workshop studies with teachers and (ii) classroom implementation studies and reflection. We accomplished different teacher workshops regarding the topics ECAAD, OLM, as well as communication and negotiation. Here, an ECAAD workshop conducted in Germany is selected and reported in more detail. These teachers could not yet handle the ECAAD method with its explicit assessment parts easily. As first classroom studies, two OpenSimulator/SecondLife scenarios took place in cross-collaborational studies within a total of three schools (Austria – Norway and Austria – Italy). Whereas students were very interested in meeting students from abroad, teaching with immersive learning environments is an ICT scenario that is not easily implemented in schools. Recommendations for teachers are provided in the appendices. In Norway, a first version of a cognitive density questionnaire was given to both students and teachers (results still under analysis) during these activities.

In chapter 6, a short description of the research activities in the TISL-level is summarized. Since the data from these studies (from Norway and England) were gathered recently, the data is not yet analysed. As one purpose of these studies was to inform the design research in WP5, results of these studies will partially be presented in D5.3.

Chapter 7 summarizes conclusions drawn from the research conducted and provides recommendations for the upcoming RDS2.
2 Introduction

2.1 Purpose of this Document

The purpose of this Deliverable is to document the on-going design-based research (DBR) studies within NEXT-TELL, and thereby, to provide a formative overview of the different research activities which took place during October 2011 and February 2012. The Deliverable presents the experiences made so far in working with school stakeholders in a design-based research manner. In order to learn as much as possible from the on-going research activities, our experiences made are presented critically. We point to challenges we faced and suggest guidelines and recommendations for the next research cycle.

2.2 Scope of this Document

The scope of this Deliverable includes different types of research activities necessary within a design-based research (DBR) approach and different types of contents necessary to cover the comprehensive school system-based approach in NEXT-TELL. With regard to types of design-based research activities the Deliverable presents descriptions and data from so called baseline studies and NEXT-TELL presentations. These research inspired initiatives represent important first steps when establishing relationships between NEXT-TELL partners and schools. Furthermore, the Deliverable reports on more intensive research workshops as well as classroom studies that go hand in hand with NEXT-TELL’s progression. With regard to different types of contents the research topics cover ECAAD, immersive learning environments, OLM, TISL, and SPICE. Following this overall approach this Deliverable contains the NEXT-TELL partners’ presentations of their context-specific (considering country-specific and school-specific characteristics) research in its current status.

This Deliverable does not contain the detailed description of the current status or rationale of the methods (e.g., modelling with ECAAD planner), the scenarios (e.g., scenarios for immersive learning environments), or NEXT-TELL tools (e.g., OLM or data transfer). Information on these issues is provided in the deliverables of the respective work packages (WPs). Moreover, this Deliverable does not provide a comprehensive and in-depth analysis of all the research data gathered so far. This is due on the one hand because data collected is still under analysis. On the other hand because some of the research data collected represents direct information to other work packages, and in order to prevent redundancy, will be presented in the respective deliverables.

2.3 Status of this Document

This is the final version of the Deliverable D6.3.

2.4 Related Documents

Before reading this document it is recommended to be familiar with the abbreviations used in the NEXT-TELL deliverables. Therefore, we recommend to first have a look in the glossary chapter at the end of this document.

Furthermore, for a comprehensive understanding we recommend the following public deliverables which present former steps within the project:

- D2.1: ECCAD (evidence centered activity and assessment design)
- D4.2: OLM (open learner model)
- D5.1: TISL (teachers’ inquiry into students’ learning), SPICE (strategic planning for ICT alignment)
- D6.2: BS and RA (baseline studies and requirement analysis)

We further recommend three deliverables following end of March 2012 which explain in more detail scenarios, methods, and tools we partially refer to in this Deliverable:

- D2.3: ECAAD
- D4.3: OLM
- D5.3: TISL, SPICE
3 Research Structure

NEXT-TELL is a research project that approaches schools with an integrated framework. Its aim is to develop an infrastructural ICT system with school stakeholders in a participatory co-design process as an integral part of DBR [Barab, 2004; Cobb, 2003; Sanders, 2008]. This chapter aims at offering a basis that should support the reader in recognizing the holistic NEXT-TELL approach despite or because of the variety of seemingly independent research studies presented in this Deliverable. This chapter shows how educational methods with their ICTs and DBR are combined to a research grid. This research grid provides the structure in which the NEXT-TELL studies are sorted.

3.1 Research Contents: Methods and Tools

The infrastructure for teaching and learning processes we develop in NEXT-TELL comprises methods as well as tools at once. The ECAAD cycle 2.0 will be presented in more detail below to explain our approach. Furthermore, we hint to our integrated framework.

3.1.1 ECAAD as Formative e-Assessment Process Cycle

Those who are more experienced in e-learning and/or e-teaching know that computers do not automatically lead to better learning outcomes. In order to support learners’ knowledge acquisition there must be a good method and the respective tool for it. Both need to go hand in hand. It is well-known that formative assessment - which can also be practiced as assessment for learning - supports learning [Black, 1998, 2009; Pachler, 2009; Popham, 2008]. Formative assessment in the classroom, however, is not easy to implement. Formative e-assessment is neither trivial to implement because it needs preparation and respective tools. It is known that the Evidence Centered Design framework (ECD) [Mislevy, 2006] can be used for producing an assessment task in a systematic manner, making explicit all the steps from domain analysis to the specification of values in a student model. NEXT-TELL’s ECAAD cycle 2.0 (see Figure 1), however, wants to extend the ECD.

![ECAAD Cycle 2.0](image)

Figure 1. ECAAD Cycle 2.0
(dark blue arrows represent processes that should be provided by NEXT-TELL tool, white arrows with blue frame represent stakeholders’ processes which should be supported by NEXT-TELL tools, light blue arrow represents learning/assessment actions in non-NEXT-TELL specific ICT)
framework to formative e-assessment and Open Learner Models (OLMs) [Bull, 2007], so that students, peers, teachers, and parents can get visual feedback on students’ learning progression and competence development (students’ data might be gathered during learning with already existing ICT programs like GoogleDocs or SecondLife). Furthermore, stakeholders who are informed about the feedback should be offered a communication platform to clarify questions and discuss next learning steps. Students, well informed, can then chose a new learning path or try again. Figure 1 depicts this ECAA cycle 2.0 which will be developed by NEXT-TELL on a web 2.0 platform. The ECAAD cycle 2.0 shows which educational methods (e.g., feedback) and tools (e.g., OLM) need to go hand in hand in order to optimize learning.

To summarize, the ECAAD cycle comprises the following steps: (i) planning/modelling the learning steps, (ii-1) collecting and analysing data in a first step, (iii) visualising feedback and (iv) interpreting feedback/sense making, (v) communicating/negotiating with others on learning. After this learning process cycle, a new cycle theoretically starts with well-informed learners and teachers. Learners and teachers can again think about learning activities and assessment methods in order to accompany the further learning path formatively. Learners are now (ii-2) well-informed about themselves and existing possibilities so that under optimal conditions learners can chose their next learning goal and step through them. The cycle repeats.

At first glance, this cycle might look rather long because it consists of several different sub-steps. However, although the planning of teaching and learning with an ECAAD method and tool looks very different from interpreting OLMs, they share one common purpose: They offer the opportunity to teachers and learners to explicate implicit knowledge and/or assumptions and thus, to become aware what’s going on during teaching/learning. If a learner knows where (s)he stands and how (s)he got there and which possibilities there are to move on, the student (and also the teacher and parents) is supported in making informed decisions (informed decision making). Hence, the ECAAD cycle 2.0 sometimes demands (ECAAD planner), sometimes offers automatically (OLM), and sometimes offers to verbalize (communication/negotiation platform) information on learning explicitly.

3.1.2 3 Levels: ECAAD, TISL, SPICE

The aforementioned ECAAD cycle 2.0 (see Figure 1) consists on a more general level of the following processes: planning, assessing (collecting and analysing data plus providing feedback), interpreting, communicating, and acting informed. NEXT-TELL suggests such a cycle of general evidence centered processes not only on the level of students’ learning but also on the level of teachers’ learning through teachers’ inquiry into students’ learning (TISL) as well as on the level of professional development to school leadership/strategic planning for ICT alignment (SPICE). Figure 2 visualises the three levels. Each of the three levels has its own specifications that

![Figure 2. Cartoon like visualisation of the 3 school-levels in NEXT-TELL’s integration framework](image-url)
need to be considered by the method as well as the supporting tool respectively. The developments of the respective methods and tools are described in detail in the deliverables of work package 2 (ECAAD) and 5 (TISL and SPICE). For understanding the ongoing research in the project it is important to know that research activities are conducted on each level, even though in different countries and in different time frames.

3.2 Research Approach: Design-Based Research

As explained in D6.1 and D6.2, NEXT-TELL works within the design-based research (DBR) framework [Barab, 2004]. DBR is regarded “as a practical research methodology that could effectively bridge the chasm between research and practice in formal education” [Anderson, 2012, p. 16]. To make this chasm come true, DBR asks researchers to work closely together with educational practitioners or school stakeholders in order to develop a solution for their practical problems. In general, DBR is a rather resource demanding methodology, which should normally last several years during which an “evolution of design principles” can take place [Anderson, 2012; p.17]. In these years, a collaborative partnership should be established. Furthermore, phases or cycles of design and re-design should take place. Finally, each cycle is recommended to be reflected as well as the final one [Reeves, 2000]. Such reflection can take part on a more individual level but also on a global collaborative network or community level. Hence, we distinguish the following steps according to different phases in DBR:

1. **Baseline**: Getting to know each other and the project (clarification of goals and resources)
2. **Workshop cycles**: development of NEXT-TELL tools (direct work on Planners, OLM, Negotiation Tool)
3. **Implementation cycles**: classroom studies (impact on and further needs in teachings)
4. **Individual Reflection**: each study type can be reflected individually or in local groups (lesson learned)
5. **Collective Reflection/sharing**: discussions in (local) local communities (experience of impact)

3.3 NEXT-TELL’s Research Grid

As an external research partner NEXT-TELL has its pre-defined goals. However, we as project partners have to be careful not to impose these goals on schools. Furthermore, even though NEXT-TELL goals fit so far well to the schools’ goals, schools do not easily have as much resources as we might need from them to fulfil our goals (see D6.2). Hence, to be in line with ethical and social responsibility [Reeves, 2005] and thereby respect the schools’ context, their needs, and resources as well as NEXT-TELL’s research goals, we developed the following research grid.

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<td>Collective Sharing</td>
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Table 1. Research Grid: Studies conducted between Nov 2011 and Feb 2012
The research grid is dimensioned of the steps from the ECAAD/TILS/SPICE cycle (planning, learning with ICT (informed action), assessment (data analysing), feedback, and communication) and on the (partially repeating) steps from phases of DBR (getting into contact/baseline, research workshops, implementation cycles, individual reflection, collaborative sense making/sharing) resulting in a 5 x 5 grid (see Table 1 with current reported studies). Depending on schools’ interests, needs, and resources, as well as on project partners’ research focus, there are different types of research studies. In general, however, new schools/school leaders/teachers or classes need to taken on board gradually and in close collaboration with the respective stakeholders. This is important in order to establish the collaborative partnership, which is necessary in order to work in a DBR manner.
4 Baseline Studies and Requirement Analysis

This chapter presents the results of different baseline studies, which were conducted in workshop and interview settings in Austria, Denmark, Norway and Germany from November 2011 to February 2012. As mentioned above, there were a variety of different workshops. The results from the Austrian workshop are more or less consistent to the results already reported in D6.2 and need no further explanation.

In addition to a Baseline study, CBS did some first meetings with teachers and students to collect information with regard to the communication tool. Two of the Danish teachers raised concerns with regard to peer comparison in visualisations of OLMs.

UniRes presents a comprehensive SPICE interview of one of their school leaders. As this school has an open attitude to sharing experience and knowledge that is very interesting in the context of NEXT-TELL we include a longer presentation of the interview with a school leader.

KMRC held a combined Baseline and DBR workshop because their teachers were too unfamiliar with the research methodology. KMRC developed a special workshop in order to bring some characteristics of NEXT-TELL and DBR together.

All baseline initiatives contribute to NEXT-TELL’s progression. The Austrian workshop, for example, was successful. Teachers interested in teaching with ICT wanted to participate in NEXT-TELL.

4.1 ECAAD-Baseline and Requirements Analysis (Austria): A Hands-on and Research Workshop

“Designing for Assessment” – this was the header of a 2-day workshop held from December 19th to 20th, 2011 with 22 teachers in Bad Waltersdorf, Austria. The official title of the workshop was “Formative, non-numerical, appraisal versus school grades. How teachers can benefit from new technologies and media” [Formative, nicht-numerische Beurteilung vs. Schulnoten. Wie LehrerInnen von neuen Technologien und Medien profitieren können].

Figure 3. Group image of the participants in the Austrian workshop “Formative, non-numerical, appraisal versus school grades”.

The purpose of the workshop was three-fold: (i) Disseminating the project and its fundamental ideas, in particular formative assessment, (ii) conducting teacher trainings, and (iii) involve teachers and their experiences in the NEXT-TELL research process. The workshop description, as well as the workshop materials, are available at http://css-kmi.tugraz.at/NTWS2011 (in German language).
Participants

The participating teachers (13 females and 9 male teachers; see Figure 3) came from 19 Austrian institutions from the fields of primary as well as secondary education and from practice school of Austria’s pedagogical academies (Pädagogische Hochschule). Mostly, STEM teachers (in total 16) attended the workshop. The average teaching experience was 21.36 (SD=11.35) ranging from 1 to 37 years.

4.1.1 Disseminating NEXT-TELL and Teacher Training

The first objective of the workshop was to spread NEXT-TELL’s ideas and foundations and, at the same time, conduct training with teachers. Thus, the first part of the workshop was characterized by presenting the baseline situation, that is, the need for a conceptual change in teaching and schooling towards a formative and more supportive assessment and appraisal based on sound evidence coming from multiple sources. Following the basic presentation of the project, its goals and capacities, we conducted training sessions for non-numerical, probabilistic assessment with a (primarily) formative purpose. Concluding this part of the workshop, we introduced a number of related tools, which can be applied in such context (e.g., the ECAAD planner, ProNIFA, or the OLM platform).

4.1.2 Training In-Depth: Formative Assessment with ProNIFA

Right in the very heart of NEXT-TELL is the idea of formative assessment – where assessing of student achievements is a core task of daily routine in school classes. Most often, unfortunately, common practice is a subjective, inconsistent, and unreliable approach to “grading” with rather summative goals. 21st century teaching – the NEXT-TELL way of teaching and assessing, however, has a supportive mind set. The key questions are how a teacher can support individual learners in their progress best and how this support can be realized facing the massive constraints in terms of resources. The simple answer is, using ICT; the problem, still, is where the technology that really supports the needs of a teacher is facing a large number of students and every day’s school life.

After year 1 of the project, NEXT-TELL has some answers. We can provide teachers with (in parts early versions) of technologies that offer an effective and tailored support of time consuming and frequently recurring tasks. Examples are the ECAAD planner, virtual worlds such as Second Life, or OLM visualizations. A very distinct tool orbits around the ideas of Competence-based Knowledge Space Theory. As described, for example, in deliverable D2.1, the basic idea is to associate achievements with so-called competence states [Heller et al., 2006]. This approach allows identifying available and lacking competencies as well as learning paths and next logical learning steps on probabilistic yet very precise level. NEXT-TELL developed a corresponding tool, tailored to the needs of teachers, named ProNIFA (Figure 4). ProNIFA stands for “probabilistic, non-invasive, formative assessment” and provides features for authoring/planning, data harvesting, data analysis and visualizations. Since the development of the tool is located in WP2, a detailed description of the tool shall be part of deliverable D2.3.
The training encompassed (i) an introduction to non-numerical testing, (ii) an introduction to probabilistic approaches to assessment, (iii) an introduction to Knowledge Space Theory and Competence-based Knowledge Space Theory and the related assessment framework, (iv) a guide to visualization techniques, (v) an overview of ProNIFA features, and finally (vi) a hands-on walkthrough to the worked example scenario “working with data”.

4.1.3 Baseline Research: ECAAD-Layer

To make the tools coming from NEXT-TELL’s pool of internal (as well as external tools such as Moodle or Second Life) easily and effectively usable for teachers, in particular in the context of formative, evidence-centred assessment and appraisal, we need to look into teachers’ mental models of technological and methodological processes very carefully, we need to identify concrete needs and requirements (all across Europe), and we need to identify attitudes of teachers and best practices for real-world applications.

As already mentioned, the workshop with Austrian teachers attempted to introduce the project and the project’s concepts and ideas as well as the outcomes of the project so far. The corresponding presentations time schedules can be found on the workshop website (http://css-kmi.tugraz.at/NTWS2011).

Following the introductions, we realized participatory design and research sessions for the methodological and technological approach in the context of CbKST/ProNIFA/formative assessment. The research methodology was primarily based on questionnaires, which were developed from a research project partner, discussions, and observation of using the tools.

Results

To get a more detailed picture of how teachers plan their teaching activities, which kind of assessment methods they are using, as well as how they give feedback to their students, teachers were asked to fill in a questionnaire. This questionnaire was based on the interview guidelines developed by KMRC in the context of the baseline studies.

In this section overall results with respect to the three topics planning activities, (formative) assessment methods, and feedback and communication with students were presented. These results highly correspond to the results of the baseline study conducted in Austria (see D6.2).

Planning and Teaching Activities

In general teachers plan their teaching activities according to the National Curriculum Standards which contains a description of the broad goals and objectives identifying the minimum content that are required at each
school level and for each course. Thereby standards were transformed and modified to fit the unique circumstances of each teaching situation. With regard to teachers' short term planning, that includes unit, weekly and daily lesson planning, teachers have wider latitude of developing their own plans coinciding with their personal teaching style. The first reference for their short term planning is the students' textbook providing the basis for defining specific learning goals and sub-goals. This is followed by selecting and choosing learning materials, homework assignments, and appropriate learning activities. Concerning their teaching strategy planning teachers pointed out to incorporate, as far as practicable, the differing development needs and interests of students as well as students' different learning styles.

**ICT-use.** For their planning teachers indicated to primarily use different Microsoft® applications such as MSExcel and MSWord. In their teaching they often use learning and teaching platforms (e.g., Moodle®, LMS®), which were rarely used in the planning phase. Beside delivering content and assessing learning activities these tools also allow collaborative learning. Additionally teachers indicated to also use specific learning software provided by schoolbooks (e.g., CD-ROMs) or different web-based applications such as learning games, free online tools/programs or videos.

**Needs and Wishes from ICT.** ICT systems should help providing, accessing and managing teaching and learning resources in an easier and most effective way. The focus thereby should lie on the one hand in enabling personalizing and extended learning and on the other hand in supporting the professional learning process.

**Assessment Methods used in the Classroom**

Teachers indicated to use a wide range of different formative assessment methods, especially tests and quizzes, homework exercises or presentations, as well as questioning and answering in the lesson. As a basis they often use a catalogue of teaching aims ('Lehrzielkatalog') or so-called grids of competencies. Additionally students were asked to assess their own work based on these characteristics and criteria which have been developed in class. Teachers see the main advantage of formative assessment in the possibility to give feedback to their students where they are in their learning, where they are going, and how to get there in a more transparent way. In general teachers understand the concept of formative assessment as measuring intermediary results of learning processes. This allows to give students regularly feedback about their learning progress. This ensures a higher transparency of the assessment process.

**ICT-use/Needs and Wishes from ICT.** In general teachers do not regularly use ICT for formative assessment. This is due to the fact that there is no coordinated approach to formative assessment (e.g., national initiatives) that explains to teachers how ICT can support them in their assessment. Rather rarely, they use either e-portfolios to get an overview of the student’s learning process or educational games and quizzes. Nevertheless teachers see the impact of using ICT in the formative assessment process especially in terms of higher transparency, better comparability between students, and visualisation of the learning and knowledge process.

**Feedback and Communication with Students**

“...In general teachers give feedback in written form on students’ individual work, or in oral form to individuals or groups of students either within or after the classroom teaching.” Teachers pointed to the fact that “[...]the most important aspect of giving feedback is that the student should comprehend and understand the grading or the given feedback. Furthermore the assessment process and the consequent feedback should be transparent for the students by using predefined assessment criteria. The main aim of feedback is to provide information to a learner in order to help him to continue the behavior or to modify it, to clarify for the learner what he or she needs to improve, extend or enhance.” [D6.2, 2011, p. 17].

**ICT-use.** Teachers repeated the importance of personally communicating with their students. Sometimes, however rarely, they use ICT for giving feedback when students are working in/with different learning platforms.

**Needs and Wishes from ICT.** There is a wish for an efficient, effective, overall system that can be used anywhere by anyone and that offers the opportunity to share and make transparent all gathered information about one student with himself and his parents by providing a comprehensible visualisation of the students’ learning progress.
ICTs’ Integration Challenges

School-level challenges

Lack of time. Teachers indicated that in many aspects of their daily work they have lack of time to use (new) technologies because often using technology is more time-consuming, especially with regard to lesson preparation, learning their use, or receiving training.

Lack of technical resources and technical support. A main challenge that bars teachers from using and integrating new technologies into their teaching is the lack of access to resources, including home access. Not every student as well as teacher has access to a computer or a mobile device. In school oftentimes hardware, software or other ICT materials are not available because most of these are shared with other teachers. Furthermore low numbers of computers and/or insufficient simultaneous Internet access make the successful implementation of ICT into the classroom problematic. Teachers also highlighted that a lack of technical support and the possibly resulting technical faults and problems discourage them in regularly using ICT.

Teacher-level challenges

Teachers inexperienced with ICT. Many teachers reported that they do not integrate ICT in their teaching because of a lack of knowledge and skills how to deal with ICT. These limitations of ICT knowledge makes teachers feel not confident to use it in their teaching. This lack of confidence is closely linked with the fear of using technology in front of class of children who perhaps know more. Additionally teachers indicated that there are not enough training opportunities for them in the use of ICT in the classroom. Therefore all the possibilities of a learning environment or a learning/teaching tool are often not fully understood. Furthermore, teachers indicated to have often no idea of how ICT can support teaching as well as of their advantages and possibilities. Some of them do not see the added value and benefit provided by ICT.

Requirements Analysis: NEXT-TELL Integration Aspects

A further part of the activities in the workshop was commonly elaborating on the foundations of assessment practice; in form of moderated discussions the group identified the key aspects of “need for action”, “visions”, “individual demands”, and “critics” (on the current methodological and technological draft of NEXT-TELL). Figure 5 shows a summary developed during the workshop using flip charts and postings and Table 2 shows a conclusion in English language.
Figure 5. Common summary of present and future use of ICT in classes from the workshop
<table>
<thead>
<tr>
<th>Individual demands</th>
<th>Visions</th>
<th>Critical Statements</th>
<th>Need for action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology must enable</td>
<td>Having resources for focusing on individual needs</td>
<td>ICT developers must be equipped with a holistic view of the learner and the learning/schooling processes</td>
<td>Fight the increasing demand of resources and time</td>
</tr>
<tr>
<td>• reflection about learning and learning contents</td>
<td>Having “really simple” tools</td>
<td>Privacy is crucial; teachers do not want a transparent student nor being a transparent teacher (in an Orwell like sense)</td>
<td>Empower teachers to address the 21st century skills in the context of topic-centered classes</td>
</tr>
<tr>
<td>• self regulated and more individualized learning</td>
<td>Having an added value (not just another educational medium) in terms of learning and development</td>
<td>It needs a cautious approach to learning; ICT must not lead to an “over-didactic” practice</td>
<td>Promote an individualization of learning and appraisal</td>
</tr>
<tr>
<td>• build upon intrinsic motivation</td>
<td>Having peer tutoring and peer assessment a serious part of the educational setting</td>
<td>Teachers are often left alone with legal uncertainties (e.g., IPRs when putting materials in the web)</td>
<td>It needs appropriate infrastructure to use ICT on a broad level (hardware as well as maintenance)</td>
</tr>
</tbody>
</table>

New developments must link all the various scattered tools

Technology must free resources instead of requiring extra efforts

Easy and fast integration of existing Learning Goal Catalogues (compiled by Austrian governmental bodies)

Provide support in finding promising “ICT”

Table 2. Aggregation of aspects of present and future use of ICT in classes from the workshop

The key message, derived from this part of the workshop is: Develop simple, easy to use tools that have an added value for an individualized teaching and assessing and provide an infrastructure to link all the scattered bits and pieces. Provide an infrastructure that allows a fast and easy integration of existing materials (i.e., plans, tools, methods, learning goals, learning objects, tests).

Accounting for one distinct result of the workshop, that is, the request of providing support in finding tools and utilities for a specific educational purpose, NEXT-TELL have started compiling a collection of useful links, platforms, and in particular tools that can be used by teachers right from scratch. The long term aim is to develop a comprehensive database of various tools for specific topics, ideally with a direct link to the envisioned NEXT-TELL infrastructure. This first collection, furthermore, was a direct feedback for the teachers after the workshop. The interesting aspects, noteworthy mentioning, is that all tools are categorized by their applicability for planning, teaching, recording of evidence, assessing achievements and aptitude (including smart interpretations), and visualizing outcomes. The first version is available at http://css-kmi.tugraz.at/NTWS2011/ict.htm.
4.2 ICT Use as Basis for Communication and Negotiation Behavior (Denmark)

In Denmark, CBS carried out three types of research activities to get in touch with different types of stakeholders. In November 2011, we worked on our collaboration with a school by (i) visiting the school and having a meeting with students to talk about their ICT use, (ii) asking students’ parents about their ICT use, and (iii) having a discussion meeting with two teachers when we presented NEXT-TELL. Moreover, we intensified our collaboration with the teachers.

4.2.1 ICT use of Students and Parents as Basis for Communication and Negotiation Tools

We visited a school where we talked with six students (four girls, two boys) about the technology in their school and how they pictured the classroom and learning in the future. Following that day, we agreed with the students’ teachers that we would post an electronic survey so the teachers could get the children’s parents to write their responses to the same questions.

Methodological considerations

Although we tried asking the parents and the children the same questions, the children were collaborating in a focus group and the parents answered the questions individually. Furthermore, in attempt to capture the parent’s imagination the questions were open ended and in a “discussion” format. The parents were asked about ICT in general. The children were also allowed to name specific platforms or hardware. The focus group generated more ideas and empirical results than the electronic questionnaire, so that this method is preferred as a method for idea generation.

Students’ Results

![Figure 6. Photo of students’ answers in the focus group](image)

**What form for ICT do you use at home?**

A computer, an iphone, an ipad, Playstation 3, a TV, a Wii, Camera, Nintendo, Facebook, YouTube, Twitter, Games, Tetris
What about technologies to communicate with your family/friends?
Skype, Viber, MSN messenger

What technology do you use at school?
Excel, Powerpoint, Word, the student intranet, Computer, Calculator, Telephones, some people have their own computers with them.

What is your favorite technology or gadget?
Playstation 3, YouTube, Skype, Wii

Would you like to have more ICT, or better ICT around school?
Maybe an iPad instead of books or to take notes on, a clever black board, maybe an app for school, use Skype instead of school, something that makes school more fun, a more recent version of Microsoft Word.

Parents’ Results
It took some time and effort to get the parents’ answers. In the end we had two respondents only. The parents’ answers to the questions, that were similar or identical to those of the students, show that these two parents are not that much involved in using new ICTs themselves. Their favourite technologies were SMS and TV. Furthermore, they like the way it is concerning ICT and gave no answers to the question how ICT might help their children learn.

Conclusions
We assume that it is rather unlikely that persons who like the status quo engage themselves very much in working on new developments. Therefore, we will consider how we proceed with regard to finding parents who are interested in the topic to develop and try out new forms of communicating between students, teachers, and parents.

The fact that the students already know and use many different ICTs and that they wanted to have more “fun” in school, whereas parents are content the way it is, might lead in future to more difficult child-parents communication scenarios, the more unflexible both parts are in extreme communication characteristics.

4.2.2 OLM: First Discussions with Teachers on Feedback
Following the meeting with the students we met with a Maths teacher (female) for 6th grade and a teacher (male) who has taught biology, geography and math for 8th grade in the last 14 years. We presented recent developments in methods and tools that the NEXT-TELL project enables. When presenting OLM, teachers raised some concerns which were said to be of cultural nature:

1. Danish people usually don’t like being compared. This is a part of the Danish culture. It is important that the students’ confidence should be held up at all times.
2. They also discussed that teachers would be afraid to be “monitored” but it was good as long as any comparison would be on the same person, meaning for example comparing yourself last month versus this month (intra-individual comparison).
3. Moreover, parents with limited resources might not be able to do much about it, if their child needs more attention regarding some subjects.

Both teachers were interested in OLM but were very sensitive to the threat that it might be misused from a social perspective by showing comparisons that undermine students’ confidence or that it would even be misused as an instrument to control persons. All in all, our first contact with the teachers was very successful because they joined us for an in-depth development of the RGFA (see chapter 5).
4.3  SPICE Interviews (Norway)

With regard to Strategic Planning (SPICE), UniRes interviewed one school leader of Nordahl Grieg Upper Secondary School in Norway. The Upper Secondary School has students from 15-18 years old. The leader has 15 years of teaching experience in teaching English and Norwegian. The school has an open-minded and knowledge sharing culture, as is evidenced in the interview with the school leader about the school’s strategic plannings. We report the school’s strategic planning in detail in order to share their practice with all those reading this Deliverable. Persons interested in getting to know more or sharing their practice in strategic planning with us and/or among others are warmly welcome to get into contact with NEXT-TELL.

4.3.1  Strategic planning – Structure and process

When it comes to strategic planning the main responsibility lies with the school management team, but as in the rest of the county, teachers and students participate in the processes of planning, and setting development goals.

The school has a development plan, required by the County’s Department of Education (DoE). This plan is based on an understanding of learning, as determined by this school. The County DoE sets some priorities from which the school choses which to work with. Among those chosen by this school is assessment. The school decided to address their planning based on a socio-cultural understanding of learning. In addition, the school uses a model from learning organisations, by Peter Senge [Senge, 1994], as a tool for development. This is a prerequisite for all strategic planning in the school, and thus sharing and evaluating are basic activities in the school. This means that strategic planning documents also are based on this way of thinking. Other schools in the county may not use this approach to strategic planning.

The school practices a long-term perspective to planning with overarching goals, which stretch over several years. One example of an overarching goal that is relevant for the foreseeable future is to increase learning outcomes. The school management team creates an annual plan that is revised each year.

Twice a year they create a six-month plan that identifies the themes for weekly management team and teaching staff planning meetings to be held that half year. These weekly planning meetings usually last a few hours.

The school uses Google Docs in the planning process:

a) The school management creates the development plan using Google Docs
b) Plans for one year are placed in a Google Calendar
c) Information about weekly activities is announced in It’s Learning, the learning management system used by the school
d) Evaluation of, and feedback on, the development plans takes place in Wikis

When it comes to how strategic planning is realised, the school management team:

a) Structures meetings
b) Determines which meetings are necessary for teachers to attend
c) Carries out repetitive evaluation

Communicate the school’s strategy

The school’s vision is Bold Interacting Minds, which means being innovative, being an entrepreneur and having a socio-cultural understanding of learning. It is a very creative vision and the students see the school as innovative and daring.

The development plan is public on the school’s website, and the teachers are told to inform parents about the school’s strategy during parent meetings. The school administration recognises that for teachers it is one thing to know this plan, yet it is another to use it pedagogically.
Strategic goals
The school bases all activity on the development plan. When developing goals in different subject areas, all goals will be addressed in relation to four areas:

1. Social action skills
2. Technology and research
3. Entrepreneurship
4. Assessment

Evaluation process
The school’s management team constantly evaluates their strategic plan(s) and in order to collect data to improve the school’s strategic planning they use a Wiki where they are looking for what is effective, what works and what the teacher’s find useful.

For example, they might evaluate:

1. The homeroom teacher board
   a. Is this effective?
   b. How is time used?
2. Teacher meetings
   a. Are the meetings useful?
   b. Are meetings important in their daily work?
   c. How is the balance between administrative meetings and educational development meeting?
3. Professional development courses
   a. Relevance
   b. Need

The management team uses Wikis to collect evaluation data; the Wikis are open to all, in order that everyone to read and give feedback. To collect evaluation data the following method is used:

1. The school management posts questions on the Wiki
2. Teachers gather in groups, evaluate and give feedback together
3. The leadership group summarises the feedback
4. The leadership group uses the feedback for further planning
5. A group consisting of teachers, union representatives and leadership personnel uses the feedback in order to provide advice to the school management on further changes

4.3.2 Achievements of goals
Action plans are created with goals and criteria for goal achievement. Milestones and how far these have been reached are documented, although we thus far have not been very good to use these.

Registration of achievement of strategic objectives
The school management team formally registers achievement of strategic objectives once a year and the strategic plan is revised according to the achieved objectives. Although objectives are not “checked off” though the year (i.e., formally traced), strategic planning is documented through the various meeting minutes. A yearly report, which documents the evaluation, is then sent to the County DoE.

Last year the development plan was open for everybody to comment on. In addition, there were evaluations done by groups of teachers. The students were also invited, but this was not that successful as the plan was too massive and too large for them to handle and to give feedback on. This evaluation experience is now under discussion:

1. How can we get a meaningful evaluation?
2. How can teachers and students learn from this process?
3. How can the evaluation lead to teachers and students having an ownership of the development plan?

Challenges met in conjunction with strategic planning
It is a challenge to know how to implement plans in order for them to be meaningful to teachers and students. Today the plan works as the school leadership’s property, while there is a wish for the teachers and students to feel ownership as well. Time and space for planning is another challenge.

4.3.3 Supporting strategic planning
We use Google documents with tables and a lot of free text for strategic planning, which is at times difficult. A wish would be a planning tool provided from the Ministry of Education, where all documents were available. Such a tool would need to be integrated in the school’s own system in order to view and plot data from the school. This would enable us to see how the school is doing compared to national plans, which have been adjusted to the local situation. This would be a system making it possible to see National strategic objectives in relation to local school objectives. A structure and a system like this would help make it easier to get good and manageable strategic planning.

4.3.4 Formative Assessment in Norway
There have been local, regional, and national initiatives to enhance formative assessment in Norway. A new assessment regulation (in 2009) set new standard for assessment. Formative assessment was to be the main assessment focus in Norwegian schools. The regulation was disseminated through websites, and instructional videos and lectures provided by the Directorate of Education, and from projects addressing the regulation.

This had enormous consequences. There was no culture on working for assessment and giving feedforward messages to the students, before this regulation. The regulation lead to a change in teaching practice and had direct consequences in the classroom. Now, the assessment should be a larger part of the teaching, and to see assessment as an important part of student learning. At the same time as there was quite an pedagogical change in classrooms, there were a discussions of formalities around assessment which were difficult to understand and caused a lot of concern about how to meet all the new rules and regulation for assessment.

This school is loyal to the regulations and the emphasis on assessment for learning. Teachers are for instance encouraged to assess without grading student work. There is a focus for teachers to make use of process-friendly documents, such as Google Docs, in order to provide good formative assessment; to comment and give feedback that student’s find useful, as students are in the process of working.

The assessment practice in the school is to encourage teachers to experiment more with different assessment forms, to see what is possible to assess, and how to assess? Last year all teachers had to find one new assessment method, not previously used. At the moment, the school is working on the aspect of what is good feedback and, how to give frequently feedback. The school tries to get away from the culture of too much testing in certain periods of the year and then how to still be able to do semester assessment.

Related to this, students should develop an understanding about grade free assessment, and only receiving feedforward messages. The students like to get grades; but while they are reluctant to get them, they want them anyway. There exists a double communication concerning grades, because the grading system is not completely removed. While there is no need of grading during the semester that ends at Christmas, translation of non-grading assessment to a final semester grade is not easy.

The characteristics of formative assessment
A good measurement of formative assessment is feedforward messages, which make students feel confident and sure about what they can do. Teachers should be able to provide good information about what students know and what they must do in order to achieve the next goal. Good formative assessment is when formative assessment and the teaching go hand in hand. Teachers should also be able to find goals that are concrete enough for students in order for students to achieve their objectives.
Formative assessment at the school

In order for the school to get teachers to focus on formative assessment the school has invited speakers to talk about assessment, self-regulated learning, feedback and validation chains. Validation chains explain how every part of teaching fits together, from the curriculum to what students are doing in class.

These inputs are used for educational meetings and further work. For example, do the teachers understand what feedback is about, how can teachers get better at giving feedback, and how can teachers find better methods to give feedback? Feedback is intended as feedforward in class, constantly providing feedback. This kind of feedback must be regular and continuous, and focus on where the student is now and what to do next.

In the teaching subject groups the school focuses on how teachers may be able to use invited speakers as input for their own practice. Teachers will set goals for themselves, on how to achieve it, and then come back in groups to share experience.

4.3.5 Technology to support assessment

The use of technology to support assessment is related to the teaching subject:

Science:
1. Students test themselves over and over again
2. Working with Wikis

Language:
1. Use Word and Track Changes. Students must be active to get feedback.
2. MarkIn. Streamlines and automated comments. Statistics function that quantifies makes this tool very convenient for students, though there is room for improvement.

All subjects:
1. Testing in It’s Learning
2. It’s Learning task submission
3. Assessment in Google Docs. Dynamic in relation to the use of criteria:
   a) Students should be given criteria
   b) Students must understand how these can be used
   c) Saves time for teachers
   d) Meaningful to get feedback on work in process

4.3.6 The school’s use of assessment results in strategic planning

The school is a learning organization [Senge, 1994]. This means learning from what has been done. When work is evaluated and assessed, student results are used in order to make plans. This can be done in the following process:

1. Results are evaluated:
   a) What is happening?
   b) Why is this happening?
2. Teachers in the subject meet:
   c) How can they work together?
   d) How can they take advantage of parallel classes?
3. Make a course on the basis of the results.

The school works on grading statistics at the subject level, but does not have an overview of results in different topics within one subject.

4.3.7 Teacher Inquiry into Student Learning

Teachers inquiry into student learning means to research ones own teaching practice. This is great to do in a school like this, where teachers share a lot of experience data and work together on evaluating it. To think
about data in order to change practice is very unusual, but very interesting. It may provide some new perspectives. Technology can advantageously be used for this, though it is difficult to answer, since teachers are working with too many things at one time. This makes it difficult to gather data. How in the world, can teachers abstract all information on student’s competence, located in one assignment in English, in order to find that student has this competence? Some of the goals in the curriculum are specific, such as in science, but in language there is very many things at once. Every time students write, they use some knowledge goals, in addition to the actual writing. It is difficult to see the shape of the perfect tool to get an overview except to narrow the goals.

4.3.8 Common European Framework Reference

The Common European Framework was concrete, but when new assessment regulations came, teachers had to create and use criteria; then the CEFR [CEFR, 2011] felt a bit useless. The downside was that it is about language, but language is about other things in addition, such as cultural skills and historical knowledge. The CEFR goals fit when just concentrating on language learning.

In the Subject committee of the County (one committee for each subject) criteria based thinking came in focus. The committees were commissioned to create criteria for each subject, but later it was understood that this was a misconception. Criteria had to be local to the school. It is not meaningful to use criteria that should apply to all texts, for example in Norwegian. The strength of local criteria is making them together with the students, tied to what the teacher wants to do with the students. In order to do this there should be a backward planning:

1. Start with the assessment situation
2. Think about what students should be able to
3. Find a way to communicate this to the students
4. Teaching towards the assessment situation, must be related to 1, 2 and 3.

4.3.9 Sharing good practice

There are very few, if any, teachers that are not willing to share good practise. This sharing is both organised, and unorganised.

Organised sharing:

1. Sharing of experiences in plenary
2. Subject meetings
3. Pedagogical meetings
   a. Planning of lessons together
   b. Sharing of experience
4. Use of It’s Learning to build a teaching collection

Unorganised sharing:

1. Some teachers publish their teaching experience online
   a. Blogs
   b. Twitter

In practice, parallel lessons do not work completely as they should, but it is desirable that teachers should be able to “switch” students, in order to move students who have special interests or special needs. It is difficult to do, because of the relationship between teachers and students. Teachers are autonomous in the sense that they are the ones that make the pedagogical decision for their student groups. The school’s management cannot interfere in this since this would not be based on knowledge about these students.
4.3.10 Support for education and professional development

The school focuses a lot on professional development and professional experience. Openness, willingness to change, distribution and change, is the circle the school uses, working to be a learning organisation. This is done in several ways by:

1. Letting research projects in school
2. Supporting further education
3. Enabling competence development
4. Facilitating new knowledge
5. Facilitating administrative structure
6. Encouraging teachers to collaborate with each other
7. Sharing workspace
8. Letting teachers working with related topics sit together
9. Homeroom teachers share offices
10. Internal courses running three to four times throughout the week, in order for teachers to choose when to attend
11. Letting subject groups go on external courses
12. Helping teachers to establish a personal learning network

Sharing of expertise and sharing of experience, trying out new things, will take place in the school all the time. Sharing information, down to the smallest detail, enables sharing of knowledge.

4.4 NEXT-TELL Presentation and Design-Based Research (Germany)

In Germany, teachers from two schools were interviewed for the baseline studies in 2011. After a longer break because of school’s summer holidays and organizational issues, MTO asked for new meetings with the two German schools. The school leader of one of the schools informed KMRC that he had assigned two further teachers to the project. The other school informed us that there is still some interest in the project but that they fear it costs too much with respect to resources. Because of the new teachers in school 1 and the result from the baseline studies and requirement analysis that teachers expected more or less a ready-made solution and that they are not too familiar with the participatory co-design process of design-based research (see D6.2), KMRC developed a workshop as an integrated solution for solving these issues.

The purpose of the workshop was manifold: (i) introducing the new teachers (and up-dating the former ones) to NEXT-TELL by applying as much NEXT-TELL as possible ourselves, (ii) explaining the DBR approach in a new way in order to increase teachers’ understanding of their active role in developing NEXT-TELL components (methods, tools, and scenarios) with the project partners, instead of applying ready-made methods, tools or scenarios which where generated outside school in a company or the Ivory Tower, (iii) present the current state of NEXT-TELL regarding the results of the previous baseline studies and requirement analysis as well as present what other countries are doing in the project and (iv) gather baseline data from the new teachers during the workshop via online-questionnaires which are integrated in a “formative assessment like way” in the workshop implementation. NEXT-TELL methods were directly integrated both in the planning process of the workshop as well as in the actual workshop implementation. To serve this purpose the ECAAD planner was used to plan the workshops.

Participants

The workshops were conducted in December 2011 and reached a total of seven participants (five teachers and two guests). One of these guests was NEXT-TELL partner MTO who had in-between a meeting with the school leaders on further organization. The other guest was the deputy principal in one school. He was very interested but could not take part in the whole workshop due to other meetings.
KMRC asked the teachers whether it is okay for them to videotape the session. The teachers did not like the idea of being videotaped. However, they gave their consent to be audiottaped. Hence, both workshops were audiottaped.

4.4.1 Workshop introduction
As one of the purposes of the workshop was to use as much NEXT-TELL methods and tools as possible to directly get the teachers involved, make them familiar with the NEXT-TELL ideas, and introduce them to the overall project vision, KMRC planned the workshop within a learning progressions map in ECAAD, just like teachers are invited to do with their lessons later on. To make the difference between a “normal” agenda, a rather simple model of it and a modelled agenda (similar to a first lesson plan impression) with assessment points more clear, we created three different kinds of agendas and let the teachers compare them. These agendas can be seen in Figure 7.

The project presentation was based on a new set of slides which can be used and adapted by every project partner if requested.
Within the workshop we presented in total seven google forms questionnaires which were introduced in different situations of the ongoing workshop process (see “assessment points” – the red squares in figure 7). Some of the results of the questionnaires were directly reflected via visualization options of google forms in a formative e-assessment manner (see below). This procedure served three purposes: (i) make teachers aware of different types (e.g., grids, open text, rating scales, multiple-choice) and purposes (e.g., reflection) of queries, (ii) show them different versions and options of immediate feedback mechanism via visualizations of given answers and (iii) gather baseline data.

The fourth purpose of the workshop itself was to make them sensible to the design-based research approach within NEXT-TELL.

All different purposes of the workshop were interwoven.

4.4.2 Presentation of 1st Baseline Results

We reported the results of the Baseline results from year 1 (see D6.2) in order to feed back the research results to the teachers. Thereby, we also checked whether we interpreted the interview answers given by the teachers correctly. The teachers found themselves reflected in the results. Moreover, they were interested in the results because they wanted to know what the teachers from the other countries do and how they differ from them.

We see this rather fast exchange between research results and practice partners as one advantage of DBR to check qualitative data interpretations, and therefore, as a means to keep a high level of research quality. Moreover, it can be seen as a part of general shared knowledge building.

4.4.3 Outcomes of the workshop

As the gathered baseline data of the two new teachers during the workshop are consistent and nearly identical to the already reported data (see D6.2), we will focus on new data.

We asked the teachers how well they think they can fulfil the very high and demanding expectations from students, parents, colleagues, school leaders, business world, and politicians as well as from themselves in their official working time. The average answer was 56%. There was, however, a big variance in the individual answers, ranging from 20% over 40% up to 70% as maximum. Besides the variety, these results show that if these teachers consider their role within a comprehensive system, they think that currently they are not that successful (if success is defined as fulfilling the expectations of all the above-mentioned system members).

Figure 8: Gauges for visualizing immediate feedback in a formative manner of questionnaire results
We also asked whether they think that digital media will sooner or later make teachers dispensable and they all strongly disagreed. The aim was to find out how essential they see their role as teachers when ICT would conquer their classrooms (e.g., tutorial systems which will automatize their instruction and therefore help to replace a teacher to some extent).

Both of these questions were used to give immediate feedback via a gauge visualization in google. From this point on the deputy principal was very interested because of the immediate feedback we gave and discussed with the teachers. He began to understand better what NEXT-TELL works on.

**Analogy: “The Lord of the Rings”**

We were especially interested in the results of our approach to help teachers understand the participatory co-design process of design-based research (DBR). Anderson and Shattuck [Anderson, 2012] for example underline that it is important in DBR that there is a good and trustful, collaborative partnership between practitioners and researchers. In order to get to know the teachers and their understanding or DBR better, KMRC thought of an analogy to “The Lord of the Rings”. According to Gentner and Colhoun [Gentner, 2010] the use of analogies in learning can improve relational transfer.

For this purpose a short outtake from the first part of the trilogy [Jackson, 2001] (“The Council of Elrond” [http://vimeo.com/28896438]) was shown to the teachers. Before we showed them the outtake, we asked whether they knew the story of “The Lord of the Rings” in order to make sure whether they were theoretically able to do the transfer between NEXT-TELL and the analogy. All teachers were familiar with the story.

Following this, a grid was presented in which the teachers should include the different roles in NEXT-TELL compared to “The Lord of the Rings”. According to our understanding, the ineffective teaching can be represented in “The One Ring” (which must be destroyed), the students can be seen in “The Shire” (which is save worthy), the NEXT-TELL partners can be represented in “The fellowship” (who want to help “Frodo” destroy “The One Ring”), the teacher can be represented in “Frodo” (who has to carry “The One Ring” by himself), and the entrance into the project can be seen in “The Council of Elrond” (where “Frodo” and “The Fellowship” decide to work together to get rid of “The One Ring”).

Teachers’ answers showed that they were all clear about their own role as a teacher (= “Frodo”), ineffective teaching (= “The One Ring”), as well as the entrance into the project (= “The Council of Elrond”). One of the teachers was not happy with the insight of representing “Frodo” in the project. He hesitated to join and said “I don’t want to climb mountains for the rest of my life”. Meanwhile this teacher has made up his mind and we are coordinating a new meeting for March 2012.

Their answers varied (see table 3), however, with respect to the roles of the students and of the NEXT-TELL partners. Two of the teachers agreed with us on “The Shire” representing students and “The fellowship” representing NEXT-TELL partners. Three of five saw the students as their “Fellowers”. We interprete this result as finding that there is a close relationship between the teachers and their students. Some teachers said that NEXT-TELL is “The Shire” because it shows a nice place to be / nice version of schools (but not current reality).

<table>
<thead>
<tr>
<th>Role</th>
<th>Ineffective teaching</th>
<th>Students</th>
<th>NEXT-TELL partners</th>
<th>Teacher</th>
<th>Entrance into the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Fellowship</td>
<td></td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frodo</td>
<td>1*</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>The Shire</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Council of Elrond</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>The One Ring</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Table 3. Analogy to “The Lord of the Rings”

* One of the teachers insisted to assign the role of Frodo not only to the teacher but also to the NEXT-TELL partners.
Teachers’ Aims in NEXT-TELL

Another component of the workshop was to start working on the aims teachers might pursue within NEXT-TELL. As NEXT-TELL seeks for longer-lasting collaborative relationships between research and practice partners, one part in NEXT-TELL is teachers’ professional development (cf. WP5 and TISL). One advantage of DBR compared to other research approaches is that participating practice partners not only invest time in a project but that they are invited to learn during the co-design process within the frames of the project. Thus, we prepared an electronic whiteboard on GroupZap (http://www.groupzap.com) where the teachers could collaboratively add their aims either asynchronously or synchronously. Because we run out of time at the end of the workshop, we asked the teachers whether they would take some time during the following days, think about what they want to do or reach in NEXT-TELL, and document it in GroupZap. About one week later the teachers put their aims together. From the tool’s protocol it could be seen, that they did this task one after the other. To work on that DBR component, we categorized the aims according to content similarities into three groups: (i) teachers want to learn new ICTs and know chances and limitations of ICT and web 2.0, (ii) teachers want to collaborate with teachers from other countries and improve their competencies (e.g., in assessment methods), and (iii) teachers want students to learn ICT and to offer them opportunities for international experience. Figure 9 shows the teachers’ whiteboard results and our categories. During the beginning of the next workshop (ECAAD workshop in February 2012, see chapter 5.1.1 we showed the teachers our categories and offered them to work on their aims to increase competencies and to let them self-evaluate their progress on them (e.g., by means of rubrics) in future sessions.

4.4.4 Summary and Conclusion

Summing up, the workshop was important to give the teachers information on where the project stands at the moment as well as to present the baseline studies and requirement analysis. This way they got another overview about the project.

We were able to integrate the explicit use of “assessment points” into the model of the workshop and make the teachers aware of this approach within NEXT-TELL. Although they did not use the ECAAD planner by themselves, they got a first impression of the potential use.

Furthermore, we got an insight into teachers’ aims which fit into the NEXT-TELL concept. In accordance to these aims further workshops are planned in close collaboration with the school leaders, the teachers, and the students as well.
5 RDS: ECAAD-Level

The second year of NEXT-TELL includes two cycles of researcher-led design studies. In addition to the above reported interviews and workshops with more baseline character, this chapter summarizes the research workshops and implementation studies of the first RDS cycle conducted also during November 2011 and February 2012. According to the research grid (see chapter 3), this chapter is divided into research workshops conducted with teachers in order to develop the NEXT-TELL specific methods and tools as well as in classroom studies in order to develop teaching scenarios with ICT for TESL and new assessment methods.

5.1 Research Workshops

Several research workshops took place in which teachers were introduced to the first versions of NEXT-TELL methods and tools in order to investigate and support the further development. The first versions of the ECAAD and OLM methods and tools were introduced to teachers Germany and Norway. Furthermore, a workshop on the negotiation tool was held in Denmark. The following sub-chapters describe these workshops and present the main results.

5.1.1 ECAAD (Germany)

For one of the German schools, KRMC offered in accordance to the aforementioned aims of the teachers from the December workshop a list of several workshop topics, because the school had a week with special offer for professional development and project teachings. We offered four possible workshop topics (assessment for learning, OLM, immersive learning environments, and ECAAD). The school was free to choose either all, some or none of them. The school principal informed us that he would like to have a half-day workshop on ECAAD. The school leader’s choice for ECAAD was partly driven by a recent reform, which led to a change in the education act [SchG, 2011, §5] in the state of Baden-Wuerttemberg where the school is. The reform stops teachers’ binding recommendation in selecting the school type for students when they change after grade 4 (age: 10 years) from elementary school into one of three school types (in Baden-Wuerttemberg the traditional school system is three-folded and offers Hauptschule, (Werk)Realschule, or Gymnasium). This means that first parents and students are free in choosing the school type after grade 4 and second the new school is not any longer informed per se about students’ grades and achievement levels (school certificate). Therefore, schools expect a greater variety in students’ achievement levels in one class than before. In order to prepare for the expected increase in achievement variety in future classes, the school principal chose ECAAD. ECAAD was described as method and tool for planning individualized teachings (see D2.1 where it is described as modelling approach auxiliary to support individual learning paths).

Participants

In addition to the four already participating teachers from the December workshop (see chapter 4.4) there was an in-service teacher who wanted to participate in the project. Moreover, as the workshop was scheduled in the week with special offers, the school principal invited three guests cooperating with the school in other projects to our workshop. Two of the guests were from the nearby pedagogical university (who left after about one hour of our workshop because of other activities in the school they wanted to attend to) and one guest with a background of electronic programming in private industry.
Workshop preparation and planned procedure

As one aim of NEXT-TELL is the development of methods and tools in cooperation with teachers to support their individual requirements (adapting ICT to end-users as much as possible instead of adapting the end-user to ICT), we developed in coordination with WP2 an ECAAD workshop in a design-based research like manner to introduce the current ECAAD method as well as the ECAAD planner to the teachers. For planning and preparing the workshop itself we used the ECAAD planner as we did in December.

For preparing the workshop, teachers were asked to do three steps:

First, teachers were asked to transfer one of their lesson plans into a prearranged google spreadsheet which was presented in English for the German teachers. The spreadsheet format was developed in WP2 (for detailed information see D2.3). The spreadsheet requested to differentiate between learning/teaching activities, effects on students’ knowledge, diagnostic triggers/methods and adaptive actions. It was also possible to add comments in case something important for individualized lesson planning was missing. Hence, this spreadsheet can be seen as a first introduction into the ECAAD method without any further information to the teachers so far.

Second, the teachers were asked to explicitly state what concepts and contents they would like to teach in another google document for that particular lesson as well as the prerequisite knowledge of their students needed for their lesson.

The third task was to bring their “usual” planning documents to the workshop or upload them into gDocs to work on them with the ECAAD method and planner during the workshop session.

The core of the workshop plan began with a part on individualized teaching, what it is and what it means for teachers and students. Second, an introduction into the ECAAD method and the planner was planned (based on the previously entered lesson plan and its extensions). Third, it was planned to let the teachers model within ECAAD another lesson plan with the aim to run this lesson later on in the school year in their classes and compare it to their traditionally planned classes. As a fourth part and as a summary of the workshop the teachers should shortly reflect on and discuss their experiences with ECAAD and the workshop as a whole. Finally, an extended reflection session was planned which should take place about two to three weeks after the workshop in order to gain benefit as researchers as well as to gain benefit as teachers by reflection at the workplace (KMRC started working on reflection at the workplace on an in-house collaboration with the MIRROR project [http://www.mirror-project.eu]).

KMRC asked the teachers and guests whether we were allowed to videotape the workshop. All participants agreed that the workshop could be videotaped from the back but not from the front. Hence, the whole workshop was videotaped from the back with the consents of the participants.
Results

The spreadsheet, which was shared with the teachers in GoogleDocs in the preparation phase of the workshop was intended to trigger certain planning steps with the help of the ECAAD method, and therefore, it was designed to think about steps which are possibly necessary for individualized teaching. The participating German teachers worked together on one lesson plan. From eight columns, they filled out four (see figure 11). They filled in (i) step number, (ii) duration time, (iii) learning/teaching activity, (iv) intentions on students’ knowledge. They did not fill in (i) information to diagnostic triggers, (ii) the diagnostic method, (iii) the adaptive action, neither (iv) any comments for detailed information.

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Planned duration in minutes</th>
<th>Learning/Teaching Activity</th>
<th>What effect on students’ knowledge/understanding do you need to know?</th>
<th>Diagnostic Trigger: What do you need to know about students’ learning/progress?</th>
<th>Diagnostic Method: How do you change in reaction to the diagnostic information?</th>
<th>Adaptive action: What would you do?</th>
<th>Comments/Links to detailed information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 min</td>
<td>tube map / maybe show students move around (steer, and look at different tube stations and choose two, ...)</td>
<td>pre-knowledge</td>
<td>get the students interested in the topic, getting to know some tube stations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5 min</td>
<td>students explain the way from station “a” to “b” (Introduction phrases)</td>
<td></td>
<td>vocabulary introduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5 min</td>
<td>students explain the way to “that” tube station to their neighbour</td>
<td></td>
<td>using the knowledge, setting down what the students still need in 4th step.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5 min</td>
<td>students write down when they did at step 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10 min</td>
<td>Parallel work. “Real talk” asking the way as a dialogue (Presenting the doing in class, homework. “How much is a tube ticket from [Location] Station to Hammersmith Gate?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>20 min</td>
<td>Preparing and asking out a dialogue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>5 min</td>
<td>Using the Internet to get information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 11. Preparation spreadsheet with suggested lesson

In the following, the literal citations from the German teachers during the workshop were translated from German into English by us researchers.

The introduction to individualized teaching ended up in a very lively discussion about what the teachers think individualized teaching consists of (with and without digital media), why it is important and what they expect from their students in an individualized instruction. One of the teachers stated that individualized teaching is closely connected to self-directed learning where students are able to work autonomously and independently.

During the discussion on individualized teaching, one teacher said that she would need more preparation time for individualized teachings, in order to find materials for differently knowledgeable students. During the introduction into the ECAAD method one teacher explained what a “normal” teaching plan (how teachers are advised in university to plan lessons) looks like and that teaching sketches does not fit into the columns of the ECAAD preparation spreadsheet. Therefore he said it was “a bit difficult to get it [their lesson plan/sketch] into the form.” Moreover, they said that it was not fully clear to them, what they could enter into the columns labelled “diagnostic trigger/method” and “adaptive actions”. They said that they filled out the columns, which were clear for them. After some conversation about adapting teaching to differently knowledgeable learners, they explained that their lesson is an introductory lesson (Asking the way to a tube station in London) in which “the possibility for students to get feedback are rather limited.” Thus, they said that it was not really possible for them to think of assessment triggers.

In further general discussions on planning a lesson in such a detailed manner as suggested by the spreadsheet (ECAAD method), one of them added “[…] It’s not reality. We cannot […] make a teaching plan for each lesson we are teaching in a week.” The teacher’s original lesson plan of their lesson filled in the spreadsheet consisted of a conversation with a colleague and about three written notes (“[…] but now that it [the explicit planning] is in our heads, we’re doing just a few notes because we can not always plan lessons extensively.”)

We explained that one benefit of using the ECAAD method (and planner) might be on the long run the reduction of planning time for teachers because of the possibility to use the lesson plan of another teacher. In general, all teachers were critical to the ECAAD approach and the potential flexible usage of other teachers’ lesson plans because, for example, one teacher said “you cannot adopt a lesson” and “if you are not the one who made the plan you have to think about it as long as it would take you to do it yourself.” One of the teachers told us that she had tried to adopt a teaching plan in one of her demonstration lessons in her exams and that she failed. Although she said that she would never try to adopt another teachers’ plan again, she mentioned that the plan of a colleague might be good for getting new impressions, ideas, and other
approaches for a specific topic. However, talking with a colleague about a lesson and writing down a few notes seemed to be preferred by the teachers.

Subsequent to the discussion on the ECAAD method, we turned to the ECAAD planner. From the given information of the aforementioned lesson plan spreadsheet both NEXT-TELL Partners BOC-AT as well as KMRC had created lesson models, to use these as further discussion basis for the ECAAD planner. The two lesson model solutions had been created as examples in order to make sure that there is not yet an optimal solution in how a lesson (unit) is planned. The possible model solutions can be seen in figure 12. Model 1 has an integrated Knowledge State Map (KSM) for both pre- and post-knowledge of the lesson and a coarse-grained Learning Progression Map (LPM). Model 2 uses two different KSM for pre- and post-knowledge, a more fine-grained LPM and additionally suggested assessment opportunities via a zooming in into a Learning Activity Map (LAM). To this model solution, KMRC had already added assessment possibilities in order to show where some assessment and linked teaching adaptation might be integrated into the lesson.

The planner was introduced by showing these different model types and the possibilities of linking different models as well as the planned function of depositing resources. One of the guests started a discussion on the distinction between a model and documentation (“Why is this a model and not a documentation?”). He insisted that a model has to be executable on computer and that it has to be an “image of reality”. According to this guest, the model of a lesson in the ECAAD planner should show whether this lesson is successful or not, whereby successful was described as for example about 75% of the students reach the learning aim and 25% of the students do not. As long as such information is not provided by the planner it cannot be called a model. The teachers found this idea disturbing from their teachers’ point of view.

Because of the fact that our teachers were not convinced from their first ECAAD contact and the presentation of the modelled plans based on their example lesson, we decided – instead of going into the hands-on activity and let them model a lesson on their own - to further work on these models together with them.

The idea to further work on the model was also based on a previous discussion when we had asked them how they might assess the level of individualization of their current lesson plan (the spreadsheet version). That was a rather difficult question for them and a teacher said that as long as the majority of the class has an increase in learning outcomes, the lesson is okay. They cannot care about 30 individual students at once.

Although they got an idea where they could put an assessment to distinguish between differently knowledgeable students they confirmed that it was not really possible to individualize this special lesson.

The teachers remained critical after the presentation of the ECAAD planner. They were still convinced that - even with additional information and resources a lesson model might offer - an adoption of the lesson of another teacher could not be done (“You never know what the other teacher thought of when he planned a lesson”). They suggested that it would be useful if NEXT-TELL provides the information and materials from the “big” schoolbook publishing houses within the planner (“The most exchange takes place regarding materials and methods”) but even with that it would not be guaranteed that a lesson could be held as planned. On the one hand every school has its own “schedule” (e.g., this particular school has a lesson duration of 60 minutes instead of the “usual” 45 minutes), on the other hand “there are always things that can get between you and your plan, things you cannot anticipate”.

In the ending discussion the teachers expressed that they think it is still a long way until they get the benefit of that modelling tool. They did not know whether it is possible for them to put resources in the development of the ECAAD method and tool, if the benefit for them is rather far away. Nevertheless, they were positive towards NEXT-TELL as a whole, because they understood the purpose of ECAAD and they wanted to get practically involved in using ICT in their lessons. This particular school has a 7th grade with boys only in which they want to implement NEXT-TELL.
Model 1: KSM - LPM - LAM with links between pre- (red) and post-knowledge (blue)

Model 2: KSM (pre- and post-knowledge) - LPM - LAM with links between pre- (red) and post-knowledge (blue) and zooming into LAM (orange)

Figure 12: Possible model solutions for lesson planning in German school
Conclusions and Suggestions for ECAAD Development

Our participating teachers really see the need to individualize their teachings. This is partly because of the above mentioned school reform in Baden-Wuerttemberg which leads to the fear that teachers can hardly get any information about the achievement levels of their students from primary school. So the need for individualizing their teachings to adequately react to the different performance of students is bigger than ever.

Based on their lesson plan they prepared for the workshop it seems that assessment (in a formative manner which can be seen as a pre-condition for an individualized instruction) is not in focus of their teachings although they use self- and peer-assessment (see below the chapter 5.1.2 on OLM). During the discussion it became clear that this is hardly the case. These German teachers use some sort of ongoing formative assessment rather intuitively and are not used to make their intuitive assessments explicit. This is in line with the result of the December workshop (see chapter 4.4). The teachers had some issues to state what kind of information relevant for teaching and learning they gather during their lessons. This might lead to the assumption that they are kind of inexperienced with the explicit planning of formative assessment and therefore of an individualized instruction (the very detailed teaching plan they showed us as an example from their teacher education did not comprise individualization).

“Time issues” – which are always mentioned by teachers in a manifold way (example in this workshop “We cannot [...] make a teaching plan for each lesson we are teaching in a week”) – also lead to some challenges because the planning of a detailed individualized instruction takes more preparation time as long as one is inexperienced.

We think that the collaboration and sharing between teachers regarding an individualized planning of lessons might help to reduce these time issues and help getting familiar with individualizing instructions (help and learn from each other). Apart from that the ECAAD planner seems to be a good solution for facilitating this because it enables or urges one to prepare explicitly with regard to decisions one can chose if different levels of students’ understanding can be assumed.

In contrast, the overall conclusion of our teachers in the ECAAD session was that it is not possible to adopt the plans of another teacher. Even if it was possible, it would not help reducing planning time. Nevertheless, it might help to have a detailed lesson plan with all needed materials inclusive. The aspect of having some sort of online repository for plans and materials seemed interesting to them for getting new ideas but they were not so fond of the idea to put their own plans and materials into the ECAAD planner.

After the discussions, we came up with the following ideas for the ECAAD planner:

- With regard to the idea that “a model has to be executable” - which might be seen as a critical aspect in pedagogical contexts but might be done with relation to data of the OLM - it might be useful if the planner detects automatically if steps are modelled in the planner which need further actions (e.g., material upload, link to an assessment method) and mirrors this back to the teacher by any kind of awareness component built into the planner. Another, more directive idea, might be to add some sort of “required fields”. In this sense the planner could indicate if necessary things for a “runnable” lesson are missing (e.g. assessment triggers, materials, decisions, etc.).

- From this perspective, it might also be useful for teachers if the ECAAD planner asks first what kind of lesson a teacher wants to plan in what specific way. If he decides that he wants to plan an introductory lesson, just the field for material is required for example. If he wants to model a rather individualized lesson it is also necessary that the model shows at least one decision. Or he might choose the “completely free” model where everything is in his hands and he has total control over the tool.

- This also might work the other way around in connection with the OLM. A teacher models his lesson and the ECAAD planner can read-out what kind of lesson it is on the basis of certain objects in the model (e.g., decision, assessment trigger, etc.). The use of different objects might indicate certain skills or competencies, which than can be fed into the OLM and visualized back either directly or into an e-Portfolio for a kind of certification.
5.1.2 OLM (Germany)

During the ECAAD workshop we had in Germany in February (see chapter 5.1.1), there was also a discussion on topics concerning feedback and the OLM. Although the workshop was prepared for ECAAD, the teachers found the topic of students’ (self- and peer-)assessment skills important and discussed it. As it was no workshop on OLMs the issue of competencies vs. grades vs. tasks was only approached on a surface level before. In contrast to one of the guests, however, the teachers were aware that school grades are not the same as specific information on competencies (e.g., grade in English at the end of a school year vs. competence levels according to the Common European Framework of Reference for Languages (CEFR) [CEFR, 2011] The discussion and its main outcomes for OLMs are described and summarized in the following. The video-data recorded during the session were analysed according to NEXT-TELL topics, focusing on ideas, needs, and requirements, not on interpreting/evaluating the ideas from different pedagogical perspectives. Thus, the chronology of the discussion during the workshop is not necessarily reflected in the summary. Moreover, not all information was considered. Discussions on the social aspects in peer-feedback are not included.

Participants

4 teachers (2 female), 1 in-service teacher (male), 3 guests from other projects of the school (see chapter 5.1.1)

Discussions on Self-Assessment and Feedback

The teachers said that individualized teaching is closely connected to self-directed learning. They mentioned that one important skill students need for self-directed learning is the ability to assess themselves realistically. However, the teachers’ average experience was that their students are not that realistic in assessing themselves. They have the impression that students tend to overestimate themselves (“This is extremely difficult for the students. They cannot assess themselves.”).

One of the teachers described her experiences as follows: She uses subjective assessment scales (e.g., checkboxes) on paper asking students to checkmark whether they solved a task correctly and thus understood it or whether they did not solve it correctly and thus did not understand it. Although the teacher wants her students to learn in a self-organized way, and therefore uses the subjective assessment scales, she doubts her current method because of several reasons:

First of all, it costs plenty of time, and hence, not too practical. Second, the teacher doubts whether marking check boxes is the best solution. (“I’m not sure whether I find it [student’s ratings] that much meaningful for the kids. Of course, they have something. But I have candidates who mark all tasks as understood. Here, these students should first start to reflect. They would need feedback in the form of ‘Sorry! But that you marked all these check boxes cannot be correct.’”). Third, she does not have the time to provide feedback to all her students on the level they would need it. Fourth, she does not have the overview of 30 students’ checkbox
results marked on paper. Moreover, in further discussion the teachers said students need to be somewhat ambitious and interested in their results. Students who want to learn need to take their time and look at their results. However, students often do not look on their results or they only do it superficially. Hence, one needs to get students attracted to their data, however, checkmarks on paper are not attractive.

**Suggestions and Requirements**

Teachers listed the following suggestions and requirements with regard to feedback that should be provided according to NEXT-TELL by the OLMs: To make it more attractive students would need (i) immediate feedback and (ii) useful information.

- First, to get immediate feedback, students would need laptops. As the computer resources are limited in that school (maybe about two to four computers in a classroom), one of the teachers thought about group work, so that not all students would need to see their feedback at the same time. Students then would need to learn when it is time for them to go to the computer and have a look on their data.

- Second, students need useful information. One teacher explained, that for example, the class average is not very interesting and informative for the students (7th and 8th graders). The class average does not tell them a lot. However, when they can see where they stand in class (how many students are above and below their level), this is much more interesting for them ("Meanwhile, they demand it"). Furthermore, they learn to get a more realistic picture of where they stand compared to their peers in comparison to not knowing the results of their peers. One best-practice example of a visualisation for feedback by another Maths teacher in that school was explained. This Maths teacher used ski huts on different heights of a mountain depicted in order to visualize students’ learning progression. The students are visualized as ski drivers moving up the mountain from hut to hut whenever they solve a task or a task level. With this type of visualising students’ learning progression, students are interested and can see (and understand) how many of their peers are on ski huts above or below the ski hut where they are.

- The teachers first talked a lot about how motivating it is for students to see where they are in comparison to their peers. They assumed that if a student is good, (s)he wants to see her/himself on the top. Then, other students are probably motivated to improve their achievements. However, one of the teachers then mentioned that such visualizations might not be motivating for students with low achievements. The other teachers agreed that it might not be the optimal solution. They did not start to work on a visual feedback solution for this case.

- Moreover, an automatic system might be good which supports students in realizing that their self-assessments do not match their task performance.

**Conclusions**

To sum up, it can be said that the teachers communicated needs for their students and came up with ideas. Interestingly, however, they did not discuss which information or visualisations they as teachers would like to have. This is even more interesting because we as workshop leaders asked them several times what they as teachers would need or want to have in order to make their students learn in a self-directed manner. One might infer that as long as the students are informed about their performances or achievements, the teachers do not need any extra information or visualizations. At this stage, they seem to be fine with the above-mentioned feedback visualisations for students.
5.1.3 OLM (Norway)

In the Norwegian OLM training workshop, held at a high school at the end of November 2011, there were 13 participating teachers, 1 of these is part of the school leadership. UniRes gave a short introduction and then Birmingham University presented the OLM theory and gave a demonstration of the OLM tool. The teachers logged in and tried out the OLM tool. A debriefing session with the teachers at the end gave input that they saw the OLM as valuable and that they could imagine using it in the future. A couple of weeks after the workshop the teachers were sent, by email, a link to a questionnaire about the OLM, however, only 6 teachers filled in the questionnaire. This makes us realise that as teachers are really busy, we need to collect data, even reflection questionnaires during our face-to-face sessions with them.

5.1.4 RGFA, Communication & Negotiation (Denmark)

In Denmark, CBS worked together (i) with the two teachers from the baseline study. These teachers supported to create the Danish version of the RGFA tool (a tool to apply the repertory grids method) in a co-design process, and (ii) we conducted a participatory design workshop with 14 teachers and organizational learning consultants for the Communication and Negotiation Tool in February 2012 (the workshop will be reported in detail in D4.3).
5.2 Implementation Studies and Reflections

Besides the above-mentioned research workshops on the development of the ECAAD method and OLM method and tool, the first cycle of developing school lesson scenarios with immersive learning environments within schools’ contexts took place. The scenarios focused on TESL with international character in immersive learning environments (OpenSimulator and SecondLife). The first versions of two scenarios were implemented in three schools in Austria, Norway, and Italy.

Immersive Learning Environments (for TESL)
The purpose of these studies was to develop the context in which the positive experiences that are made with immersive environments in gaming and adult education can be transferred to schools.

Immersive environments were first adopted by the gaming community but are in the meantime also well understood and well researched in the context of teaching and learning. EU funded projects like AVALON (http://www.avalonlearning.eu/), AVATAR (http://www.avatarmosaic.eu/avatarmosaic/index.php), or NIFLAR (http://cms.hum.uu.nl/niflar/) had contributed a lot of knowledge and experience to the education community. A good source for latest trends in virtual education are conferences like the annual conference “Virtual Worlds - best practices in education” (http://www.vwbpe.org/).

For language learning we see the strengths of immersive learning environments mainly in the possibility to create all kinds of learning environments, including cross discipline environments, and to meet and collaborate in these environments with native speakers or other learners of the same or third language.

5.2.1 Austria & Norway: “The Chatterdale Mystery” Scenario

Introduction
In this joint Austro-Norwegian school study Austrian and Norwegian students were teamed up and sent to the virtual village “Chatterdale” in OpenSimulator (OpenSim), where they had to solve a mystery with the help of some native speakers. Before sending the teams to Chatterdale, activities in Moodle helped with team building and getting-to-know each other and the Norwegian students took a reading and listening test. The study, which began before Christmas, will continue until the end of the school year.

In this study we addressed:

1. technology-rich teaching in real school contexts – a new experience for teachers and students
2. TESL in international context (students’ experience of such a setting)
3. testing different activities for language learning with OpenSim
4. gathering data for the assessment method(s) to be development in WP2
5. testing of cognitive density measurement questionnaires

Schools
Two lower secondary schools, one in Austria and one in Norway participated in the study. Two classes and three teachers (1 English teacher and 2 homeroom teachers) were involved in the Norwegian school.

Participants
- Austria: 47 students (aged 13 years old) from a grammar school. The students were divided in four groups
- Norway: 41 students (12-13 years old), 1 English teacher and 2 homeroom teachers

Curriculum and Learning Goals
The study addressed five learning goals from the Norwegian curriculum for 7th grade:

- use digital and other aids in their own language learning
- participate in conversations relating to everyday situation
- use different situations in order to elevate their English skills
• use polite expressions and event-related expressions adapted to different contexts
• use listening, speaking, reading and writing strategies appropriate to the purpose

Learning and Assessment tools
• CLIL-Test (Reading and listening test in English)
• Writing postcards: http://www.readwritethink.org/files/resources/interactives/postcard/
• Moodle chat and forum (NEXT-TELL Moodle): http://research01.exact-learning.com/moodle_nt/
• OpenSim with “The Chatterdale Mystery” (Figure 15 shows a map of the town; a detailed description of this scenario will be provided in deliverable 2.3)

Organisational Issues
Organising an international cross-school cooperation raises several organisational and technical challenges. There were several issues to be addressed:

• Contact with schools
  ○ Agreement with teacher
  ○ Agreement with principal
• Legal and ethical issues
  ○ Registration at Norwegian Social Science Data Service
  ○ Information letters to parents
• Contact with County’s ICT department, which is responsible for the school’s ICT equipment and software
  ○ Acceptance from the County ICT department
  ○ Installation of computer programs (Imprudence and TeamSpeak)
  ○ Trouble shooting problems with Imprudence and TeamSpeak in the Norwegian school
• Classroom and lesson logistics (Norway)
  ○ Coordination between the English teacher and the homeroom teachers around the teaching timetable
  ○ Coordination with the use of the school’s computer lab
  ○ Coordination with the English teacher’s teaching schedule (she works on a research project 2 days a week)
• Classroom and lesson logistics (Austria)
D6.3
Report on RDS 1

○ Coordination within the school
● Coordination between Austrian and Norwegian school
  ○ Timetables
  ○ Groupings of students and creation of login IDs for Moodle, OpenSim and TeamSpeak
  ○ Flexibility due to local changes that affected the plans almost on a weekly basis

Preparations
Preparations for running the immersive learning environments scenario in two schools started in summer 2011 with the alignment of the timetables of the 4 involved classes. This was to ensure that one Austrian and one Norwegian class would have English lessons and access to a computer lab at the same time.

Further preparations included involving teachers, addressing infrastructure issues (installing software, configure firewalls, organising headsets, etc.) and grouping the Austrian and Norwegian students together in teams of 4-5 students, 2/3 Norwegians and 2/3 Austrians per team. Finally, we had to train the students in using the OpenSim environment before we could actually start with our shared activities.

Lesson Plans: ECAAD-Model
TALK used the ECAAD-Planner for planning the most complex part, the Chatterdale mystery (see figure 16).

[Diagram: Plan for Chatterdale Mystery]

Teambuilding - Getting to know each other
As a first step, the students were asked to write an introduction about themselves. Second, they were asked to reply to the team members from the other country. Finally, the students were asked to share information about their country with their foreign team-members and as it was just before Christmas they exchanged information about Christmas traditions, in addition to more touristic themes as the highest mountain and sports heroes. The Austrians started the conversation by sending e-postcards, see figure 17.
Learning to use OpenSim

In December the Austrian students began in the Chatterdale village. In February, after all technical difficulties regarding accessing OpenSim from the Norwegian school computers, the Norwegian students were able to begin in the Chatterdale village, see figure 19, learning about their avatar (e.g., changing clothes), moving around (e.g., walking, running, flying), communicating (e.g., chatting and talking) and gesturing. The students were given a checklist of 26 items, which if they completed, would ensure that they were prepared for embarking on the Chatterdale Mystery. During these sessions the students also encountered some native speakers whose avatars were in the village at the same time.
Austrian students sitting in small groups and working on the Chatterdale mystery in OpenSim

Norwegian students working learning to move around in Chatterdale.

**Figure 19: Norwegian and Austrian students working cross-national in an immersive learning environment**

“The Chatterdale Mystery”

In December we first tested “The Chatterdale Mystery” scenario (see D2.3 for a detailed description) with students from the Austrian school only.

In February one session with 5 Austrian-Norwegian teams solving the Chatterdale Mystery was held. At the time of writing the remainder of the sessions have yet to take place.

**Researchers’ observations of the Chatterdale Scenario**

**Technical preparations**

It is very important to make sure that the technical issues are solved in good time before embarking on a scenario. UniRes experienced much difficulty in coordinating between the County ICT department and the school. This was due much to the County’s policy of only speaking to the school rector and not to the research team, creating unnecessary time delays. There were so many unforeseen, and unnecessary delays due to cooperation problems and miscommunication.

**Coordination between schools**

As each school has its own timetables and routines there is a great deal of time that is required to coordinate such an international collaboration.

**Team-building**

It is important to have team-building activities before embarking on a complicated Mystery.

**OpenSim**

The students seemed not to have too many problems with learning to maneuver their avatars in the Chatterdale village. Chatting was also not a problem, but talking was somewhat of a challenge due to the way in which speaking zones are organised in OpenSim.

**Chatterdale Mystery**

The Chatterdale Mystery proved to be too complex for the students to understand. This was related to the need for inferencing information during the different tasks given to the students. As a result there needs to be
a re-design of the Mystery before continuing with the mixed team trials. The Mystery will be updated and tested in UniRes's premises on a group of 13 year olds before it is taken back into the schools.

A first reflection on the problems with the Chatterdale Mystery includes:

- For the mixed trials the original scenario was adjusted due to time constraints (the Norwegian students were online half an hour before the Austrians) and used asymmetric information distribution: The Norwegian students received information about what to do, whereas the Austrian students only got a map of Chatterdale with several coloured marks on it (which saved a lot of time).
- Each team had to meet in a designated location (e.g. the computer shop) and first share information with the other team members. At this point the students were going to look for clues (especially the letters of Prof. Jones) and talk to the two surviving Chatterdalers. With some help, some teams finally found the cave and freed Prof. Jones.

**Online Etiquette**

The Norwegian students and their teachers experienced inappropriate behaviour from the Austrian students. This means that there needs to be focus on how to behave in online environments. This is part of the Norwegian curriculum from an early grade so they sensitive to this inappropriate behaviour.

**Data Collection**

In order to collect data that can be used to both improve the Chatterdale scenario and to inform the WP2 work on assessment methods, several data collection methods have been taken into use.

**Content and Language Integrated Learning (CLIL) test**

CLIL tests in English have been developed for use in Norway and are meant to be taken in the start of a school year and at the end of the school year in order to measure progression. The tests comprise different competences related to listening and reading. The Norwegian English teacher was keen to use the CLIL test for her students and UniRes researchers saw an opportunity to use the specifications of the test (access through research colleagues) and the student’s answers to develop an assessment method in WP2. Thus, 41 Norwegian students took the CLIL test during one lesson. The results and the development of the method will be described in a D2.3.

**Cognitive Density Questionnaire**

A first version of a cognitive density questionnaire has been given to both students and teachers at the Norwegian school. The results have not been analysed yet, but will be used to feed into further development of the questionnaires.

**Voice recordings of Chatterdale Session**

Voice recordings of discussions going on in the Norwegian class were collected during the session with Chatterdale Mystery. These recordings can be used to find out what discussions were going on between the Norwegian students while they were also interacting in Chatterdale and to identify problems that they were having.

**Debriefing Sessions**

Debriefing sessions have observation notes and recordings. Debriefing both with students and with teachers might give valueable input into organisation and implementation of the scenario.
5.2.2 Austria & Italy: Team Building Show & Project work

In contrast to the Austro-Norwegian team who worked on the Chatterdale Mystery, the Austro-Italian team was older and so, a second scenario was tested.

Introduction

In this joint Austro-Italian school study we worked with older students (aged 15/16) than in the Austro-Norwegian trial. Consequently the used scenario was more adapted to this age group: not a fictive mystery story, but the requirement to work on a real project; setting up the project teams was done via a “team building show” similar to popular “mating-shows” on TV.

In contrast to the Austro-Norwegian the focussed language was not English, but was Italian for the Austrian students and German for the Italian students – thus the basic model was a language-tandem. Another characteristic of this study was, that the scenario-design defined asymmetric involvement of the students, which means not each student needs to do the same at the same time.

Moodle played an important role in this study, not so much for “getting-to-know-each-other” (students did already know each other) but for preparing the students for the in-world sessions.

The study will go on until the end of the school year.

Study / Methods

Similar to the Austro-Norwegian trial we addressed mainly the question of how to integrate immersive learning environments into schools.

Thus, in this study we addressed:

- technology-rich teaching in real school contexts – a new experience for teachers and students
- language tandem classes (students’ experiences)
- picking the right scenario for the right setting - asymmetric student involvement
- gathering data for the assessment method development in WP2

Schools and Participants

- Austria: 10 students (aged 15-16 years) from a grammar school; level of Italian: A1-A2
- Italy: 11 students (aged 15-16 years); level of German: A1-A2

Materials

1. Moodle chat and forum
2. OpenSim with a “Teambuilding show” (Figure 20 shows the setup; a detailed description of this scenario will be provided in D2.3)
3. OpenSim with stages that support the project work (to be defined)

Preparation

The 2 schools had already a working relationship, thus aligning timetables and teacher-coordination was a lot easier than in the Austro-Norwegian trial. More complicated, however, was the technological part: internet connections in Italy are a lot slower than in Austria and also the existing computers were challenged by the used browser. TALK went to Italy in October for a fact finding mission and first trial.

The Teambuilding Show -Step 1: Preparation in Moodle

For the teambuilding show the students first had to think about questions they would like to get answered by their future team-collegues. As a general principle students always had to use the language that they should learn. Those questions were posted in a Moodle forum, then became corrected by the other school’s students (the native speakers of the post’s language) and answered by the other school’s candidates. E.g. “Which comic animal would you like to be?”, “What would you do with 1 000 000 Euros”? 
The Teambuilding Show - Step 2: in OpenSim

For the teambuilding show we set up a stage in OpenSim that supported the selection-process of candidates. (We wanted to alternately pick one candidate from Austria and one from Italy in each team).

Project work
Now, as we have the teams, we’ll go on with letting the teams pick their topic and type of project - that's planned for the upcoming semester.
Results

- Requirements for analysis of Moodle-Forum/Chat, like:
  - Students’ engagement: How much did each student post? Where there students who didn’t post at all?
  - Group activity: Which groups were most active / most in-active?
  - Quality of conversation: To which extend did students answer posts of their colleagues?
- Data (chat logs, videos, ...) as input for developing assessment methods (see further development in WP2)

Teacher’s impression of the students:

- Most students enjoyed the activity - especially being in a virtual world and actually using English in a very natural, task-related context
- Some of the students were overwhelmed by the activity
- In the trial with mixed teams, students talked and chatted English a lot!
- Students flexibly changed from voice chat to text chat when voice problems occured; obviously their wish to keep on communicating was big enough!
- Italian session: Students performed very well in the online-session because they prepared the questions and answers in Moodle beforehand. They enjoyed the scenario because they knew this kind of set-up from mating shows (these students are 15/16 years old!)
- Italian session: the participating students were eager to make a good impression – therefore they invested extra time in preparation (remember, they are 15/16 years old!)

Conclusions and Recommendations

The main conclusion is, that working in schools, using advanced technology and coordinating at the same time with another school is really hard work. Complexity can be reduced significantly by skipping the cooperation - which at the same time would mean, that one main added value of using immersive environments for language learning, which is meeting and cooperating using the language, that should be learned, gets lost.

Sessions in immersive environments can run very well (producing engaged, focussed kids and satisfied teachers) – and they can also easily fail. A scenario that works very well with one group can fail with another group (as in any other teaching as well). However there are some crucial factors that, if carefully addressed, reduce the risk of failure dramatically (see the masterplan and checklist in the appendix for more information on that.)

One issue that must not be ignored is the necessary time-investment. The experience shows, that, depending on the learner, it needs 1-3 sessions until the learner feels competent and comfortable in the immersive learning environment. Thus, the full benefit of the environment comes after the 2nd time. If the project is over after 2 sessions, then students and teachers might end up frustrated.

Why are schools so different from the gaming and adult context? Reflecting our experience, we have found some practical answers, why immersive learning environments have not yet found their way into regular school life:

- Schools work with a minimum of resources; e.g., the computer lab is usually in permanent use – one class finishes as the next one arrives. This makes it extremly difficult to prepare and test something beforehand.
- Processes in schools are not flexible. Changes involve many people and are not appreciated. You need to plan far in advance - but always be prepared that something unexpected happens (e.g., the school leader needs the computer lab).
- School life is a hard business. Schools suffer pressure from all sides (politics, economy, parents), but usually are far away from getting the resources they need. “The show must go on” - many teachers just concentrate on their curriculum; there is little room for innovation.
The technology is often too demanding for schools’ technical management. The need to install software on the client machine and to configure the firewall is often more than a school IT is willingly to handle.

Tangible recommendations produced by our studies are:

- Guidelines for teachers who want to use immersive environments in schools (see Appendix A)
- Checklist for teachers who want to use immersive environments in schools (see Appendix B)
6 RDS: TISL-Level

Besides the development of the NEXT-TELL tools on the ECAAD level, there was also research on the TISL level in Norway and England.

6.1 TISL Workshop (Norway)

In December 10 teachers, 6 STEM teachers and 4 English teachers from an Upper Secondary school in Norway participated in a TISL training workshop in Norway. During the workshop the teachers were organised into three groups in order to discuss questions related to teacher’s inquiry into student learning. The questions were:

- Do you collect data about your students learning? Why (not)? How?
- Do you share data about students learning? Why (not)? How?
- Do you develop teaching based on collected/analysed/shared data? Why (not)? How?
- Do you analyse data about students learning? Why (not)? How?
- Do you document data gathering, analysis and sharing of data? Why (not)? How?
- What do you do with collected/analysed/shared data? Why (not)? How?
- How do you use technology to document, analyse and share data? Why (not)? How?
- Do you model the process of planning/teaching and assessment? Why (not)? How?

Data collection

Their discussions were recorded and will be analysed further and partially reported in WP5. In addition to the discussion the teachers drew a model of their process of planning, teaching, and assessment, and the drawings have been collected. One of the drawings was further used in a participatory workshop as a basis for discussion (this will be reported in WP4).

6.2 TISL Studies (England)

IOE conducted TISL studies in two schools (in one of the schools also a SPICE study). The data collection was carried out via audio and video recorders. Gathered data was uploaded for a shared audio and video analysis.

Up to now teachers have been very eager to use audio data collection. As the EVA tool (the NEXT-TELL tool for video analysis) was too difficult in its handling for teachers to conduct TISL research with it, IOE and teachers are looking for a more easy video annotation service or tool to use as an alternative.

As that the last study was conducted on the 20th of February 2012, the data analysis is not yet completed and will be reported in D5.3 (end of March 2012) and D6.4 (end of August 2012) respectively.
7 Conclusions and Recommendations

NEXT-TELL has made good progress given our starting point (unexperienced, schools not prepared for high-level ICT like immersive learning environments, missing hardware). Project partners worked on both baseline studies and Researcher-lead Design Studies (RDS cycle 1). In the following the main findings of the studies are discussed.

The new reported baseline and requirements data are consistent with the data reported in D6.2. The interest in NEXT-TELL is high and there is a clear need for research on formative e-assessment based on evidence from multiple sources, and how to develop and/or support these skills in teachers. While teachers see the impact of ICT on formative assessment; the next commitment towards participation, however, is more difficult. In the last half year, however, we have made progress.

The results of the research conducted in the last half year are summarized and discussed in the paragraphs below starting with the sequence of the ECAAD cycle (see chapter 3.1). Recommendations for the next research cycle of the components constituting NEXT-TELL are provided respectively.

7.1 ECAAD

Whereas teachers liked to discuss the OLM and getting immediate feedback (see below), the German teachers did not like the idea of modelling their lessons, no matter with the ECAAD planner or just on spreadsheets. For these teachers “ECAAD modelling” their lesson is much too detailed. This was probably true because they did not see the need in finding assessment triggers or assessment methods. In their classroom lessons, they would do it automatically (but not with ICT support) without explicit planning. Although the school and teachers want to teach more individually, use more ICT, and also like the OLM idea (a programme which needs data in order to run), the teachers were not yet in the mood to plan assessments before hand with ECAAD. It was, however, also clear that they could not really explicate themselves at this stage in the process what they need in order to make their teachings more individualized. Furthermore, although these teachers already use ICT to some extent, their integrated Technological Pedagogical Content Knowledge (TPCK) [Koehler, 2008; Mishra, 2006] might not be experienced enough to see that implementing formative e-assessment needs more preparation than a traditional classroom lesson without formative e-assessment. Being equipped with hardware is necessary but not sufficient for formative e-assessment. Despite all, teachers were engaged in discussing and sharing their ideas, opinions, and experience with us. They inspired us researchs a lot and we generated new ideas on what might be built into the ECAAD planner.

Recommendations for ECAAD

For next research on ECAAD, WP2 and WP7 as well as the research partners will discuss whether introducing the ECAAD method in the way we did, needs refinement with regard to teachers’ knowledge and habits in lesson planning, formative assessment, and ICT use. As ECAAD is obviously too extensive and complex compared to current (German) teachers’ planning habits, we will consider how to handle teachers’ unwillingness to test methods that do obviously not fit their daily working practice. As NEXT-TELL wants to support teachers in their workflow, we need to consider carefully how to bridge the gap from where teachers are right now and where NEXT-TELL offers them to accompany them.

7.2 ICTs and Technical Infrastructure in Classrooms

Project partners in Austria but especially in Norway (it took about two months) faced a lot of technical challenges until they could start their Chatterdale Mystery session in OpenSim. Although immersive learning environments are successful in the gaming and adult learning context it is not that trivial to coordinate access to computer Labs between schools in different countries. However, with good preparations before hand, immersive learning environments in an international group setting offer students an experience they normally do not encounter, and the teachers are enthusiastic.
In Germany, the topic of hardware equipment emerged, when talking with teachers about the next steps, which would mean planning of classroom studies with ICT, because the computer Lab (two rooms with about 15 computers each) is often occupied. Moreover, in order to run the workshops with the teachers in the schools, project partners had to bring laptops to the school. Providing laptops for a hand full of teachers is possible, but providing the equipment for whole classes cannot that easily be done. Hence, solutions within each school need to be generated.

**Recommendations for ICTs**

The guidelines and recommendations that were generated based on the experience from organizing the international OpenSim sessions are highly recommended to all teachers who are interested in immersive learning environments (see appendix A and B). Moreover, project partners and schools interested in NEXT-TELL should have a look on the technical requirements listed on the project’s homepage and consider as soon as possisble how technical issues can be handled (http://www.next-tell.eu/schools/school-readiness/). Next, project partners and teachers are recommended to develop class scenarios which consider teachers’ experiences in using ICTs and teachers’ goals concerning professional development in ICT use. Finally, project partners and schools might start a process of clarifying how close or far away schools are with regard to actual ICT equipment and thereby the actual possibilities to fulfill the requirements concerning students’ competencies in IT from educational ministries.

### 7.3 e-Assessment Methods and Tools

CBS worked further on RGFA development with teachers (Repertory Grid for Formative Assessment). Moreover, UniRes collected data in immersive learning environments which need further processing for the development of automatized assessment (see D2.3 and D2.8). Not reported in this Deliverable is the continuing technical part of WP2, WP3 and WP4 with regard to online data and assessment issues.

**Recommendations for e-Assessment**

Research partners will address formative e-assessment continuously when working on ECAAD or OLM.

### 7.4 OLM

Teachers’ interest is especially high for the visualisation of feedback or Open Learner Models (OLM). For Austrian teachers the idea of an OLM fits with their wish for an “overall system” which allows them to share and make all gathered information on a student transparent either to the student himself, the teacher, or the parents by providing a comprehensible visualisation. German teachers also liked the idea of visualizing students’ performances. According to them, students not only need to know where they are compared to their peers in order to develop the skill for realistic self-assessment, but they would meanwhile already demand for such information. Class averages, which are too inconcrete for students, are not seen as very helpful. Furthermore, the five German teachers were very fond of the idea that their students’ co uld range themselves in comparison to other students. They assumed this might raise the students’ motivation to improve their achievements. Two Danish teachers, however, did not want their students to compare themselves with their peers. They think comparison between students might undermine the students’ confidence.

**Recommendations for OLM**

For the next research cycle we suggest to work out with teachers and students which feedback they would like to visualise and in which way to their students/teachers, to themselves, and to parents. In order to work on this process, already existing data (e.g., probably test grades, students’ self-assessment ratings) should be gathered by and from teachers and fed into the OLM by project partners, even though these data are not yet representing competence levels. The Norwegian teachers already do some of the evidence work needed for providing data to an OLM and are very excited about having an ICT tool that can help them in formative e-assessment.
As discussed above different teachers think differently about the type of feedback (e.g., German vs. Danish teachers) and its effects on students' motivation. The (intuitive/experience-based) assumptions of the teachers concerning feedback and motivation might be picked up and translated into a research question, when working with them in TISL.

7.5 Communication and Negotiation

Data concerning communication and negotiation were gathered so recently that they are still under analysis.

Recommendations for Communication and Negotiation

For recommendations we will wait until D6.4.

7.6 TISL and SPICE

While TISL and SPICE studies were carried out, they were so recent that it has not yet possible to analyse the data and some of the data analysis will be reported in WP5. Moreover, there was one Norwegian school leader who comprehensively described their school strategy. This school is already practicing knowledge sharing and collaborative knowledge building. Thus, this school has got the attitude that fits NEXT-TELL and its idea to build an international network of schools, school leaders, teachers, parents, and students in order to learn as much as possible from and with each other.

Recommendations for TISL and SPICE

Partners working with teachers on the ECAAD level are asked to be attentive to issues teachers are interested in (e.g., feedback visualization and motivation). These issues might be transformed into (research) questions in order to invite teachers later on to TISL. IOE highly recommends being sensitive and opening to teachers' opinion on inquiry tools suggested by the project and teachers' own suggestions.

Moreover, it is suggested that project partners and participating schools clarify whether and which school visits between different countries are possible (e.g., during plenary meetings).

Concerning SPICE, UniRes suggests an international face-to-face meeting of school leaders interested in order to establish a network.

7.7 DBR

NEXT-TELL is practicing DBR, because DBR offers "a practical research methodology that could effectively bridge the chasm between research and practice in formal education" [Anderson, 2012, p. 16]. Although we share this assumption, DBR is a rather new research approach. It can be traced back to Ann Brown and Alan Collins in the US about 20 years ago [Brown, 1992]. In a recent review paper on DBR, Anderson and Shattuck [Anderson, 2012] showed that from the top cited 47 DBR journal publications European countries like Germany, Norway, or the UK conducted only 2%-4% each. The vast majority (73%) were conducted in the USA, its country of origin. Although this is per se nothing spectacular, practitioners in countries such as Germany or Austria are not as familiar with active practitioner research because they are more familiar with experimental or large-scale assessment research. Hence, project partners had to deliberately explain this type of research to teachers and school leaders. Many schools in these countries are not used to such a participatory and rather resource demanding research project (NEXT-TELL is a challenge for some schools and they might need support in resources for professional development). Therefore, German project partners, for example, think that NEXT-TELL is a chance for German schools in order to take actively part in their development. This is especially true because DBR gains not that much attention and acceptance by other research approaches like the large-scale evaluation approach or the experimental approach. There are, however, initiatives that advocate DBR more extensively in Germany [Reinmann, 2005, 2011]. Hence, in the long run, it is expected that schools will get used to projects which offer them the opportunity to take actively
part in the knowledge building and knowledge sharing on topics with which they struggle and which they want to solve.

**Recommendations for DBR**

Project partners are informed to present NEXT-TELL as a whole, including not only the research contents or aims but also DBR as a research approach. We recommend to put in more effort during the first school contacts and inform schools as comprehensively as possible. As stakeholders are more used to large-scale assessment research or ready-made quasi-experiments which do not demand a longer-lasting collaboration it might take longer to make them convince (not understand) that one method of NEXT-TELL is the co-development with stakeholders over several years. Project partners are also informed to check the beliefs about “e-teaching” and inform respectively (e.g., using ICT in educational contexts requires teachers’ competences in methods and tools – a tool on its own, does not cause success). We recommend to better start working with fewer schools in a close relationship and organize a somewhat delayed scaling-up [e.g., Gomez, 1998], instead of working with many (in the range of DBR) schools that are not fully committed to the project’s content and research approach. The questions in Appendix C are thought to offer a guideline for clarifying with schools - after their first interest in the project - whether NEXT-TELL (including DBR) is in line with school’s and/or teachers’ aims.
8 References


9 Glossary

Terms used within the NEXT-TELL project, sorted alphabetically.

BSCW The document store used in NEXT-TELL used for storing internal documents
Document store see BSCW
EuresTools The reporting tool used in NEXT-TELL
PM Person month
T Task
WP Work package

Partner Acronyms

JRS JOANNEUM RESEARCH Forschungsgesellschaft mbH, AT
UniRes UNI RESEARCH AS, NO
KMRC Medien in der Bildung Stiftung, DE
TUG Technische Universität Graz, AT
CBS Copenhagen Business School, DM
BHAM University of Birmingham, UK
IOE Institute of Education, University of London, UK
EXACT eXact Learning Solutions SPA, IT
TALK Verein offenes Lernen, AT
BOC-AT BOC Asset Management GmbH, AT
BOC-PL BOC Information Technologies Consulting SP.Z.O.O., PL
MTO MTO Psychologische Forschung und Beratung GmbH, DE

Abbreviations

BS Baseline Study
CbKST Competence-based Knowledge Space Theory Training Course
CBT Computer Based Training
DBR Design-Based Research
ECAAD Evidence Centered Activity and Appraisal Design (builds on the ECD)
ECD Evidence Centered assessment Design (e.g. PADI project)
EFL 'English as a Foreign Language'; EFL refers to learning English in a non-English-speaking region, such as studying English in an Asian or Latin American nation. Typically, EFL is learned as part of a student's school curriculum or for career purposes if working for an international corporation.
ENA Epistemic Network Analysis
ESL English as a Second Language; refers to learning English in the target language environment
HCI Human Computer Interaction
ICT Information and Communication Technology
IT Information Technology
LEPP Longitudinal Evaluation of Performance in Psychology (2nd generation e-portfolio)
NEXT-TELL Next Generation Teaching, Education and Learning for Life
OLM Open Learner Model
PADI  The PADI project aims to provide a practical, theory-based approach to developing quality assessments of science inquiry by combining developments in cognitive psychology and research on science inquiry with advances in measurement theory and technology.

RA  Requirement Analysis

RDS  Researcher-led Design Study

SRI  Stanford Research Institute

STEM  The Science, Technology, Engineering, and Mathematics (STEM) fields are collectively considered core technological underpinnings of an advanced society, according to both the National Research Council and the National Science Foundation

TDS  Teacher-led Design Study

TEL  Technology Enhanced Learning

TESL  Teaching English as Second Language

TISL  Teachers Inquiry into Students Learning

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Appendix A - Using immersive environments in class - Guidelines for Planning

Preparations

- **Check IT in time**
  coordinate with IT administration in order to check if school IT meets the technical requirements

- **Check surrounding conditions in time** (computer availability, lab acoustics, number of students, other projects that you need to coordinate with, curriculum, partner-school/timetable); ask/fight for having at least sessions of each 90 minutes and having enough sessions with students to gradually immerse them to the environment.

- **Coordinate with the partner-school:** Although having school-mixed teams significantly adds to the complexity it is worth doing it! Make sure your timetables fit together and that you have a possibility to communicate with the other teacher at all times (e.g. via chat on mobile phone)

Pedagogical Recommendations

- **Picking the scenario:** Make sure the task/scenario fits the skills of the students; keep in mind that a pre-defined scenario (like “The Chatterdale Mystery”) can easily made easier by giving the students more hints.

- **Immerse students gradually to the environment:** Make sure your students get the chance go gradually acquire all the technical and social skills they will need. By introducing one skill after the other, technology never becomes the “one and only” focus and you can always incorporate some language exercises.

  Ideally this would look like this:

  o Start with a session in the immersive environment where no cooperation is needed and no task needs to be solved. Let students just explore the environment and enjoy changing clothes, flying around, exploring. Make sure students understand what this virtual world actually IS and that behind each avatar a real person sits infront of a computer screen.

  o Do one session, where students can concentrate on using voice-chat using some external VoIP-solution (e.g. Teamspeak). Give them simple cooperation tasks in this voice-chat environment (e.g. collaborative story writing).

  o Do one session in the immersive environment where students have tasks to solve and communicate with other people (e.g. non-playing characters).

  o Finally, add partners which whom they must collaborate in the immersive environment - e.g. solve “The Chatterdale Mystery”

- **Gradually build up social relationships within the teams.** If you use internationally mixed teams, then the students must get the chance to get aquainted with each other. Before they collaborate on a complex task, they should really have become a team; they should be interested in each other (if that happens, then even more communication will happen!) This will also reduce the risk that they start bullying each other.
Ideally this would look like this:

- Have a shared platform (e.g. Moodle). Let students register and add a picture and profile information about themselves.
- Start with asynchronous activities like sending eMails and posting in the forum. Make sure your students have some topics to exchange information about, so they know what to write. Ideally, their information-exchange is somehow linked to a later activity (e.g. a quiz about the other country).
- Go on with life-chatting (see b in list above!)
- Prepare the joint in-world task, e.g. post some questions they need to think about in a Moodle-forum and ask them to answer (as we did in the Austro-Italian trial)
- In-world-sessions
- Ideally some real-life activities would follow (e.g. student exchange)

- Think about role-distribution: Is it necessary that all students do the same thing at the same time? E.g.: Start with one team (while the others watch); add one team at a time
APPENDIX B - Running an immersive activity with your students - Checklist

This checklist provides recommendations for teachers on the actual day when running a scenario in an immersive learning environment like OpenSim or SecondLife.

Right before class starts ...

- try to be in the lab before the session starts: check internet availability, headsets and audio; login students (if possible)
- have material prepared (e.g. slides, texts, hard copies of eMails, maps of Chatterdale) - have one for EACH student (not for each team)

How to get the students started with the activity (the first 5 minutes of class)

Make sure ...

- students understand the story / the task - be very clear with instructions!
- students are aware of the fact, that the other avatars are real people and that bullying is not tolerated; if bots or automated chat-messages are part of the scenario - point that out to the students!
- students of same team do NOT sit next to each other (this is the reason, why they EACH need one hard-copy of the distributed material) - if they sit next to each other it becomes more difficult to communicate via headsets, because they hear each other twice (and they do not rely on what they hear in their headphones)
- students do NOT log in before you have told them everything you want to tell them
- do a voice-check before letting the students start, i.d. make sure that each student’s audio and voice works

During the activity

- check for student’s appropriate behaviour - and intervene if necessary
- check with on-site teacher in other school
- stay in contact with in-world staff
- help students with technology
- enjoy the student’s excitement - this may include a higher noise-level (which is no problem as long as students can properly talk/hear each other)
- in case of voice-problems: encourage students to use text-chat (while you e.g. change the headset)
Appendix C – Participating in Design-Based Research (DBR) - Guidelines for School Contacts

Project partners inform schools about DBR. The following questions should be used as a first basis to discuss openly between schools and NEXT-TELL partners whether a project collaboration is a win-to-win situation for both sides. The decision process might take only one or several meetings because schools are “flooded” with projects and they need a stable basis for deciding where they put their limited resources in.

Information to schools:
Feel free, to ask NEXT-TELL partners for more information in case you do not feel informed well enough about the project. Make sure you have information on the research aims and on the research approach called design-based research.

Questions to schools:
We invite you to take your time and find your answers to the following questions. Discuss your answers with NEXT-TELL partners in order to find out whether your school and NEXT-TELL matches besides the content (e.g., ICT for formative e-assessment/individualized teaching/learning) of NEXT-TELL (e.g., with regard to duration of the project, possible resources you want to invest, teachers that are interested in).

- Which type of project are you looking for? Please, think about your preferences in working with external partners.
- What do you expect to gain from NEXT-TELL? What are your aims in NEXT-TELL?
- How do you think NEXT-TELL can contribute to your school aims?
- How do you think you can contribute to the aims of NEXT-TELL?
- What do you think you can contribute to your professional development?
- How do you think you can contribute?