INTERACTIVE TEACHING ACROSS CULTURE AND TECHNOLOGY

Editors: Isabel Chumbo, Elisabete Mendes Silva

Title: Interactive Teaching Across Culture and Technology
Editors: Isabel Chumbo, Elisabete Mendes Silva
Development: Serviços de Imagem do Instituto Politécnico de Bragança
Instituto Politécnico de Bragança · July 2015
5300-253 Bragança · Portugal
Tel. (+351) 273 303 200 · Fax (+351) 273 325 405
http://www.ipb.pt
Cover: Soraia Maduro
ISBN: 978-972-745-188-3
Online version: http://hdl.handle.net/10198/11931

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Preface

Remember the time when you had a teacher in front of a blackboard endlessly talking, sometimes in a rambling way to students? Those days are gone. This project is a proof of that and aims at palliating students' boredom.

Interactive Teaching Materials across Culture and Technology (INTACT) intends to present an alternative way in the teaching paradigm as it intends to be a resourceful tool in the teaching/learning process. Both teachers and students can work together cooperatively and collaboratively, two different ways well explained by Mary Glynn and Ildikó Szabó further ahead. Teachers will no longer become the centre of learning but they will become guides and facilitators throughout all the learning process. Students can learn from their teachers but the latter can also learn from the former.

The novelty here is that learners are engaged online in a different set of activities and among students. Therefore, the INTACT platform caters for an online collaborative learning community comprised of both students and teachers. As Sarolta Lipóczi so well puts it, the crux of the matter is 'learning to learn too'.

The teaching paradigm is changing and we are witnessing different approaches and techniques in pedagogical matters. In this context, at the basis of the INTACT project is a display of a wide array of new techniques and methodologies that account for active learning based on multimodal teaching and learning resources. Students will thus interact cognitively and in a constructivist way with different materials, such as visuals, texts, audio, to name a few. INTACT offers students and teachers options so that they can choose several actions in the course of the learning unit, for instance watch, browse, select, compare and manipulate all the resources available.

Bearing in mind this short introduction to the project, in Part 2 Mary Glynn and Ildikó Szabó give us a better definition of INTACT and the educational arguments

underlying its foundation. They also focus on the difference between collaborative and cooperative learning and on the importance of bilingualism and the advantages of CLIL, now one of the trendiest bilingual teaching methods,

In part 2, we find a sample of resources ranging from Biology to second language learning. In the first learning unit, Toni Cramer and Steffen Schaal from the University of Education-Ludwigsburg, Germany, conceived an 8-lesson unit plan on the Human Immune System. Through these 8 lessons, students will learn how to explain blood types, to describe the parts of the human immune system model and collect data and interpret the spreading of diseases using adequate simulations, among other useful knowledge.

The second and the third learning units are targeted at primary school students. The authors' main purpose, Mary Glynn, from St. Patrick's College in Dublin and Mariangeles Caballero from Universidad Complutense – Faculty of Education in Madrid, respectively, is to enhance students' knowledge on science and technology by exploring and applying scientific ideas and concepts. Magnetism and the Human Circulatory system are therefore the proposals presented by the authors.

Framed in the Geography programme of the 7th grade of the 3rd cycle of the basic education, for a target audience aged 12-13 years old, Maria Antónia Martins, from Emídio Garcia Secondary School in Bragança-Portugal, conceived the fourth learning unit on *Elements* and *Climate factors* regarding the Translational Motion and the Seasons of the Year. The *temperature* element was chosen to be studied throughout 3 lessons. In the course of these, students should not only be capable of relating the diurnal and annual variation of the temperature according to the movements of the earth but also to understand the relation between the annual variation of the temperature and the latitude of the place.

The fifth and the sixth learning units aim at improving foreign language and social skills while at the same time students are taken back in time, thus broadening their knowledge on culture and history. Through the most suggestive title: 'Legends and heroes – To be a Knight in King Arthur's court', Ildikó Szabó, from the Kecskemét College, Teacher Training Faculty in Hungary, takes us on a tour through medieval times meeting the needs of several learning styles, such as acoustic, kinaesthetic and visual.

Sarolta Lipóczi, also from the Kecskemét College, Teacher Training Faculty, conceived the sixth learning unit titled 'Mozart as a child and his travels' a way to learn German as a foreign language. In this unit, primary school students are given the story of a famous musician born in Austria. Students thus develop cultural knowledge and language competences through exciting learning objects and activities.

In part 3, Birgit May, Annika Jokiaho and Vítor Gonçalves, with the collaboration of José Exposto make a brief overview of the INTACT platform, explaining the methods adopted and highlighting more technical issues related to results achieved during the the project. Subchapter 3.2. reflects on good practices resulting from

the whole project. It also records the national teams' experience in working with the others for accomplishing the various tasks as well as the numerous unexpected and unavoidable problems that came up in the three years during which the project was completed.

Being all said, we truly hope that this ebook can become an appetiser to the project, largely to make both students and teachers frequent users of the interactive platform.

1. INTACT: the project

Isabel Chumbo, Elisabete Mendes Silva

The acronym INTACT is based on the words "Interactive Teaching materials across Culture and Technology". In 2012 when the application was filled in and submitted to Brussels the acronym was full of words and full of ideas. The main dream was to go beyond many other already existent possibilities and resources. It was rather clear that the project was addressing a set of European values, specifically:

a) Language learning and linguistic diversity
b) Innovative ICT-based bilingual settings
c) Understanding among young people and educational staff
d) Basic skills with interactive teaching material

INTACT is a multilateral Comenius project, funded under the Lifelong Learning Programme of the European Union. The project started in December 2012 and comes to an end in November 2015. The consortium comprises partners from six European institutions, namely the University of Education Ludwigsburg (Germany), the Universidad Complutense Madrid, the Kecskemét College (Hungary), St. Patrick's College, Dublin (Ireland), the Polytechnic Institute of Bragança (Portugal), and Babes-Bolyai University Cluj (Romania). Ludwigsburg University of Education is the coordinating institution.

The project organised itself into four groups, covering the different work packages planned and described in the application. There is an umbrella group named Steering group where all project institutions have a seat in order to make global decisions and become aware of ongoing work in the other three groups. Group 1 covers dissemination and exploitation, Group 2 dedicates to the teaching and learning materials, their development and implementation, testing and evaluation.

Group 3 is responsible for the development, implementation, testing and evaluation of the platform.

The project addresses the secondary schools' need for reliable interactive materials which can be used in science, mathematics and social science classrooms in bilingual educational settings. Environmental issues and intercultural questions are also focal points for the interactive materials.

These teaching materials were developed by Higher Education experts from all partner countries together with teachers at pilot schools from at least two different countries of the consortium. In fact, pilot schools and teachers from each of the countries have a very important role in the project. They were the voice, the guide and the link between the experts, researcher, platform developers and the real educational setting.

Before the application for the project was submitted, it was already accepted that the use of Interactive Whiteboards (IWB) was widely common across Europe, although at the kick-off meeting the consortium realised that the different countries had different policies regarding this kind of technologies. At some school levels, like the secondary schools in Portugal or Germany IWB were common, but countries like Romania and Hungary still felt behind with this technology. Thus, this aspect immediately posed itself as a challenge within the team. This is the reason why the materials, presented later on in this book, are implemented in the HTML5 standard to be used not only with specific interactive whiteboards but with other interactive devices like tablet-PCs, smart phones, among others. Further, the materials can be used for virtual cooperation scenarios connecting different classrooms all over the world via a server and using tools such as videoconference, chat and forums.

The platform containing a repository of teaching materials and a process to create one's own can be found under www.intactschools.eu. At this stage the platform, which is the main outcome of the project, facilitates interactive collaboration inside and outside the classroom and can be used in multiple situations, from homework tasks to tests. The access is easy as long as there is an internet connection.

Initially the INTACT project idealized these outcomes – platform and materials – for secondary schools only. This was very soon perceived as insufficient when educational experts started dealing with curricula and syllabi, as well as the different European guidelines for the fields of study the project wanted to work on. Both educational experts and pilot teachers realised that different topics were approached at several ages across different countries in Europe and, as such, the resources had to be adaptable to different settings even in terms of content. So far, the platform's repository contains a catalogue of materials which can be used from kindergarten to higher levels in secondary schools and Higher Education.

Apart from that each user of the platform can build his/her own resource adapting it to each level. Thus, the target groups of the platform are teachers, educational staff in higher education, teacher training, students in kindergartens, primary

and secondary schools. Students involved in teacher training can also gain from using the platform in their teaching practice. The ultimate targets of the platform are education providers, universities and research groups, as well as national and umbrella associations in education and networks.

As seen later on in this book, the consortium aimed at developing and implementing resources primarily located within the field of Sciences, but at this stage the platform and the resources have gone well beyond that.

Education in sciences is viewed as one of the many ways to educate active, engaged and informed individuals who are capable of making decisions in the society they live in. In that sense it is unanimous that education in sciences should be for everyone and start at early ages. As such, education professionals must stimulate both curiosity and research spirit in children, thus promoting situations and resources which motivate deeper and more concrete learning.

By now the INTACT catalogue of resources also shows materials in the field of Entrepreneurship, English Culture and Translation Studies. This surely accounts for the adaptability of the platform.

Another relevant pan-European aspect of this project is the bilingual approach. The growing trend towards globalisation and the need to communicate in a second language (L2), particularly English in different contexts, has led to important changes regarding language policy and teaching in education throughout Europe.

Bilingualism is defined functionally as the "ability to communicate in two (or several) languages independently of the relative level of competence, of the modes and ages of acquisition and of the psycholinguistic relations between the different languages composing the speakers' repertoire" (Ó Riagáin, P. & Lüdi, G., 2003, p. 5). Insofar bilingualism is applicable to all age levels and in the context of this project is viewed as an advantage in students' educational itinerary.

Bilingual competences are vastly explored in higher education, due to the Bologna reform and mobility programmes, but also due to a series of professional and social factors which lead institutions and parents into thinking that the more languages the better for the professional future of students. Many European universities have implemented bilingual programmes and introduced innovative language teaching methodologies. As such, CLIL (Content and Language Integrated Learning) seems to be the perfect company to bilingualism and to the stress which has been put on the English language as a result of globalization and educational changes in Europe and the rest of the world.

Within the INTACT project the bilingual focus is set on English and in the case of Hungary and Romania also on German. All participant institutions have a language expert in their group and the staff from St. Patrick's College in Ireland ultimately supervises language use and correction.

In many of the chosen pilot schools a bilingual setting is not considered a norm when it comes to the classroom, but the CLIL methodology has gained importance as an innovative teaching and learning approach schools do not mind implementing.

In *The European Framework for CLIL Teacher Education* CLIL is defined as a "dual-focused educational approach in which an additional language is used for the learning and teaching of content and language with the objective of promoting both content and language mastery to predefined levels" (Maljers, Marsh, Wolff, Genesee, Frigols-Martín, Mehisto, 2010, p. 11).

This methodology is well known for its integrative nature and this serves the INTACT project's objectives quite well, since it is suitable to all levels of education – primary, secondary, tertiary, vocational and adult. CLIL seeks to teach two subjects in one – a content subject and a language. Content subjects, such as mathematics and an additional language, are usually taught separately. With the exception of primary teachers, other professionals are often trained to teach just one subject be that a content subject or a language, and not both. INTACT project is groundbreaking in this aspect as well. Both teachers and learners have the possibility to work in this specific environment and use several languages.

This also means that the resources were very carefully planned and written from the language point of view in order to actively promote language learning and linguistic diversity.

The visibility of the project has been assured from the start. Apart from the website (www.intact-comenius.eu), the INTACT team has always carried out actions and activities to promote the work developed so far, through direct mailing to professional and educational networks and stakeholders, through meetings with teachers at schools, workshops and participation in academic and professional events across Europe. This means that the project has permanently gained from contacts and communication with other projects and education professionals.

This has made INTACT to project itself over time and keep the main outcomes active in order to participate in meeting the Europe 2020 Strategy which sets objectives for the growth of the European Union by 2020. The Digital Agenda proposes to better exploit the potential of Information and Communication Technologies (ICTs) in order to foster innovation, economic growth and progress. We believe that, in this sense, INTACT can provide the most adequate interactive materials aiming at quality and diversity of teaching.

In conclusion, it is our belief that INTACT serves the purpose of both teachers and students at all levels of learning as it features innovation, creativity, rigour and, above all, envisages a multidisciplinary approach on learning.

References

Marsh, D., Mehisto, P., Wolff, D., Martín, M. (2010). *The European Framework for CLIL Teacher Education*. Graz: ECML.

Ó Riagáin, P. & Lüdi, G. (2003). *Bilingual Education: some Policy Issues*. Strasbourg: Language Policy Division of the Council of Europe.

2. Cross-curricular learning resources

Christine Bescherer, Mary Glyun, Ildikó Szabó

Introduction

The INTACT project aims to support primary and secondary school teachers towards more effective pedagogical use of interactive technology devices in the classroom. This is achieved through the creation of a sample bank of interactive teaching and learning resources for science, mathematics, social science and language curricula for bilingual educational settings. All resources have been developed in accordance with the national curricula of the countries involved (DE/HU/IE/PT/RO/ES).

In order to have an open architecture that will be available into future years, the resources are implemented in HTML5 standard. The facilitation of web access will thereby expand the adoption of the resources to a wider range of platforms and mobile devices (whiteboards, touchpads, tablets, mobile phones, among others) and additionally meet the requirements of different technical infrastructures and systems.

A main focus of the INTACT project is the development of an online collaborative learning community comprised of both students and teachers. The INTACT online platform has been developed to house this community and accommodate the interactive teaching and learning resources created. Participating teachers can utilise INTACT's online platform to create their own online units of work, lessons and interactive resources or utilise existing teaching and learning resources created by others.

Collaborative learning

Collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together (Smith & MacGregor, 1992). It represents a shift away from the teacher-centred classroom in that teachers who use collaborative learning approaches tend to think of themselves less as transmitters of knowledge to their students. Instead, they become designers of intellectual experiences where groups of learners work together to solve a problem, complete an activity, or create a product. The responsibility for learning is shifted from the teacher to the student who takes on the role of self-directed learner. Learning occurs though active engagement among students, either face-to-face or online.

Collaborative learning is similar to, but not the same as, cooperative learning. In cooperative learning the task is divided vertically (i.e., members work more or less concurrently on different aspects of a project), whereas in collaborative learning the task is divided horizontally (i.e., members work together more or less sequentially on different aspects of a project) (Dillenbourg, 1999). Collaboration is much more than co-operation. Collaboration entails the whole process of learning. This may include students teaching one another, students teaching the teacher, and the teacher teaching the students. More importantly, it means that students are responsible for one another's learning as well as their own and that reaching the goal implies that students have helped each other to create meaning together.

The main characteristics of collaborative learning are: a common task or activity; small group learning, co-operative behaviour; interdependence; individual responsibility and accountability. Usually, students are working in small groups, mutually searching for understanding, solutions, meanings, or creating a product.

The basis of both collaborative and cooperative learning is constructivism: knowledge is constructed, and transformed by students. The learning process must be understood as something a learner does by activating already existent cognitive structures or by constructing new cognitive structures that accommodate new input. Learners do not passively receive knowledge from the teacher; teaching becomes a transaction between all the stakeholders in constructing knowledge together (Dooly, M., 2008).

Bilingualism

An additional focus of the INTACT project is one of bilingual educational settings.

The nature of knowledge, including knowledge of languages has changed a lot in the past few decades. A new type of language knowledge has emerged which is integrated, cognitively engaging, and the main mode of knowledge delivery is through learners' active participation. This type of language knowledge can be ideally delivered through teaching a school subject in that language. The change

concerns the goal of knowledge. The focus has shifted to the actual use of the foreign language, *the knowing of* has become more important than *the knowing about*. To use the language as a vehicle, content-based tuition has proven to be the ideal way.

Educational bilingualism is a result of acquisition or conscious instructed learning. In Europe Content and Language Integrated Learning (CLIL) has become the most common type of bilingual education. It is a type of bilingual education in homogeneous regions. It can be described as any educational setting in which an additional language is used for the teaching and learning of subjects other than the language itself. Through learning content and language together, children gain a second language and subject knowledge in parallel, without any extra effort. The characteristic features of CLIL include the following facts: teachers are not necessarily native speakers of the target language, the teaching resources are not aimed at native speakers and immigrant students usually do not take part in these programmes.

Research shows that bilingual education is a positive experience for the vast majority of learners. Bilingual education enhances brain improvement as this type of education facilitates creative, problem-solving and critical thinking. Bilingual education promotes multicompetence as the brain is capable of storing more than language. The learned words from one language won't crowd out the words from another language. If a child experiences early that he/she can express a concept in different words while the concept remains the same, his/her thinking becomes more flexible and capable of association. He/she will have various learning strategies; as a result he/she will become target oriented. The child's articulation database is flexible, therefore starting bilingual education at an early age can guarantee a native-like accent. Students in bilingual education experience that learning is fun, they develop a curiosity towards languages. Learning through the medium of another language by no means interferes with the mother tongue; it is mutually beneficial and has a positive effect on dual literacy. According to results of CLIL programmes, subject matter knowledge remained the same or even improved when learned in a different language. Cognitive test results showed that multilingual brain organization is different from monolingual brain organization which is the cause of higher achievements. It is also a strong point that bilingual education/CLIL provides an efficient and effective curricular model for learning more languages in a shorter time without adding any extra language lessons to the curriculum. In bilingual educational situations children obtain positive attitudes towards inclusivity, openness and tolerance.

Use of Interactive Devices for Learning

The use of IT in education is often associated with the claims of supporting learning processes and improving the quality of education (Voogt & Knezek, 2008). Some aspects of quality of education are student-centeredness of curriculum and learning scenarios, competency-based materials, authenticity of learning materials

and the activity level of the learners (UNICEF, 2000). All of these can be supported by using the INTACT-platform but it is especially the level of activating the learners that can be raised by using interactive teaching scenarios. It is rather obvious that increasing the interaction in classrooms is also possible without digital technology but it is just so much easier using IT.

ICT-based learning devices such as interactive whiteboards, tablets, smartphones, used for learning in various age groups and learning settings, allow synchronous, authentic communication or the production, storing, reusing and processing of learning materials or artefacts. Not very surprisingly research on the use of interactive devices in classrooms show an increase of interaction between teachers and students or among students (i.e. Shi, Y.; Yang, Z.; Hao Yang, H. & Liu, S., 2012).

But of course this comes not by just providing access to these technologies but by designing and implementing adequate learning scenarios to allow authentic learning environments in i.e. language and literacy classrooms (Reid & Ostashewski, 2011).

The main advantages in the INTACT-platform and exemplary learning units are the interactivity of the resources, the integration of multimedia in particular the possibility of (authentic) audio files in foreign language learning and the possibilities to connect classrooms across countries with different languages using mobile devices such as smart phones. Especially the possibility to record and use audio files or real time video conferences with classrooms in other countries in the communicative scenarios of language learning is very helpful for learning foreign languages (Son & Park, 2012).

Intercultural communication

Needless to say that all the previous features of the project have largely contributed to an increased intercultural communication and a pan-European approach within a project of the kind. They appear as foundations of this umbrella concept which only became possible because collaborative learning, bilingualism, use of interactive devices in a cross-curricular perspective all combined with all the good practices gained from the project. In fact, all of these, when linked to our platform and ongoing work developed there guarantee the sustainability of the INTACT project for future years.

References

Dillenbourg P. (1999). What do you mean by collaborative learning?. In P. Dillenbourg (Ed) *Collaborative-learning: Cognitive and Computational Approaches*. (pp.1-19). Oxford: Elsevier.

Dooly, M. (Ed.) (2008). Constructing Knowledge Together (21-45). Extract from *Tele collaborative Language Learning. A guidebook to moderating intercultural collaboration online*. Bern: Peter Lang.

Reid, D. & Ostashewski, N. (2011). iPads in the Classroom – New Technologies, Old Issues: Are they worth the effort? In T. Bastiaens & M. Ebner (Eds.), Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2011 Chesapeake, VA: AACE 1689-1694. Online at http://www.editlib.org/p/38089 last retrieved 02/23/2015.

Shi, Y.; Yang, Z.; Hao Yang, H. & Liu, S. (2012). The impact of interactive whiteboards on education. In Proceedings of the 4th International Conference on Internet Multimedia Computing and Service (ICIMCS'12). ACM, New York, NY, USA, 213-218. doi:10.1145/2382336.2382397.

Smith, B. L. & MacGregor, J. T. (1992). What is collaborative learning? In Goodsell, A., Maher, M., Tinto, V., Smith, B. L. & MacGregor J. T. (Eds.). *Collaborative Learning: A Sourcebook for Higher Education*. Pennsylvania: Pennsylvania State University; National Center on postsecondary teaching, learning, and assessment publishing.

Son, J. B., & Park, J. Y. (2012). Intercultural usability of language learning websites. International Journal of Pedagogies and Learning, 7(2), 135-141. doi:10.5172/ijpl.2012.7.2.135

UNICEF (2000). Defining Quality in Education. A paper presented by UNICEF at the meeting of The International Working Group on Education Florence. Italy June 2000. Working Paper New York, USA. 43pp.

Voogt, J. & Knezek, G. (Eds.) (2008). International handbook of information technology in primary and secondary education. New York: Springer.

Interactive resources on the INTACT platform

The following resources represent a sample of those created for the INTACT online platform. We must stress that these tables are just very condensed descriptions of examples of how to accomplish the INTACT ideas in regular classrooms. This way of describing a learning unit has been first derived from the concrete curricula description in each educational national system and then put in a more systematic, comprehensive and thus far-reaching way. Needless to say this is not ready to use material. It still has to be adapted to each country's curriculum and to each class and students.

2.1.	Secondary Science: Biology	Human Immune System
2.2.	Primary Science	Magnetism
2.3.	Primary Science	Circulatory System
2.4.	Geography	Translational Motion and the Seasons of the Year
2.5.	Second Language Learning	Legends and Heroes - King Arthur
2.6.	Second Language Learning	Mozart

2.1. Secondary School Science: The Human Immune System

TOPIC TITLE	**The Human Immune System**
LANGUAGE	English, German
GENERAL DESCRIPTION:	
SUBJECT COVERAGE	Secondary Science
TARGET AUDIENCE	Secondary School (in Germany: Realschule, Gymnasium)
AGE RANGE	14 - 16
CURRICULUM	**Curriculum Biology Germany (recommendation):** http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2004/2004_12_16-Bildungsstandards-Biologie.pdf p. 13 **Links to curricula of Southwestern Germany (Baden-Württemberg):** Gymnasium - http://www.bildung-staerkt-menschen.de/service/downloads/Bildungsstandards/Gym/Gym_Bio_bs.pdf p. 207, 2013 Realschule - http://www.bildung-staerkt-menschen.de/service/downloads/Bildungsstandards/Rs/Rs_NWA_bs.pdf p. 99 Hauptschule - http://www.bildung-staerkt-menschen.de/service/downloads/Bildungsstandards/WRS/WRS_MNT_bs.pdf p. 126 **Links to public online version of school books:** Prisma DIFF A 7-10: http://klettbib.livebook.de/978-3-12-068470-1/ > Chapter 7 "Gesundheit und Krankheit", Pages 194 to 237 Prisma 7-10 A/ Band 2: http://klettbib.livebook.de/978-3-12-068365-0/ > Chapter "Für die Gesundheit kann jeder etwas tun", Pages 174 to 203 Natura 2 für Gymnasien: http://klettbib.livebook.de/978-3-12-049121-7/ > Chapter "Immunbiologie", Pages 304 to 323

AIMS	**Learners...** • are able to describe the parts of the human immune system • differentiate the specific / unspecific as well as the humoral and the cellular defense • are able to describe different diseases based on specific activities of the immune system • construct models of the interplay of different parts of the immune system on different levels (plasma and membrane, cells, tissues, organic system) • can describe active and passive immunization • can explain the blood types • can model, collect data and interpret the spreading of diseases using adequate simulations
NUMBER OF LESSONS	8
DURATION	8 x (2 x 45 minutes) = 12 ½ (time) hours
REQUIREMENTS	See linked lessons for individual lesson requirements
ASPECTS FOR COLLABORATION	All 8 lessons in this resource provide scope for in-class collaborative learning; the jigsaw-method is used several times as well as the American debate method. These methods provide opportunities for inter-school collaborative learning both at national and international levels. Collaborative learning aspects should be designed so that students develop the skills of predicting, investigating, collecting and interpreting data, analysing and evidence-based decision making, debating, organising, sharing, reporting, etc. **Suggestions for collaboration with creative tasks:** <u>In-class collaboration:</u> • Students collaborate in small groups with different resources • Students document the development process and the results digitally (e.g. Padlet, collaborative mind mapping, virtual wallpaper, etc.) <u>Interschool communication / collaboration options:</u> • Pilot teachers create an opportunity where each school uploads / shares their resources • Students email their digital stories/videos/slideshows to the collaborating pilot schools • Pilot teachers set up video conference using the INTACT platform for students to display and discuss their resources with other pilot class. • Pilot teachers support one another in skills development for web 2 tools, etc, if required • Pilot teachers set up inter school competition for the most creative representation of the functions of the immune system, stop-motion-video or animation about the process of immunization, etc – classes skype, display and discuss • Pilot teachers set up Facebook page where each paired class contributes with ideas and posts

DEVELOPMENT OF SKILLS	**Working Scientifically**
	• Questioning
	• Observing
	• Predicting
	• Investigating and experimenting
	• Estimating and measuring
	• Analysing
	  • *Sorting and classifying*
	  • *Recognising patterns*
	  • *Interpreting*
	  • Recording and communicating
	
	Designing and Making
	• Exploring
	• Planning
	• Making
	• Evaluating

CONTENT and LEARNING OBJECTIVES:	
LESSON 1: Childhood Diseases and Scarlet fever (2x45 min) **Description**: The lesson starts with an introduction of different **childhood diseases** using specific cases as anchor for situated learning. Learners use a variety of interactive micro-modules to investigate the reasons for the cases and to find explanations and disease treatments. Exemplarily different (childhood) diseases and **scarlet fever** are provided as learning objects or schoolbook graphics.	
LEARNING OBJECTIVES	Teachers and students are using interactive media on a simple interactive level (e.g. browsing, deriving information) Learners … • get an overview to the major childhood diseases and find opportunity to tell stories concerning their own life (situated learning) • are able to classify the common grounds of each disease (structure knowledge) • are predicting the phases of an infectious disease (mental modelling) • suspect that micro-organisms are responsible for diseases

LESSON 2: Structure and lifestyle of a bacteria (2x45 min) **Description**: Bacteria are one sort of pathogenes. Students work out the **structure/histology** of bacteria as well as their **life cycle**. The goal is to identify the bacterial metabolism as cause of a disease, not the bacterial intention!	
LEARNING OBJECTIVES	Teachers and students are using interactive media and simulations on a higher interactive level. Learners… • explore the typical structure of a bacteria cell (structure knowledge, mental modelling, cognitive load) • study the exponential growth of bacteria and the dependence of time and temperature (cognitive flexibility)**.** For advanced learners, a link to the mathematical modelling is possible

LESSON 3: Structure of a virus – viral infection (2x45 min) **Description**: Viruses are another sort of pathogenes. Students work out the **structure** and **life cycle** of viruses. The goal is to identify that viruses need a host for reproduction.

LEARNING OBJECTIVES	Teachers and students are using interactive media and simulations on a medium interactive level. Learners … • are reading an information text and use the information to assemble a virus from its typical parts (cognitive flexibility) • observe virus infection step by step using animations (mental modelling) and describing microbiological processes using scientific terms • verify their knowledge by arranging the phases of virus infection into the right order (mental modelling, structure knowledge)

LESSON 4: Components of the immune system – White blood cells in action (2x45 min)
Description: Students discover the **components of the immune system**. The learning resources facilitate differentiated and collaborative knowledge construction using micro-modules and video-quest methodology. This lesson allows international cooperative / collaborative learning

LEARNING OBJECTIVES	Teachers and students are using interactive media and simulations on a medium interactive level. Learners … • explore the lymphatic system as a 3D-walk from macro to micro structures (mental modelling) • learn that their body owns a specific defense system • observe with blood cells during phagocytosis of intruders (mental modelling) • discuss and suspect that the human body is in charge of a specific immune response system (structure knowledge)

LESSON 5: Immune response: non-specific and specific response (2 or4x45 min)
Description: Students use micro-modules to develop an **overview of the immune cells** that are part of the immune system and respectively the **immune response**. As they are informed of the various cells, they can suspect in discussions, what function the different cells have and exchange their knowledge.
In a second step, students use the micro-module as part of a classroom activity on tablets or desktop computers. The task is to draw a **"process diagram"** (see graphic of Prisma) that visualizes the interdependence of the different steps of immune response (international exchange should, again, be possible).
To foster grammar school level another micro-module can be used, that deals with **antibody-antigen-representation on cell membranes**. On this level, teachers can discuss recognitions signals and activation processes.

LEARNING OBJECTIVES	Teachers and students are using interactive media and simulations on a medium to higher interactive level. Learners … • develop basic (or deeper) overview of the cells of the immune system (structure knowledge, mental modelling) • investigate on model level the interplay between the different cells of immune response (mental modelling) • construct a process diagram to visualize the complex network of immune response (structure knowledge)

LESSON 6: Active and passive immunisation (2x45 min)
Description: The discovery of the vaccination was an important step in medical history. This lesson deals with the re-discovery of the **vaccination** by E. Jenner. Students use micro-modules to work out the scientific background of vaccination. At the end of the lesson they discuss the pros and cons of vaccination in an **"American debate"**: The students are divided in two groups (supporters and opponents of vaccination), they have to derive arguments from their learning results and discuss it within a structured debate.

LEARNING OBJECTIVES	Teachers and students are using interactive media and simulations on a medium interactive level. Learners … • observe the mechanism of active immunisation step by step with virtual zooming (metal modelling, cognitive load) • use scientific terms to describe a molecular process (mental modelling) • predict on base of already acquired knowledge the mechanism of active immunisation (cognitive flexibility)

LESSON 7: HI-virus and HIV-infection (2 or 4x45 min)
Description: As students already know the general **structure of a virus cell** and the **process of viral infection** (see lesson 3), teachers pulse on the question which structure is decisive for the specific functions during viral infection. The specific properties and structure of **the HI-virus** are described. The lesson closes with the discussion of the **course** of the **quantity curves during** different time periods. They learn the difference between HIV infection and AIDS as illness.

LEARNING OBJECTIVES	Teachers and students are using interactive media, 3D-models and simulations on a medium to higher interactive level. Learners … • explore the 3-dimensional structure of a HIV virus (mental modelling) • formulate hypotheses about the special mechanism of HIV infection (cognitive flexibility) • discuss scientific ideas to combat HIV virus and prevent human beings from HIV infection (situated learning, cognitive flexibility) • understand the difference between infection and illness

LESSON 8: Malaria - infection and propagation (2x45 min)
Description: Beneath bacteria and viruses **parasites** are a third class of pathogenes. **Malaria** as a specific disease is visualised and the complex stages of **malaria infection** are described step by step. Finally, the students discover the **propagation** of different diseases by an interactive inquiry activity using simulations.

LEARNING OBJECTIVES	Teachers and students are using interactive media and simulations on a medium to higher interactive level. Learners… • collaborate on developing a scientific approach to problem-solving which emphasises understanding and constructive thinking (cognitive flexibility, metal modelling, structure knowledge) • simulate human behaviour on the effect of malaria propagation (cognitive flexibility) • foster communication competences by formulating hypothesis on propagation of infectious diseases (cognitive flexibility)

EDUCATIONAL DESCRIPTION - THEORETICAL FRAMEWORK		
THEORIES OF LEARNING		
What theories of learning underpin this teaching and learning resource?		
Constructivist	✓	The unit of work/learning unit takes into account the learners' prior knowledge and everyday-life naïve concepts about the immune system and the diseases. Knowledge is constructed collaboratively using different micro-modules and learners have to combine their individual results to solve a problem. An important sub-task is to use knowledge maps, for instance, to elaborate a graphical representation of the specific immune response.
Social Constructivist	✓	
Constructionist		
Cognitive	✓	
Design-based learning	✓	
Observational learning	✓	

CORE PEDAGOGICAL METHODOLOGIES		
What methodologies underpin interactivity with the teaching and learning resource?		
Student Talk and Discussion	✓	This science education resource fosters active learning which engages students in the dual aspect of doing and thinking about what they are doing. It promotes a respect for the evidence of scientific inquiry, while the collaborative nature of its activities can also help students to acquire social and co-operative skills. Investigations and problem-solving tasks facilitate the development of higher order thinking skills and nurture the inventive and creative capacities of students. When lessons are presented through an interactive whiteboard, a physical dialogic space is created where small groups of students can engage in collaborative meaning making through talk, discussion and interaction. This specifically in this presented unit of work/ learning unit is fostered by the use of own devices. Differentiated learning is facilitated through a variety of tasks differing in degree of difficulty where the teacher continually scaffolds and releases responsibility to the learner in a gradual manner. Additionally, differentiation is enabled through lessons that facilitate a variety of learning styles – e.g. visual, audio-visual and manipulative.
Active learning	✓	
Inquiry based learning	✓	
Collaborative learning	✓	
Facilitation of Higher Order Thinking Skills	✓	
Facilitation of a Dialogic Space	✓	
Learning to learn (Gradual release of responsibility from teacher to learner)		
Supports differentiated learning	✓	
Other		

TEACHING WITH INTERACTIVE TECHNOLOGY		
What instructional methods will be utilised?		
Presentation	✓	A blend of instructional methodologies bridges a continuum from teaching to active, constructivist learning where teacher-led explanations, illustrations and questioning are utilised to support and scaffold students' learning. Clear goals or learning targets are outlined by the teacher in the form of learning objectives. Multiple modalities in the form of new digital literacies are introduced providing teachers with new opportunities to use interactive linguistic, visual and audio modes to support and enhance teaching. These multiple modes move away from a traditional style of linguistic teaching to facilitate and support a variety of learning styles of students
Demonstration	✓	
Explanation	✓	
Illustration	✓	
Set clear goals	✓	
Multimodal teaching	✓	
Questioning	✓	
Other		

GENERAL INTERACTIVITY WITH MATERIALS		
How will students interact with this resource?		
Visual	✓	This secondary science resource introduces multiple modalities in the form of digital literacies to enable and support learning. Students use interactive linguistic, visual and audio modes to conceptualize and make meaning at different level. These multiple modes move away from a traditional style of linguistic learning to facilitate and support a variety of learning styles of students. Technological advances through functional Magnetic Resonance Imaging (fMRI) scans confirm that visual and text/auditory input are processed in separate channels. Multimodal teaching and learning resources with well-designed combinations of visuals, audio and text thereby present the potential for simultaneous reinforcement of learning.
Verbal	✓	
Social / interpersonal	✓	
Physical (kinaesthetic)		
Multimodal	✓	
Technical		
Facilitation of all Learning Styles		

COGNITIVE INTERACTIVITY WITH MATERIALS			
How will students interact with this resource at a cognitive level?			
- -  + +			
	Watching	✓	Through active, collaborative, socially constructivist participation, students will process information at a cognitive level by thinking and doing. They will develop skills through the aspects of • **Working scientifically** which involves them in active questioning, discussion, observation, prediction, investigation, selection, experimentation, estimation, measurement, analysis, recording and communication • **Designing and Making** - using the knowledge and skills acquired by working scientifically to explore, plan, develop, make, test and evaluate. Different levels of cognitive interactivity are provided by the different levels of (technical) interactivity within the learning objects. Simple browsing activities, higher-order knowledge organisation or predictive, inquiry-based learning with simulations cover all levels of interactivity.
	Reading	✓	
	Browsing	✓	
	Selecting	✓	
	Comparing	✓	
	Communicating	✓	
	Composing	✓	
	Developing		
	Testing	✓	
	Manipulating	✓	
	Collaborating	✓	

TECHNOLOGIES / TOOLS		
Which technologies/tools will utilise this resource?		
IWBs (interactive whiteboards)	✓	Within this unit of work, teachers are supported by the INTACT platform to construct "micro-modules" for the use on a personal computer but also with (their own) mobile devices (smartphones, tablets, etc.)
iPads	✓	
Tablets	✓	
Own devices (i. e. smartphones or tablets)	✓	
Authors	Toni Cramer, Steffen Schaal University of Education Ludwigsburg	
Rights	Creative Commons 3.0 Klett publisher group, Stuttgart/Berlin, provided several resources for the use within the INTACT platform. Users are only allowed to use the modules, not to change, due to third party rights	

2.2. Primary School Science: Magnetism

TOPIC TITLE	MAGNETISM UNIT OF WORK
LANGUAGE	English
GENERAL DESCRIPTION:	
SUBJECT COVERAGE	Primary Science
TARGET AUDIENCE	Primary School
AGE RANGE	6 - 11
CURRICULUM	Primary Science Curriculum, Ireland http://www.ncca.ie/uploadedfiles/Curriculum/Science_Curr.pdf Pages 44, 64, 86

AIMS	• to develop knowledge and understanding of scientific and technological concepts through the exploration of natural and physical aspects of the environment • to develop a scientific approach to problem-solving which emphasises understanding and constructive thinking • to encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities • to foster the child's natural curiosity, so encouraging independent inquiry and creative action • to enable the child to communicate ideas, present work and report findings using a variety of media
NUMBER OF LESSONS	4
DURATION	4 x 45 minutes = 3 hours
REQUIREMENTS	See linked lessons for individual lesson requirements
ASPECTS FOR COLLABORATION	All 4 lessons in this resource provide scope for in-class collaborative learning and the creative tasks at the end of Lessons 1, 3 and 4 provide scope for inter-school collaborative learning both at national and international levels. Collaborative learning aspects should be designed so that students develop the skills of predicting, investigating, collecting, evaluating, analysing, debating, organising, sharing, reporting, etc. In order to prepare for collaborative learning, young children at primary school level may need to be trained initially in the skills of cooperative learning e.g. • teacher trains children in social skills in small groups • teacher structures group activities where each child has a specific role (recorder, reporter, manager, etc.) • teacher observes and guides group discussion and debate, intervening when necessary • students are guided to assess their group performance through a class designed rubric. **Suggestions for collaboration with creative tasks:** <u>In-class collaboration:</u> • Students collaborate in small groups to develop their resource • Students record the development process digitally (digital images/ video /audio) • Students create a digital representation of the process of development and creation of the resource using images or video and adding audio voiceover – e.g. Photostory3, movie, podcast, slide show, PowerPoint, digital flipchart, Web 2 tools e.g. blog, glogster, animoto, voicethread, popplet (For iPad use, a variety of apps are available for digital storytelling). <u>Interschool communication / collaboration options:</u> • Pilot teachers create a blog where each school uploads / shares their resources • Students email their digital stories/videos/slideshows to the collaborating pilot schools • Pilot teachers set up video conference (skype, adobe connect) for students to display and discuss their resources with other pilot class. • Pilot teachers support one another in skills development for web 2 tools, etc, if required.

	• Pilot teachers set up inter school competition for the fastest boat, most creative board game, etc – classes skype, display and discuss. • Pilot teachers set up facebook page where each paired class contributes ideas and posts.

DEVELOPMENT OF SKILLS	**Working Scientifically:**
	• Questioning
	• Observing
	• Predicting
	• Investigating and experimenting
	• Estimating and measuring
	• Analysing
	  • *Sorting and classifying*
	  • *Recognising patterns*
	  • *Interpreting*
	• Recording and communicating
	
	Designing and Making:
	• Exploring
	• Planning
	• Making
	• Evaluating

CONTENT and LEARNING OBJECTIVES:	
LESSON 1: **Examine and classify objects and materials as magnetic and non-magnetic** **Description:** Children actively examine a selection of objects, materials and magnets and predict which objects will be attracted to the magnets. The accompanying interactive resource (digital flipchart - learning object linked to lesson) should act as an accompaniment to a classroom activity where children conduct an active scientific investigation. Equally, the resource can be utilised as a tool for revision or assessment	
LEARNING OBJECTIVES	The child should be enabled to • use magnets of different shapes and sizes in • purposeful play to explore their effects on different materials • examine and classify objects and materials as magnetic and non-magnetic
LESSON 2: **Will magnets attract certain materials through other materials?** **Description:** Children actively investigate if magnets attract certain materials through plastic, glass, water, paper and wood. The accompanying interactive resource (digital flipchart - learning object linked to lesson) should act as an accompaniment to a classroom activity where children conduct an active scientific investigation. Equally, the resource can be utilised as a tool for revision or assessment	
LEARNING OBJECTIVES	The child should be enabled to investigate that magnets attract certain materials through other materials through • plastic • glass • water • wood • paper
LESSON 3: **Unlike poles of a magnet attract, like poles of a magnet repel** **Description:** Children play freely with a selection of magnets, discuss their observations and investigate how magnetic poles attract and repel each other. The accompanying interactive resource (digital flipchart - learning object linked to lesson) should act as an accompaniment to a classroom activity where children conduct an active scientific investigation. Equally, the resource can be utilised as a tool for revision or assessment.	
LEARNING OBJECTIVES	The child should be enabled to • explore how magnets have poles and investigate how these poles attract and repel each other • learn that magnets can push or pull magnetic materials

LESSON 4: Make a magnetic compass **Description:** Children actively create a magnetic compass using a needle, cork, bowl of water and a magnet.	
LEARNING OBJECTIVES	The child should be enabled to • explore the relationship between magnets and compasses • investigate how magnets may be made by stroking a piece of iron or steel with a magnet • make a simple compass

THEORIES OF LEARNING		
What theories of learning underpin this teaching and learning resource?		
	√ or X	
Constructivist	√	The paradigm of cognitive learning uses the metaphor of the mind as computer where the learner is viewed as an information processor and requires active participation in order to learn. Information in processed leading to certain outcomes which result as a direct consequence of thinking. Children will be allowed to construct their own meaning making as a community of practice in a cognitive and socially constructivist manner where the materials with which they will interact become constructionist 'objects to think with'. Theory and practice are bridged through design where children explore, predict, plan, investigate, make and evaluate.
Social Constructivist	√	
Constructionist	√	
Cognitive	√	
Design-based learning	√	
Communities of Practice	√	
Observational learning		

CORE PEDAGOGICAL METHODOLOGIES		
What methodologies underpin interactivity with the teaching and learning resource?		
	√ or X	
Student Talk and Discussion	√	This primary science education resource fosters active learning which engages students in the dual aspect of doing and thinking about what they are doing. It promotes a respect for the evidence of scientific inquiry, while the collaborative nature of its activities can also help children to acquire social and co-operative skills. Investigations and problem-solving tasks facilitate the development of higher order thinking skills and nurture the inventive and creative capacities of children. When lessons are presented through an interactive whiteboard, a physical dialogic space is created where small groups of children can engage in collaborative meaning making through talk, discussion and interaction. Differentiated learning is facilitated through teacher questioning and a variety of tasks differing in degree of difficulty where the teacher continually scaffolds and releases responsibility to the learner in a gradual manner. Additionally, differentiation is enabled through lessons that facilitate a variety of learning styles – e.g. visual, auditory and kinaesthetic.
Active learning	√	
Inquiry based learning	√	
Collaborative learning	√	
Facilitation of Higher Order Thinking Skills	√	
Facilitation of a Dialogic Space	√	
Learning to learn (Gradual release of responsibility from teacher to learner)	√	
Supports differentiated learning	√	
Other		

TEACHING WITH INTERACTIVE TECHNOLOGY		
What instructional methods will be utilised?		
	✓ or X	
Presentation		A blend of instructional methodologies bridges a continuum from teaching to active, constructivist learning where teacher-led explanations, illustrations and questioning are utilised to support and scaffold students' learning. Clear goals or learning targets are outlined by the teacher in the form of learning objectives. Multiple modalities in the form of new digital literacies are introduced providing teachers with new opportunities to use interactive linguistic, visual and audio modes to support and enhance teaching. These multiple modes move away from a traditional style of linguistic teaching to facilitate and support a variety of learning styles of students.
Demonstration		
Explanation	✓	
Illustration	✓	
Set clear goals	✓	
Multimodal teaching	✓	
Questioning	✓	

GENERAL INTERACTIVITY WITH MATERIALS		
How will students interact with this resource?		
	✓ or X	
Visual	✓	This primary science resource introduces multiple modalities in the form of digital literacies to enable and support learning. Students are provided with new opportunities to use interactive linguistic, visual and audio modes to conceptualize and make meaning. These multiple modes move away from a traditional style of linguistic learning to facilitate and support a variety of learning styles of students. Technological advances through functional Magnetic Resonance Imaging (fMRI) scans confirm that visual and text/auditory input are processed in separate channels. Multimodal teaching and learning resources with well-designed combinations of visuals, audio and text thereby present the potential for simultaneous reinforcement of learning.
Verbal	✓	
Social / interpersonal	✓	
Physical (kinaesthetic)	✓	
Multimodal	✓	
Technical	✓	
Facilitation of all Learning Styles	✓	

COGNITIVE INTERACTIVITY WITH MATERIALS			
How will students interact with this resource at a cognitive level?			
		✓ or X	**Elaborate on the impact of the selected interactions?**
--	Watching	✓	Through active, collaborative, socially constructivist participation, children will process information at a cognitive level by thinking and doing. They will develop skills through the aspects of • **Working scientifically** which involves them in active questioning, discussion, observation, prediction, investigation, selection, experimentation, estimation, measurement, analysis, recording and communication • **Designing and Making** - using the knowledge and skills acquired by working scientifically to explore, plan, develop, make, test and evaluate.
	Reading		
	Browsing		
	Selecting	✓	
	Comparing	✓	
	Communicating	✓	
	Composing	✓	
	Developing	✓	
	Testing	✓	
	Manipulating	✓	
++	Collaborating	✓	

TECHNOLOGIES / TOOLS		
Which technologies/tools will utilise this resource?		
	✓ or X	**Elaborate on rationale for selected tools?**
IWBs (interactive whiteboards)	✓	Designed to use as a whole class teaching and learning resource, the main Learning Objects are designed for use on interactive whiteboards although some online Learning Objects (videos, simulations, etc. may be used on Tablets and other mobile devices.
iPads	✓	
Tablets	✓	
Author	Mary Glynn St. Patrick's College Dublin 9	

2.3. Primary School Science – Human Circulatory System

TOPIC TITLE	HUMAN CIRCULATORY SYSTEM
LANGUAGE	English
GENERAL DESCRIPTION:	
SUBJECT COVERAGE	Primary Science
TARGET AUDIENCE	Primary School
AGE RANGE	11-13
CURRICULUM	Primary Science Curriculum. http://www.boe.es/boe/dias/2014/03/01/pdfs/BOE-A-2014-2222.pdf page 20.
AIMS	• to develop knowledge and understanding of scientific and technological concepts through the exploration of natural and physical aspects of the environment • to develop a scientific approach *using problem-solving methodologies* which emphasises understanding and constructive thinking to encourage the child to explore, develop and apply scientific ideas and concepts through designing and making activities • to foster the child's natural curiosity, so encouraging independent inquiry and creative action • to enable the child to communicate ideas, present work and report findings using a variety of media
NUMBER OF LESSONS	5 lessons
DURATION	One lesson is 50 minutes. Some lessons need extra time to develop extended activities that require collaborative work with other classes. Lesson 1: 1 session + 1 session for extended activity. Lesson 2: 1 session Lesson 3: 1 session (need previous data collection extra-curricular) Lesson 4: 1 sessions Lesson 5: 1 session + 1 session for extended activity. Total sessions: 7
REQUIREMENTS	See linked lessons for individual lesson requirements

ASPECTS FOR COLLABORATION	In-class collaboration: throughout all activities of predicting, investigating, recording, discussion, etc. With other classes / nations (Cross Classroom Collaboration): will be specified in the activity. (Usually these are extended activities)

DEVELOPMENT OF SKILLS	**Working Scientifically**
	• Questioning
	• Observing
	• Predicting
	• Investigating and experimenting
	• Estimating and measuring
	• Analysing
	  • *Sorting and classifying*
	  • *Recognising patterns*
	  • *Interpreting*
	• Recording and communicating
	
	Designing and Making
	• Exploring
	• Planning
	• Making
	• Evaluating

CONTENT and LEARNING OBJECTIVES:	
LESSON 1: MY INNER CIRCULATORY SYSTEM **Description:** After experiencing that "blood is moving inside my body" (check my pulse) we use a metaphor as a cognitive bridge between the already known concept of "circulation" (vial circulation) to the new concept of blood circulation. A drag and drop quiz will be used as assessment tool to test if the metaphor has been understood. Circulatory system will be related to other systems (previously studied) by a mental map. Finally, students will prepare a personal metaphor of the Circulatory System. A Circulatory System Metaphor competition will be held in order to promote students' interaction.	
LEARNING OBJECTIVES	The child should be enabled to • Be aware of the existence of an inner circulatory system. • Establish the parallelism between vial and blood circulation, identifying main organs and their functions. • Understand the necessity and function of the circulatory system within the Human Nutrition Process.
LESSON 2: DELIVERING OXIGEN AND NUTRIENTS **Description:** Our heart is introduced as a pump that moves our blood. Comparing our heart with a "truck station" very well organized so that trucks with oxygen don't mix with tracks with carbon dioxide. Children are required to design a proper structure of this station (heart) in order to avoid errors in the delivery of oxygen and nutrients. The two main routes of our blood will be presented (double circulation). We also introduce the necessity of different types of roads (vessels) to arrive everywhere (every organ). Finally we propose an extended activity (cross cultural collaboration), devoted to learn the names of the main vessels in different languages.	
LEARNING OBJECTIVES	The child should be enabled to • Discover the movements of the heart in order to move our blood. • Make hypothesis about the internal structure of the heart to solve the problem of "wrong deliveries". • Memorize the name of the main arteries and veins in our body (if possible in different languages)

LESSON 3: HEART, HEALTH AND EXERCISE **Description:** This lesson is focussed on the practical use of the contents previously learned. Working in groups the students will analyse the relationship between heart and exercise and its consequences in our health. This activity is designed as a whole research. In order to enhance cross class collaboration an exchange of data is proposed. Results will be discussed in big international group.	
LEARNING OBJECTIVES	The child should be enabled to • Collect and organise data. • Identify main variables, and formulate a possible relation between them. (hypothesis) • Analyse data collected in order to test the hypothesis. • Incorporate the conclusions of the research developed to his/her own health habits.
LESSON 4: TAKING CARE OF MY BLOOD **Description:** Each group of students will receive some blood test and are requested to identify the different cells of the blood. As an extended activity they are required to identify the person who has anaemia (a previous definition of this disease will be given). After reading some information about the properties of different aliments they will have to propose a treatment for this disease.	
LEARNING OBJECTIVES	The child should be enabled to • Identify different types of blood cells. • Analyse data in order to recognise the disease (anaemia). • Recognize the relationship between food (nutrients) • Apply the information read about ailments to establish a treatment • Incorporate the knowledge learned about anaemia and its treatment to her/his own health habits.
LESSON 5: RECAPITULATION AND FINAL ASSESSMENT **Description:** Working in groups the students will elaborate a conceptual map integrating all the concepts of the unit. To promote cross class cooperation, the students, working in mixed groups, will have to build an integrated conceptual map. The process will be done in two stages: 1.group conceptual maps; 2. Integrated mental map. Finally, the students will make a quiz (individually). The quiz will include memory questions and questions that require applying the knowledge in the solution of simple problems.	
LEARNING OBJECTIVES	The child should be enabled to • Understand and establish relations between the concepts presented in the unit. • Apply the knowledge acquire in the solution of some simple problems.

THEORIES OF LEARNING		
What theories of learning underpin this teaching and learning resource?		
	√ or X	
Constructivist	√	The paradigm of cognitive learning uses the metaphor of the mind as computer where the learner is viewed as an information processor and requires active participation in order to learn. Information in processed leading to certain outcomes which result as a direct consequence of thinking. Children will be allowed to construct their own meaning making as a community of practice in a cognitive and socially constructivist manner where the materials with which they will interact become constructionist 'objects to think with'. Theory and practice are bridged through design where children observe, explore, predict, plan, investigate, make and evaluate.
Social Constructivist	√	
Constructionist	√	
Cognitive	√	
Design-based learning	√	
Communities of Practice	√	
Observational learning	√	

CORE PEDAGOGICAL METHODOLOGIES		
What methodologies underpin interactivity with the teaching and learning resource?		
	✓ or X	
Student Talk and Discussion	✓	This primary science education resource fosters active learning which engages students in the dual aspect of doing and thinking about what they are doing. It promotes a respect for the evidence of scientific inquiry, while the collaborative nature of its activities can also help children to acquire social and co-operative skills. Investigations and problem-solving tasks facilitate the development of higher order thinking skills and nurture the inventive and creative capacities of children. Differentiated learning is facilitated through teacher questioning and a variety of tasks differing in degree of difficulty where the teacher continually scaffolds and releases responsibility to the learner in a gradual manner. Additionally, differentiation is enabled through lessons that facilitate a variety of learning styles – e.g. visual, auditory and kinaesthetic.
Active learning	✓	
Inquiry based learning	✓	
Collaborative learning	✓	
Facilitation of Higher Order Thinking Skills	✓	
Facilitation of a Dialogic Space	✓	
Learning to learn (Gradual release of responsibility from teacher to learner)	✓	
Supports differentiated learning	✓	

TEACHING WITH INTERACTIVE TECHNOLOGY		
What instructional methods will be utilised?		
	✓ or X	
Presentation		A blend of instructional methodologies bridges a continuum from teaching to active, constructivist learning where teacher-led explanations, illustrations and questioning are utilised to support and scaffold students' learning. Clear goals or learning targets are outlined by the teacher in the form of learning objectives. Multiple modalities in the form of new digital literacies are introduced providing teachers with new opportunities to use interactive linguistic, visual and audio modes to support and enhance teaching. These multiple modes move away from a traditional style of linguistic teaching to facilitate and support a variety of learning styles of students.
Demonstration		
Explanation	✓	
Illustration	✓	
Set clear goals	✓	
Multimodal teaching	✓	
Questioning	✓	

GENERAL INTERACTIVITY WITH MATERIALS		
How will students interact with this resource?		
	✓ or X	
Visual	✓	This primary science resource introduces multiple modalities in the form of digital literacies to enable and support learning. Students are provided with new opportunities to use interactive linguistic, visual and audio modes to conceptualize and make meaning. These multiple modes move away from a traditional style of linguistic learning to facilitate and support a variety of learning styles of students. Technological advances through functional Magnetic Resonance Imaging (fMRI) scans confirm that visual and text/auditory input are processed in separate channels. Multimodal teaching and learning resources with well-designed combinations of visuals, audio and text thereby present the potential for simultaneous reinforcement of learning.
Verbal	✓	
Social / interpersonal	✓	
Physical (kinaesthetic)	✓	
Multimodal	✓	
Technical	✓	
Facilitation of all Learning Styles	✓	

COGNITIVE INTERACTIVITY WITH MATERIALS			
How will students interact with this resource at a cognitive level?			
--  ++		√ or X	**Elaborate on the impact of the selected interactions?**
	Watching	√	Through active, collaborative, socially constructivist participation, children will process information at a cognitive level by thinking and doing. They will develop skills through the aspects of • **Working scientifically** which involves them in active questioning, discussion, observation, prediction, investigation, selection, experimentation, estimation, measurement, analysis, recording and communication. • **Designing and Making** - using the knowledge and skills acquired by working scientifically to explore, plan, develop, make, test and evaluate.
	Reading		
	Browsing		
	Selecting	√	
	Comparing	√	
	Communicating	√	
	Composing	√	
	Developing	√	
	Testing	√	
	Manipulating	√	
	Collaborating	√	

TECHNOLOGIES / TOOLS		
Which technologies/tools will utilise this resource?		
	√ or X	
IWBs (interactive whiteboards)	√	Designed to use as a whole class teaching and learning resource, the main Learning Objects are designed for use on interactive whiteboards although some online Learning Objects (videos, simulations, etc. may be used on Tablets and other mobile devices.
iPads	√	
Tablets	√	
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2.4. Geography – Translational Motion and the Seasons of the Year

UNIT OF WORK TEMPLATE TITLE of UNIT	Climate elements and factors
KEYWORDS	Rotational motion, translational motion, temperature variance, gradient from sunlight, surface incidence
LANGUAGE	English, Portuguese
GENERAL DESCRIPTION:	
SUBJECT COVERAGE	Geography
TARGET AUDIENCE	third cycle of Basic School
AGE RANGE	12-14
CURRICULUM	http://dge.mec.pt/metascurriculares/index.php?s=directorio&pid=20

AIMS	- To describe the daily variance of temperature in different sites of the earth, based on graphs. - To relate the daily variance of temperature to the rotational motion of the earth. - To relate the sun's rays incidence angle to the thickness of atmosphere to trespass as well as to the surface of incidence - To describe the annual temperature variation in places of the northern and Southern hemispheres. - To relate the annual variation of temperature to the translational movement of the earth, emphasizing the June and December solstices as well as the March and September equinoxes. - To understand the relation between the temperature variation and the latitude of a given place.
NUMBER OF LESSONS	3
DURATION	3 x 45 minutes
REQUIREMENTS	Software: ActivInspire
ASPECTS FOR COLLABORATION	There will be plenty of opportunity for pair work, particularly to debate results the students have achieved while simulating or answering to the quizzes. **Creative tasks as follow-up activities at the end of lesson 3** • Students create a digital representation about the variation of the temperature in each of the climate zones: • Each group will be given one of the climate zones (intertropical zone, north temperate zone, south temperate zone, north cold zone and south cold zone). • Each group will prepare a digital representation (photos, graphics…) that characterize the variation of the temperature throughout the year in the area in focus. Students should put images that demonstrate the contrasts of the temperature (ex: snowing in the June solstice, in the temperate south region, when at the same time in the same region of the north hemisphere the highest temperatures are reached; the midnight sun in the June solstice in the cold zone of the north and the complete darkness in the opposite hemisphere; images from Christmas in places as Australia, right at the beginning of the summer in these regions, at the same time the winter that is beginning in Europe). **Collaboration between schools** Pilot-teachers create a blog where each school uploads/shares digital representations produced by students.
DEVELOPMENT OF SKILLS	Usage of different language media as well as to observe and analyse geographic information; Autonomous performance of activities, such as simulations, thus using geographical knowledge; Collaboration with peers, thus allowing the debate on the proposed activities, as a way to understand the geographical phenomenon under study
CONTENT and LEARNING OBJECTIVES: **Temperature variation:** - To understand the daily temperature variation - To understand the annual temperature variation - To understand the variation of the temperature according to the latitude	

LESSON 1: Title: Daily temperature variation **Description:** Students identify elements of the terrestrial sphere in a globe. Students observe how the temperature varies along the day and seek its relation with the rotational motion of the earth.	
LEARNING OBJECTIVES	The student should be able to: - identify the terrestrial axis and reference circles (polar, tropics, equator circles); - describe the direction of the rotational motion; - relate the variation of temperature with the rotational motion of the earth; - to relate the incidence angle of the sunlight to the incidence surface.
LESSON 2: Title: The translational motion, the inclination of the solar radiation and natural day length. **Description:** Students watch a video with the translational motion, the inclination of solar radiation and the duration of a natural day. They try to justify why the season of the year occur.	
LEARNING OBJECTIVES	The students should be able to: - describe the translational motion; - relate the annual temperature variation to the translational motion of the earth, emphasising the equinoxes and solstices; - relate the incidence angle of the sun rays to the surface it incides on; - relate the translational motion to the duration of a natural day; - explain the occurrence of the seasons of the year.
LESSON 3: Title: Temperature variation according to latitude **Description:** Students use two simulators (season simulator and daylight simulator) from where to obtain data which will allow them to understand and explain the relation between the translation movement, the seasons of the year and temperature ranges.	
LEARNING OBJECTIVES	The students should be able to: - associate season of the year with equinoxes and solstices; - relate the variation of the inclination of sunlight to the latitude and season of the year; - relate the duration of a natural day to the latitude and the season of the year; - explain the variation of temperature along a year.

EDUCATIONAL DESCRIPTION - THEORETICAL FRAMEWORK		
THEORIES OF LEARNING		
What theories of learning underpin this teaching and learning resource?		
Constructivist	√	This unit of work takes into account students' previous knowledge. Knowledge is built in a collaborative way, where students have to combine individual conclusions to answer the scaffolding key questions.
Social Constructivist	√	
Constructionist		
Cognitive	√	
Design-based learning		
Communities of Practice		
Observational learning	√	
Other		

CORE PEDAGOGICAL METHODOLOGIES		
What methodologies underpin interactivity with the teaching and learning resource?		
Student Talk and Discussion	√	Promote the active learning, engaging students to act and think in what they're doing. In each group, students are asked to talk, discuss and interact cooperatively. Differentiated learning is done through the tasks presented with different degrees of difficulty and with lessons that comply for diverse learning styles (visual, audio-visual and manipulative).
Active learning	√	
Inquiry based learning		
Collaborative learning	√	
Facilitation of Higher Order Thinking Skills	√	
Facilitation of a Dialogic Space		
Learning to learn (Gradual release of responsibility from teacher to learner)	√	
Supports differentiated learning	√	
Other		

TEACHING WITH INTERACTIVE TECHNOLOGY		
What instructional methods will be utilised?		
Presentation	√	Teacher-led explanations through visual language and scaffolding learning questions. Clear goals or learning targets are outlined by the teacher in the form of learning objectives.
Demonstration		
Explanation	√	
Illustration	√	
Set clear goals	√	
Multimodal teaching	√	
Questioning	√	
Other		

GENERAL INTERACTIVITY WITH MATERIALS		
How will students interact with this resource?		
Visual	√	This geography resource for the 3rd Cycle of Basic Education uses various interaction ways to facilitate the teaching/learning process to students with different learning styles.
Verbal	√	
Social / interpersonal	√	
Physical (kinaesthetic)		
Multimodal	√	
Technical		
Facilitation of all Learning Styles		

COGNITIVE INTERACTIVITY WITH MATERIALS			
How will students interact with this resource at a cognitive level?			
- - + +	Watching	√	Students use different language types as a means to observe and analyse geographical information. Students collaborate in the proposed activities, discussing different viewpoints to understand the area of study in focus. Students learn through research based on simulations.
	Reading	√	
	Browsing		
	Selecting	√	
	Comparing	√	
	Communicating	√	
	Composing	√	
	Developing		
	Testing	√	
	Manipulating	√	
	Collaborating	√	

TECHNOLOGIES / TOOLS		
Which technologies/tools will utilise this resource?		
	√ or X	**Elaborate on rationale for selected tools?**
IWBs (interactive whiteboards)	√	Resources were created to be used in a classroom. The main learning objects were conceived for the interactive whiteboard, even though there are also online learning objects (such as videos and simulations) They can be used in iPads, tablets and other mobile devices.
iPads	√	
Tablets	√	
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2.5. Second Language Learning: Legends and Heroes - King Arthur

TOPIC TITLE	**Legends and Heroes (To be a knight in King Arthur's Court) UNIT OF WORK**
LANGUAGE	English
GENERAL DESCRIPTION:	
SUBJECT COVERAGE	English as a Foreign Language, Civilisation
TARGET AUDIENCE	Primary School (Secondary School)
AGE RANGE	11-12 (A2 CEF level)
CURRICULUM	Bilingual Education Framework, Hungary http://kerettanterv.ofi.hu/

AIMS	• To get to know the key incidents of the history in the target country, get familiar with the principles of democracy, current historical and social processes. • To learn to respect human rights, religious and ethnic pluralism. • To become able to work in groups with cooperative methods, share opinions, respect different points of views, have unbiased discussions. • To improve students' self-efficacy, develop their own learning strategies that make them motivated for life-long learning.
NUMBER OF LESSONS	3
DURATION	3 x 45 minutes
REQUIREMENTS	See linked lessons for individual lesson requirements
ASPECTS FOR COLLABORATION	• In-class collaboration throughout all activities of prediction, investigation, recording of results and discussion. • Scope for collaboration with other classes/nations in Creative Tasks at end of Lesson 1. • Collaborative learning aspects should be designed so that students develop the skills of predicting, investigating, collecting, evaluating, analysing, debating, organising, sharing, reporting, etc. • In order to prepare for collaborative learning, young children at primary school level may need to be trained initially in the skills of cooperative learning e.g. teacher trains children in social skills in small groups • teacher structures group activities where each child has a specific role (recorder, reporter, manager, etc.) • teacher observes and guides group discussion and debate, intervening when necessary • students are guided to assess their group performance through a class designed rubric. **Suggestions for setting up mixed ability random groups for collaborative learning at primary class level:** **Coloured-paper pairing/grouping:** Pass out various pieces of coloured paper. Make sure that you have divided equal numbers of coloured paper and that the colours are dispersed adequately throughout the class. Have all students who have the same colour work as a group. **Count-off:** Students count off into pairs/groups (whatever number you deem necessary) and then must sit in their counted groups to perform the activity. These techniques to put students into pairs/groups can be applied throughout the unit in case of each and every pair/groupwork. **Sample Questions for collaborative talk and discussion:** Pre discussion: Q: What do you already know about life in a king's court? Q: What they ate? Q: What they wore? Q: How they were to behave? Q: How they entertained themselves? After discussion: Q: What have you learned about knights and medieval times? **Suggestions for in-class collaborative talk and discussion** **(1) Think Pair Share:** 1. Assign pairs to work as collaborative talking buddies. 2. Ask an open question or pose a problem to the students.(e.g. Are all materials attracted by magnets?)

3. Give the students a time limit in which they can ponder the answer individually and silently.
4. At the end of the time limit, each child discusses their answer with their talking buddy.
5. Teacher calls on random pairs to share their answers with the whole class.

Think-Pair-Share can be applied when it is indicated in the Lesson Plans.

(2) Placemat

Why use "Placemat"? –The advantages of this cooperative learning method

1. All group members can start working immediately and become actively engaged in the thinking while independent thinking is encouraged.
2. Many students find it safer or easier to enter into a discussion with a smaller group.
3. When students have appropriate "think time", the quality of their responses improves.
4. Students learn how to build on the ideas of others, combine common thoughts, and write them down as a group.

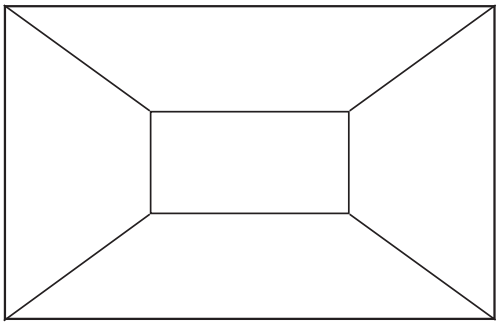
How to use "Placemat" – Steps

1. Form groups of up to four members.
2. Assign a topic.
3. Give each group a piece of chart paper (in A1 format or table size) and each student a pen or pencil.
4. Divide the paper into parts based on the number of members in the group, and leave a central square or circle.
5. Have the students put the chart paper in the middle of their table.
6. Have students write their ideas / results about the assigned topic in their designated spaces on the chart paper – e.g. with different-coloured pens.
7. The group examines their different statements by rotating the "placemat".
8. After sharing and discussing their ideas / results, they come to final group consent and write their common ideas in the centre of the paper.

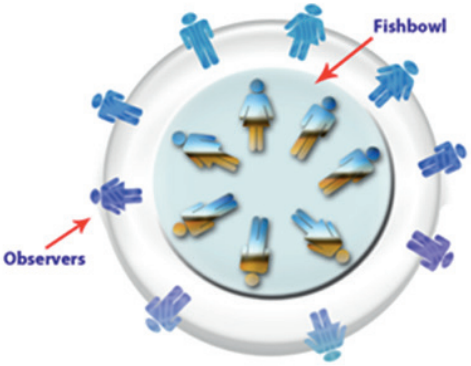
Hints and Management Ideas

- Encourage independent thinking as well as group sharing.
- Monitor the discussions for common confusions that can be addressed later with the whole group.

Placemat for a group of four



Placemat can be applied and used e.g. when comparing present and past forms of lifestyle, legends in different cultures, rules in different schools.

	Fishbowl The teacher places students into heterogeneous groups of four. He/She asks students to make a **fishbowl** in the middle of the room and invites one group after the other to come into it. For each group teacher acts as the discussion leader. (DL) Assigning a different task, teacher invites each group into the fishbowl again. This time one student is assigned to the role of the discussion leader After each group has been in the fishbowl twice, groups work individually with another task (or a piece of text), this time group members taking turns in being the „teacher" in the role of the discussion leader. **Advantages of fishbowl:** for those inside it: In the centre of attention students take procedure seriously. Students outside it can experience several times how RT works and take notes on the procedure. **Teacher modeling with small groups in a fishbowl**  Fishbowl can be used e.g. in tasks on comparing rules, legends, cultures. Collaborative Learning Roles for Investigation Prepare badges for collaborative learning group roles e.g. manager, time-keeper, recorder, questioner, reporter, collector, explainer, motivator, etc. When relevant, assign roles within the group according to students' skills and strengths Students wear badges to illustrate their roles within the group while completing tasks.
DEVELOPMENT OF SKILLS	**Social skills:** Communicative, critical thinking, collaborative skills are developed
CONTENT and LEARNING OBJECTIVES: • to broaden knowledge on culture and history of medieval times; to improve critical thinking (making comparisons between historical periods and cultures) • to enable the child to communicate ideas, present work and report findings using a variety of media	
LESSON 1: Living in a king's court **Description:** Children's vocabulary will be improved through a variety of activities that are suited to meet all different learning styles. They will be familiarised with pieces of clothes, furniture in medieval times, and see a photo, watch a film to evoke images in their minds	
LEARNING OBJECTIVES	The child should be enabled • to examine and compare objects in the present and past • to furnish rooms and dress up figure according to the age when they lived

LESSON 2: The moral code of knights vs. the moral code of students' school **Description:** Learners will provide examples related to the moral codes of the knights. They compare these moral codes with the moral codes that are in force within the students' school. Learners activate their previous knowledge about life in medieval times (clothes, food, behaviour, entertainment etc.) by creating unique characters. Learners practise the imperative form of the verb. Learners have to imagine that they organize a party in Sir Arthur's castle. They design a suitable invitation to this party.	
LEARNING OBJECTIVES	The child should be enabled to • to write an invitation on a certain topic • to broaden knowledge on culture and history of medieval times • to use appropriately past tense forms and imperative forms of verbs • write their school code; this way their self-esteem and identity can be supported
LESSON 3: A king or a legend in our land **Description:** Students actively investigate by using the internet, their tablets about a king or a legend in their country. They make a presentation (ppt or other format) on the topic. Equally, the resource can be utilised as a tool for revision or assessment.	
LEARNING OBJECTIVES	The child should be enabled to • examine and compare different cultures, narratives • find and assess similarities and differences between cultures • strengthen their national identity.

THEORIES OF LEARNING		
What theories of learning underpin this teaching and learning resource?		
	✓ or X	
Constructivist	✓	The paradigm of cognitive learning uses the metaphor of the mind as computer where the learner is viewed as an information processor and requires active participation in order to learn. Information in processed leading to certain outcomes which result as a direct consequence of thinking. Children will be allowed to construct their own meaning making as a community of practice in a cognitive and socially constructivist manner where the materials with which they will interact become constructionist 'objects to think with'. Theory and practice are bridged through design where children explore, predict, plan, investigate, make and evaluate.
Social Constructivist	✓	
Constructionist	✓	
Cognitive	✓	
Design-based learning	✓	
Communities of Practice	✓	
Observational learning		
Other		

CORE PEDAGOGICAL METHODOLOGIES		
What methodologies underpin interactivity with the teaching and learning resource?		
	✓ or X	
Student Talk and Discussion	✓	This primary education resource encourages students to discuss differences and similarities in different subtopics. They have to compare and analyse aspects in different cultures in different chronological and geographical settings. They are expected to discuss certain aspects with their peers, and by giving a presentation on a topic, they practise student talk as students have to do a mini-research in these lessons. The teacher mainly scaffolds the students work and supports them in acting according to the instructions. This resource is designed to meet the needs of visual, acoustic and kinaesthetic learning styles.
Active learning	✓	
Inquiry based learning	✓	
Collaborative learning	✓	
Facilitation of Higher Order Thinking Skills	✓	
Facilitation of a Dialogic Space	✓	
Learning to learn (Gradual release of responsibility from teacher to learner)	✓	
Supports differentiated learning	✓	

TEACHING WITH INTERACTIVE TECHNOLOGY		
What instructional methods will be utilised?		
	✓ or X	
Presentation		Pictures, film extracts are to demonstrate meaning. Multiple modalities in the form of new digital literacies are introduced providing teachers with new opportunities to use interactive linguistic, visual and audio modes to support and enhance teaching.
Demonstration		
Explanation	✓	
Illustration	✓	
Set clear goals	✓	
Multimodal teaching	✓	
Questioning	✓	

GENERAL INTERACTIVITY WITH MATERIALS		
How will students interact with this resource?		
	✓ or X	
Visual	✓	This second language or civilisation resource introduces multiple modalities in the form of digital literacies to enable and support learning. Students are provided with new opportunities to use interactive linguistic, visual and audio modes to conceptualize and make meaning. Visual interactivity: students will watch a movie extract, see pictures or photos. Verbal: they will communicate in the target language. Social/interpersonal: they will interact with their peers or teacher throughout the whole lesson. Students are engaged in role-play activities. They discuss the topic together with their mates, help each other, and also work alone. Multimodal: they will listen to some medieval music. Technical: students should use their tablets extensively. Facilitation of all Learning Styles: students are engaged in watching film extracts, looking at pictures, reading texts, and acting out stories.
Verbal	✓	
Social / interpersonal	✓	
Physical (kinaesthetic)	✓	
Multimodal	✓	
Technical	✓	
Facilitation of all Learning Styles	✓	

COGNITIVE INTERACTIVITY WITH MATERIALS			
How will students interact with this resource at a cognitive level?			
--  ++		√ or X	**Elaborate on the impact of the selected interactions?**
	Watching	√	Through active, collaborative, socially constructivist participation, children will process and share information at a cognitive level by communicating. They will develop skills through the aspects of • **Watching**: students will watch an extract from a film • **Reading**: they read a passage/an extract from literary resources. • **Comparing:** they will compare similarities and differences between their and their peers' assignments, and do the same with their teacher's. They will also compare life in the past and in the present. • **Communicating:** they will communicate in different work forms and situations throughout the lesson. • **Composing:** they will write short passages about certain school rules. • **Collaboration:** they collaborate with their peers to reach the goals of the lesson.
	Reading		
	Browsing		
	Selecting	√	
	Comparing	√	
	Communicating	√	
	Composing	√	
	Developing	√	
	Testing	√	
	Manipulating	√	
	Collaborating	√	

TECHNOLOGIES / TOOLS		
Which technologies/tools will utilise this resource?		
	√ or X	**Elaborate on rationale for selected tools?**
IWBs (interactive whiteboards)	√	Designed to use as a whole class teaching and learning resource, the main Learning Objects are designed for use on interactive whiteboards although some online Learning Objects (videos, simulations, etc. may be used on Tablets and other mobile devices.
iPads	√	
Tablets	√	
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2.6. Second Language Learning: Mozart as a child and his travels

TOPIC TITLE	UNIT OF WORK: Mozart as a child and his travels
LANGUAGE	Target Language: German Work language: English
GENERAL DESCRIPTION:	
SUBJECT COVERAGE	Second language learning
TARGET AUDIENCE	Primary School
AGE RANGE	6 - 11

AIMS	• offers modern, exciting learning objects and activities; • to develop cultural knowledge and language competences • to give an overview of the life of Mozart, his childhood and music; • to acquire new information based on reading and listening • to enable the child to communicate ideas, present work and report findings using a variety of media.
NUMBER OF LESSONS	2
DURATION	2 x 45 minutes = 90 minutes
REQUIREMENTS	See linked lessons for individual lesson requirements.
ASPECTS FOR COLLABORATION	1. Collaboration between individual students. The individual students work together and get common results. 2. Collaboration in groups. Lesson 1 offers more possibilities for group collaboration: • With the text (L04) the learners have to draw the different routes of Mozart's travels. The teacher prints first one of the maps. When each team has drawn his own route, they come to IWB and present their results. The teacher can participate only as a learning consultant. He/she is available for questions and advice for the students if they need it for their group work. 3. International communication: After watching the film about Salzburg students can work as an international group with padlet. Information can be uploaded and internationally compared and evaluated. Teachers can upload a quiz for work internationally.
CONTENT and LEARNING OBJECTIVES:	
LESSON 1: Mozart as a child and his travels / Lesson 1 **Description:** Children have to understand cultural information about Austria and work with them. The resource can be used for transmitting new information and interactive working forms. In the resource children use different kind of media: film, music, digital flipchart and make interactive text production.	
LEARNING OBJECTIVES	The child should be enabled to • understand the information of the film and work with their words; • discover music; • understand a nonfictional text about Mozart's travels; • answer questions to the topic; • draw the different routes of Mozart's travels.
LESSON 2: Mozart as a child and his travels /Lesson 2 **Description:** Learners will have to listen and understand an audio-text about the travels of Mozart during his childhood and early teens. They have to solve some exercises based on this text and the text from previous lesson about Mozart's prodigy child life and travels through Europe. Teacher scaffolding through activities is essential for the development of skills.	
LEARNING OBJECTIVES	The child should be enabled to • present the results of the internet research (homework) • activate previous knowledge • understand a heard text • recognize words

THEORIES OF LEARNING		
What theories of learning underpin this teaching and learning resource?		
	✓ or X	
Constructivist	✓	Children learn information about culture and work with them. Teachers use the theory of cognitive learning and the theory of developing competences.
Social Constructivist	✓	
Constructionist	✓	
Cognitive	✓	
Design-based learning	✓	
Communities of Practice	✓	

CORE PEDAGOGICAL METHODOLOGIES		
What methodologies underpin interactivity with the teaching and learning resource?		
	✓ or X	
Student Talk and Discussion	✓	Learners have to discuss routes, use specific vocabulary. Learners have to recognise, discuss and elaborate spoken texts. Learners have to do mini-research as homework and present it. Students have interpersonal contact during the work. They have to answer together to the different tasks. Cede of responsibility of learning from teacher to the learner. The teacher mainly supports the learner's work and supports them in acting according to the instructions.
Active learning	✓	
Inquiry based learning	✓	
Collaborative learning	✓	
Facilitation of Higher Order Thinking Skills	✓	
Facilitation of a Dialogic Space	✓	
Learning to learn (Gradual release of responsibility from teacher to learner)	✓	
Supports differentiated learning	✓	

TEACHING WITH INTERACTIVE TECHNOLOGY		
What instructional methods will be utilised?		
	✓ or X	
Presentation		Development of language skills in German as a foreign language: hearing, reading, speaking, writing. Pictures, film extracts are to support the input. Pictures, film extracts. Multiple modalities in the form of new digital literacies are introduced providing teachers with new opportunities to use interactive linguistic, visual and audio modes to support and enhance teaching. These multiple modes move away from a traditional style of linguistic teaching to facilitate and support a variety of learning styles of students.
Demonstration		
Explanation	✓	
Illustration	✓	
Set clear goals	✓	
Multimodal teaching	✓	
Questioning	✓	

GENERAL INTERACTIVITY WITH MATERIALS		
How will students interact with this resource?		
	✓ or X	
Visual	✓	This primary science resource introduces multiple modalities in the form of digital literacies to enable and support learning. Students are provided with new opportunities to use interactive linguistic, visual and audio modes to conceptualize and make meaning. Learners watch a movie extract, listen to music, see pictures or photographs and work interactive with them. They will communicate and solve tasks in the target language interactive. They will interact with their classmates or teacher throughout the whole lesson. They use the IWB, tablet, iPad / smart phone during most of activities. Learners are engaged in watching films, looking at pictures, reading texts, solving tasks. They discuss the topic together with their classmates, help each other, and also work alone. The accent is set on learning to learn too. These multiple modes move away from a traditional style of linguistic learning to facilitate and support a variety of learning styles of students. Technological advances through functional Magnetic Resonance Imaging (fMRI) scans confirm that visual and text/auditory input are processed in separate channels. Multimodal teaching and learning resources with well-designed combinations of visuals, audio and text thereby present the potential for simultaneous reinforcement of learning.
Verbal	✓	
Social / interpersonal	✓	
Physical (kinaesthetic)	✓	
Multimodal	✓	
Technical	✓	
Facilitation of all Learning Styles	✓	

COGNITIVE INTERACTIVITY WITH MATERIALS			
How will students interact with this resource at a cognitive level?			
--		✓ or X	
	Watching	✓	Students will watch a short film. They will read short texts and tasks. They will compare the life of Mozart as a child with their own life. They will select pictures about Salzburg and Mozart's life from the internet. They will use different forms of communication. Differentiated testing. Students will work with each other and the teacher.
	Reading		
	Browsing		
	Selecting	✓	
	Comparing	✓	
	Communicating	✓	
	Composing	✓	
	Developing	✓	
	Testing	✓	
	Manipulating	✓	
++	Collaborating	✓	

TECHNOLOGIES / TOOLS		
Which technologies/tools will utilise this resource?		
	✓ or X	
IWBs (interactive whiteboards)	✓	Teacher and students use IWB, Tablets and iPads during several parts of the lessons for films and different tasks with pictures, texts, exercises, etc.
iPads	✓	
Tablets	✓	
Authors	Sarolta Lipóczi Kecskemét College /Hungary Based on earlier collaboration on this topic with: Ioana Velika University Cluj-Napoca	

3. Results

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Contributors José Exposto, Vitor Gonçalves

3.1. Overview of the INTACT platform

Introduction

The internet offers a fast variety of internet platforms providing teaching materials for schools and universities. Up to now most of these online platforms are focused on the use in a normal classroom setting, rather than to be used for synchronous, collaborative work at different locations on a shared task. These platforms as well as content like MOOCs (Massive Open Online Courses) or OER (Open Educational Resources) deliver teaching materials asynchronously and lack "live experience" during a lesson. The Europe 2020 strategy demand for an education and training system in Europe that allocate an adequate mixture of skills and competences, advocates the progress of transversal competences, teaches how to use digital technologies and fosters social and civic competences as well as cultural awareness and expression by communicating especially cooperating with other students from other countries. With the INTACT platform teachers and students have the possibility to improve their knowledge in these areas. Teachers can create their own materials within the INTACT platform especially high-quality CLIL-teaching materials and ask other teachers from their own country or also across frontiers for collaboration. The technological requirements in European schools are widespread and diverse. Therefore a central aim for the development of the INTACT-platform was to enable a simultaneous access for computer-supported collaborative learning directly in the classrooms and to provide a platform that facilitates learning beyond cultural boarders.

Methods

In order to enable two schools in different locations to work simultaneously on one set of materials, the technical implementation of an online platform was absolutely necessary. Therefore the INTACT platform was developed during the project. At first the requirements were identified and use cases evolved. In a second step the platform was implemented from an external company. The project partners elaborated the requirements for the platform with all the partners including the teachers and developed a concept with the basic and central ideas for the INTACT platform.

In the beginning of the project a brainstorming session took place in order to collect ideas and visions. The INTACT online platform should focus on interactivity, bilingual education, social learning, collaborative learning, independency from a specific technology and open source. This first vision was specified to more than 50 different functional requirements which were collected in a wiki. To include teachers' needs and specific interests as well in such a platform a questionnaire was additionally created based on the described requirements. Within this questionnaire the partners were also able to divide the functional requirements in "must-have" and "nice-to-have" criteria.

A comprehensive concept including the description of the main idea of the INTACT online platform as well as all functional requirements, use cases and mockups was provided for the companies to propose their technical implementation to the INTACT project. Generally the INTACT online platform integrates different types of systems. (1) The INTACT online platform is a repository of learning objects. Thus this component contains a database to store content that has been created or imported into the system (characteristics of an Learning Management System (LMS) as well as accessing and managing permissions concerning content and users (characteristics of a Content Management System (CMS)). (2) The INTACT online platformis a system for creating content. This component allows users to create, combine, modify, reuse, and share content or to aggregate them in already existing learning contexts or absolutely new ones. (3) The INTACT online platform is a platform for cooperation and collaboration. This component enables synchronous and asynchronous collaboration and cooperation with other teachers and students.

This combination is one-of-a-kind and existing learning management systems do not provide these features by default. Therefore an existing system had to be extended and modified by a company in order to fulfill the requirements. The INTACT online platform is based on the free open-source content management system (CMS), Drupal (https://www.drupal.org/) and an extension of Drupal called Opigno LMS. Drupal is highly configurable, extensible and flexible for adding new features and customizing the layout. It has a core advanced authentication and authorization system and a complete node (content) management with custom content type and dynamic field definition. Furthermore, all core features may be

improved using a module system. Opigno LMS allows to manage training paths organized in courses and lesson, to facilitate interactions due to meetings, forums and chats, and to manage roles, courses and questions. In order to enable real time collaboration and cooperation the web conferencing tool BigBlueButton (http://bigbluebutton.org/) was integrated in the INTACT online platform. BigBlueButton has an unlimited number of sessions, and it is recommended for up to 50 users in one session. BigBlueButton has audio, video and chat conferencing integrated. It supports whiteboard and PDF and Microsoft Office file sharing with pan and zoom. Finally there is an option to also share the desktop.

As soon as the implementation of the INTACT online platform was finished, an evaluation took place through training sessions for the participating pilot teachers and the creators of the INTACT teaching materials. Based on this, the feedback amendments on the INTACT online platform were made and implemented.

Results

The INTACT online platform offers a convenient access to the creation of content which includes questions and static content with a WYSIWYG[1] editor with the possibility to embed and attach external content. Collaboration was achieved with multiple synchronous and asynchronous tools, like chats, messages and real time video and audio conferencing. Further collaboration is reached by integrating video conferencing in the lessons. Teachers may also collaborate in common learning units by using subscription and the authorization system. Figure 1 shows the main page before login.

***Figure 1**: The main page of the INTACT online platform*

[1] WYSIWYG is the acronym for What You See Is What You Get.

One of the main functionalities of the INTACT online platform is to provide the possibility for teachers to create, describe, store, manage and search for content. Thus the INTACT project consortium defined their own definition of learning units (LU), lessons and learning objects (LO). Within the platform the units, lessons and learning object have a multifaceted possibility to be described with metadata. The metadata is passed on to the next element, e.g. if a unit has the metadata of the subject/coverage to be Primary Science and Environmental Education, the lesson would have the same metadata. In case the lesson has a different subject/coverage this metadata can be overwritten.

Learning Units (LU) are similar to a course in a conventional learning management system e. g. Moodle. Lessons combine several learning objects and communication/collaboration tools in order to create a structure and sequence that contributes to achieving the learning objectives of this particular lesson and can be compared with a section within a course in a conventional Learning Management System. A Learning Object (LO) is any digital entity that may be used or re-used for learning, education or training. A small Learning Object can be an image, a text, a video, a sound, an animation, a simulation, a Java applet (e.g. calculator) or any combination of those media (text, image and animation can form a larger Learning Object) with a clear educational purpose. At the creation of a new content teachers can decide whether the Learning Unit (LU) should be public or private.

Another main idea of the INTACT project is to facilitate teachers to get in touch with other teachers and to enhance them to collaborate with other teachers. Therefore they can ask for collaboration in Learning Units that are released for this feature. All Learning Units that are available for teacher-teacher collaboration can be found in the section "Learning Units for Collaboration". Moreover the INTACT platform has a complex search system that helps teachers find teaching materials made by other teachers. The search is able to filter almost any information of the metadata. Finally the INTACT platform can be used by anyone free of charge because all the components (Drupal, Opigno, BigBlueButton) are open-source. Teachers can request for a teacher role in order to create their own content.

A huge benefit of the INTACT platform is the ability to integrate content from external platforms. Mainly external content is embedded in the learning objects with an iframe. Thus teachers can embed Youtube videos or also small interactive tasks from other web applications like LearningApps.org. In addition the INTACT platform provides the possibility to present on one screen a synchronous communication tool and an interactive task where schools from different countries can interact and communicate together.

By creating a new Learning Object content it is possible to place the virtual classroom tool BigBlueButton on one side of the screen and any iframe content on the other side of the screen. Figure 2 shows an example. On the left side there is a BigBlueButton session with the teacher May (Germany) and the teacher Kalk-

brenner (Hungary). On the right side a multi-player quiz from LearningApps.org was inserted. The structure of the quiz is like Jeopardy and the schools can answer the questions alternating respectively the school team which gave the right answer can choose the next question. The school team with the right answer will get the points shown on the figure (100, 200, 300, and so on). This quiz is about football and the first sector is World Cup, the second Champions league and the last German national football. Currently the German team has 100 points and the Hungarian team 300 points. Question one (100) and three (300) were already answered and therefore these question are shown in gray.

The two teams in Hungary and Germany have the possibility to discuss the questions using BigBlueButton which is shown on the left side of the screen. The teams can for instance give some hints for solving the questions and get in touch playing the game together. In Hungary German is often taught as second language. In this example the pupils could talk in German so the Hungarian pupils have the possibility to practice their language skills with a native speaker. It is also possible that both classes use English for the collaboration in order to improve their knowledge in English. Of course the two classes would not immediately start with this interactive task, but first get to know each other by informing where both schools are located, how the weather in the particular country is etc. Thus the pupils can chat in an informal way and develop language skills in a real life situation.

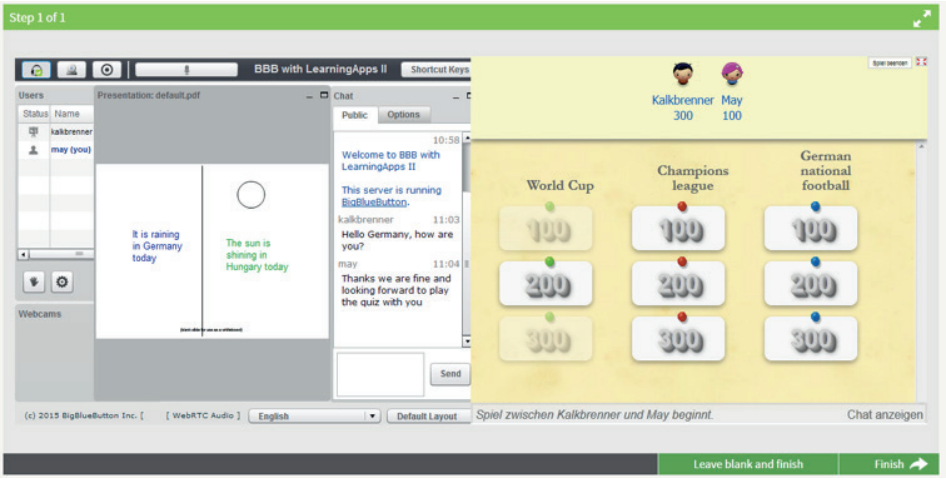

Figure 2: Example with the combination of BigBlueButton and a multiplayer quiz on the same screen

3.2. Good practices

This third and last chapter of the book on "best practices" was conceived as a tool at the disposal of the prospective applicants to any European line of funding. Its goal is to offer them an idea of what it means to work in a truly multicultural

environment (in the project whose results we are disseminating in this book were involved no less than six nations: Germany, Hungary, Ireland, Portugal, Romania and Spain) in a common European context but under the auspices of radically different national systems of education and different national legislations.

Despite of the fact that the INTACT project has been carried out by European countries, the development of teaching materials showed that there are still differences concerning teaching and learning culture. Furthermore the curricula in the involved countries differ concerning the content and the timeframe when this content is taught. Also the concepts of the pedagogy vary in each country so especially in the beginning of the project the partners needed more time than expected to discuss these cultural differences.

Most of the challenges in the INTACT project were due to intercultural differences but this was also one of the most interesting and inspiring parts of the project. In a crucial moment of the project an external expert beside the core project members was invited to the project meeting in Cluj. The external expert was one of the German lecturers who initially developed teaching materials. He moderated the discussions in Cluj and a lot of open issues could be solved during that meeting. For all project members it was very productive.

Intercultural differences are on the one hand certainly a shortcoming all projects on a European level face. On the other hand, the intercultural differences are also an enrichment that helps all project partners to widen their horizons and profit from the expertise of one another.

One of the most important aspects to retain is the democratic outlook of teams and staff. It is important that all partners make a contribution to a common idea. Therefore, the members of the different nations always discussed the proposal together, always bearing in mind national characteristics and different education systems, ensuring that the common theme got applied to all nations.

In the INTACT project the national characteristics are represented, since all national teams had the chance to propose which topic they would develop. Some of the partners, namely the Hungarian, the Portuguese and Romanian participants of the project are foreign language teachers, too, and, through them the use of digital teaching materials in foreign and second language education had achievements. This proved to be a very good area, because it is part of the national educational development concept as well. The approach of the teaching materials developed from the INTACT project member can be adopted to any language being possible to apply these resources in a multicultural environment. The materials developed meet the requirements of different educational systems. This aspect is accomplished in this project as well. Portugal's testimonial highlights and proves this to have been well achieved:

> The diversity of curricula across the different nations as well as the ICT based solutions found were topics very dear to us. From the start

> we thought that creating resources for IWB was just more of the same. That is the reason why the html 5 solution was so good for us and we looked at it as being really innovative in the Portuguese teaching/learning context. Another great challenge for us was the use of bilingual resources based on a Content and Language Integrated Learning approach (CLIL). Bilingualism is used in Portugal in very specific schools (private and connected to specific nationalities), and INTACT made this approach more 'democratic'. This meant that teachers experimented the resources both in English and Portuguese and the results were similar. In fact, students were very interested in learning how to say things in English.

The initial meeting took place in Germany. Partners met everyone and were shortly divided into working groups. From then on, they were able to immerse themselves into precise aspects of the project, working collaboratively in a specific role within our groups and working in parallel with the other groups; merging when appropriate. Communication was accomplished through a Moodle forum and participants met regularly though live Adobe Connect meetings.

Overall, INTACT has offered to each team member participating in this project the opportunity to develop, to a certain degree, one's intercultural communicative competence as, nowadays, communicating in a globalized world entails interacting with a diversity of languages and cultures. Therefore, all the teams have understood that effective communication across cultures and making oneself understood in a foreign language represent targets that need to be accomplished. Moreover, participants became aware of the fact that the content of the message and the sociolinguistic context are of paramount importance when communicating in a foreign language.

In this context, some communication characteristics, highlighted by the Romanian team, that have been established with team members are presented below:

- use a formal speaking style, irrespective of the situation;
- use dictionaries in order to be able to write our messages in a correct manner;
- understand and accept errors in communication;
- try to communicate in English as clear and concise as possible;
- understand that language and culture are interrelated;
- understand that culture can have an impact on communication (especially when agreeing on establishing the date and time for some meetings or meeting/missing the deadline of some tasks)
- demonstrate respect, flexibility, interest and curiosity when talking to various participants from different countries;
- pay attention to how different participants value for example time, personal space or make use of their non-verbal language when interacting.

As the project nears completion the partners believe it has been a worthwhile adventure. They learned a lot from each other and have become closer as a team through their discussions, travels and commitment to the project, as the Irish account so well exemplifies:

> It has been a meaningful learning experience to be immersed into different European cultures and educational philosophies. We have had the opportunity to really engage with and discover people, places and institutions, which would otherwise not have been possible. It has been fascinating to get an insight into different university structures, approaches to hosting and management of a project of this nature. We have learned to communicate, share and collaborate with everyone involved through these processes. There have been highs and lows and everything in-between, as you would expect in a project of this magnitude. Life-long friendships and working partnerships have been formed. It has been very fulfilling to watch a conceptual seed grow to fruition, to see the project come together as it is now; a platform that can be used by people all over the world to communicate and collaborate in real-time to further educational and cultural experiences.

To conclude, in the end the INTACT project has been very fruitful and the best way to strengthen people's own intercultural competence is to get in touch with other colleagues and get to know their daily work life as well as to share experiences across cultural boarders.

Project members:

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Disclaimer: This project has been funded with support from the European Commission. This communication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.