

DEVELOPMENT, EVALUATION AND IMPLEMENTATION OF DIGITAL RESOURCES AND AN ONLINE PLATFORM (INTACT PROJECT) IN BILINGUAL EDUCATION



ILDIKÓ SZABÓ

Kecskemét College Teacher Training Faculty, Kaszap u. 6 - 14, 6000 Kecskemét,
Hungary.

E-mail address: balazsne.ildiko@tfk.kefo.hu

SAROLTA LIPÓCZI

Kecskemét College Teacher Training Faculty, Kaszap u. 6 - 14, 6000 Kecskemét,
Hungary.

E-mail address: lipoczi.sarolta@tfk.kefo.hu

ABSTRACT

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 in the 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. The 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.

Key words: interactive teaching and learning resources, online learning platform, bilingual education, INTACT.

INTRODUCTION

The INTACT project (Interactive Teaching materials Across Culture and Technology) was a multilateral Comenius project under the Lifelong Learning program of the European Commission which addressed schools' need to engage with current technological developments in student teaching and learning. The project, which ran from December 2012 to November 2015, aimed to develop adequate teaching and learning materials in the subject areas of mathematics, geography,

technology, natural and social sciences, environmental education and second language learning. These materials can be used on a variety of platforms such as whiteboards, tablets, smartphones and other mobile devices in order to promote a culture of interactive, collaborative learning among students.

Interactive materials within the above listed educational areas were developed by experts from six European partner nations - Germany, Hungary, Ireland, Portugal, Romania and Spain and were tested in pilot schools by classroom teachers. In order to facilitate the implementation of the materials in classrooms, they have been developed in accordance with the national curricula of all the partner countries. In recent years, Web 2.0 tools have afforded teachers the opportunity to create, interact and collaborate both locally and across cultures in a virtual community. This has contributed to the increase of online information and virtual learning spaces. INTACT aims to connect schools from all over Europe in real time via an online platform, which supports students in 21st century European education.

THE GOALS OF INTACT PROJECT

INTACT developed cooperative and collaborative teaching and learning resources that can be applied for content-integrated-language-learning (CLIL) instruction and, through the use of an online platform, are made available over cultural borders.

The project addressed the secondary schools' need for reliable interactive resources, to be used in science, mathematics and social science classrooms in CLIL educational settings. Environmental issues and intercultural questions were also focal points for the development of the interactive resources.

The two central targets were cooperative and collaborative course materials that could be applied to CLIL instruction and, the development and implementation of an online platform as repository and facilitator for the use of these interactive resources.

Collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. 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 through active engagement among students, either face-to-face or online.

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, 2008).

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 (Szabó, 2012). 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 CLIL (Content and Language Integrated Learning) has become the most common type of bilingual education (Kovács, Trentinné Benkő, 2014). 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. 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, tolerance (Van de Craen, 2011).

THE PROJECT APPROACH

Currently, there is only a limited number of contemporary interactive teaching and learning resources available that allow cross platform, synchronous, collaborative work from different locations on a shared task. Against this background INTACT has developed an online platform with a bank of interactive teaching and learning materials for science, mathematics, social science and language curricula for bilingual educational settings.

To support an open architecture that will be available into future years, the materials are implemented in HTML5 standard. The enabling of web access can thereby expand the adoption of the materials to a wide range of platforms and devices (whiteboards, tablets and other mobile devices) and additionally meet the requirements of diverse technical infrastructures and systems.

INTACT project is fitting into the list of EU key competences very well. One of the traditional key competences is communication in foreign language which is a focal point in our project. The target groups of the teaching and learning resources developed by the project are teachers and students of bilingual education throughout Europe. The wide variety of the resources represents several subject areas the language of which is a second language for the students. Using these resources in classrooms that are in different parts of Europe and working together using a foreign language improve the skills of students in the foreign language. Digital skills of teachers and students are improved by the interactivity of the learning resources and the online platform both of which serve collaborative work between schools, students. Besides these skills, cultural awareness was raised in the project. Both teachers and students could learn about different educational settings, ways of thinking, approaches by working together either with the interactive resources or on the online platform. The two resources on Mozart and King Arthur were especially targeted at cultural, historical aspects and required students to compare their own culture with the ones represented in the resources. In this way they improved students' critical thinking skills, as well.

The interactive resources and the online platform created by the project improve the digital skills of their users. Enhancing digital literacy by creating interactive, computerised learning resources accessible to as many as possible is a requirement met by INTACT project.

The value of INTACT project is the integration of all these key competences: the foreign language and the technology are the main tools to facilitate the learning of the subject content.

Throughout our project there was a great emphasis on democratic decision making policy. Each partner could have their say in choosing the subjects and topics of the resources; topics of workshops and online meetings. The forum of the platform supported this vision of working together in an ideal way as any partner could raise new ideas or reflect on others' thoughts freely. Each partner country had the opportunity to join those groups and work in those work packages they volunteered based on their expertise. This mutual trust between the project coordinator and the partners created a supportive background for the project in which a fair and balanced share of work was experienced by all the project members.

To facilitate communication and documentation of the project, the learning management system Moodle was used

- as a repository for all project documents
- for communication within and between groups via a Newsforum
- for dissemination of information to project partners and pilot teachers
- to document and organise work operations

Virtual group meetings took place regularly within Adobe Connect of the German Research Network (DFN)¹. These online meetings were recorded and both minutes and recordings were provided in Moodle. In addition, regular meetings of all national teams dealt with internal tasks to be completed.

CONCEPTUAL DESIGN OF THE TEACHING AND LEARNING MATERIALS

The project involved six partner nations: University of Education Ludwigsburg (Germany), Universidad Complutense Madrid (Spain), Kecskemét College (Hungary), St. Patrick's College, Dublin (Ireland), Polytechnic Institute of Bragança (Portugal) and Babes-Bolyai University Cluj (Romania).

INTACT operated a collaborative approach where paired project partner nations were assigned responsibility for a specific aspect of the project according to the skills and expertise of the involved persons and of their institutions. A communication and collaboration plan was developed by the project coordinators to visualize and facilitate this approach.

The project was divided into four main working groups. Each group was allocated responsibility for a main theme of the project, (sub-divided into work packages) and the group was then managed cooperatively by two paired partner nations. All groups were interlinked and worked collaboratively with one another under the direction of the Steering Group.

Group 2 was responsible for the following outputs:

- Work Package 5: Conceptual design of the teaching materials for each subject.
- Work Package 7: Implementation of the teaching materials.
- Work Package 9: Testing and evaluating of the teaching materials.

All aspects of conceptualisation, design, implementation and evaluation of teaching materials were assigned to Group 2. This correlated with three distinct work phases of the project – design, implementation and evaluation of materials.

The first step for the development of the INTACT teaching and learning resources and for the online platform was an intensive discussion to find a common understanding of

- (i) the educational setting for the introduction of the INTACT approach
- (ii) the theoretical, evidence-based framework for the development of interactive and collaborative learning/teaching resources.

A result of this first work package was a short-paper as review of the theoretical background and a template for the theory-based development of the diverse INTACT resources in the different related subjects on a primary or secondary school level. The second step, the construction of a common template for the description of the INTACT resources, was the result of an intense and partially contentious discussion due to the different cultural and scientific background of the partners in group 2.

The description of the INTACT resources is threefold:

a) Learning objects (LO): As basic component of the INTACT resources, the Los are single digital objects to foster one specific aspect of a topic, e.g. an interactive animation of the human circulatory system, a simulation of the human visual perception under different light conditions or a hypermedia learning environment to discover the life of nocturnal mammals including different format like video, interactive maps or audio-files for primary education. Each learning object is described based on the LOM standard.

b) Lessons: The LOs are included into a lesson. Within the INTACT framework, the lessons are based on a socio-constructivist understanding of learning which fosters a dialogic knowledge and active construction. The description of the lesson plans follows an international standard.

c) Learning units: in most of the cases the lessons are part of a learning unit. The description outline, the intentions of the learning unit, its goals and central educational approaches (Szabó, & Lipóczy, 2015, pp.82-84).

The INTACT teaching and learning resources are developed to be used as learning units, but teachers can also use single LOs as part of their teaching. Finally the following concepts for INTACT resources have been designed and realized:

- Biology: Immune System; Circulatory System
- Civilisation: Legends and Heroes (To be a knight in King Arthur's Court)
- Geography: Climate elements and factors
- German as a second language: Mozart als Kind und seine Reisen
- Primary Science: Creatures of the night; Magnetism (Szabó, & Lipóczy, 2014)

Following design and implementation, resources were tested and evaluated collaboratively in paired pilot schools. Pilot teacher evaluations and suggestions led to revisions and amendments of all teaching and learning resources. The following resource represents the structure of those created in the project. This teaching resource was developed by one of the authors of this article.

Table 1

Unit of Work for Teaching Resource Civilisation

| 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://kerettanternv.ofi.hu/ | |
| AIMS | <ul style="list-style-type: none"> • 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 view, 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 | <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> ➤ 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 |
| DEVELOPMENT OF SKILLS | Social skills: Communicative, critical thinking, collaborative skills are developed |
| CONTENT and LEARNING OBJECTIVES: | |
| <ul style="list-style-type: none"> • 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 | |

Source: INTACT Project. Retrieved from http://www.intact-comenius.eu/p/overview-contemporary-interactive_14.html

CONTENT AND STRUCTURE OF THE ONLINE PLATFORM

The INTACT platform is based on the Drupal solution, more precisely the Opigno Learning Management System (LMS). The Opigno LMS constituted the technological base for the development of the project and was a good starting point to meet the majority of INTACT requirements within the project's completion deadline and available budget. While the INTACT platform structure is based on the Opigno LMS distribution, it was necessary to make a set of adjustments to meet specific requirements of the project, not only in the creation of new fields, but also to facilitate new kinds of content and to develop an interface that would be intuitive and user friendly for both teachers and students.

All resource descriptions allow setting up a database on the INTACT platform that allows an easy access to the materials including a powerful search engine. One

of the main functionalities of the INTACT platform is to provide the possibility for teachers to create, describe, store, manage and search for teaching content. That is why the INTACT project outlined its own definition of learning units, lessons and learning objects. Within the platform the units, lessons and learning objects are described using metadata. The INTACT platform allows a teacher to organize the learning objects individually to create, for instance, different micro-modules for heterogeneous classes to provide resources for different abilities. Additionally, it offers the possibility to embed and attach external content. Due to different school systems, the metadata has to be adjusted to each system. Collaboration is achieved with multiple synchronous and asynchronous tools – e.g. chats, messages and real time video and audio conferencing. Further collaboration is reached by integrating video conferencing into lessons.

Another main idea of the INTACT project is to facilitate teachers to get in touch with other teachers and to encourage them to collaborate with other teachers. Therefore teachers can ask for collaboration in Learning Units that are released for this feature. Moreover, the INTACT platform has a complex search system that helps teachers to find teaching materials made by other teachers. The search is able to filter almost any information of the metadata.

The target group of the platform are teachers, educational staff in higher education, teacher training, students in kindergarten, primary and secondary schools. Students involved in teacher training can also gain from using the platform in their teaching practice (INTACT Platform <http://www.intactschools.eu>).

EVALUATION OF THE OUTCOMES

Evaluation of the project was a separate workpackage (WP 9), for which Kecskemét College was the responsible team. Following the evaluation procedure of the project, group 2 had the task to evaluate the resources. The evaluation of unit/lesson was done by collaborating pilot school teacher/s in paired teams. The pilot teachers were asked to study the Unit of Work and one selected lesson. Pilot teachers evaluated the unit/lesson using a questionnaire template provided for them. Feedback from pilot teachers was sent to collaborating members in the host country where the resource was piloted. Group 2 members uploaded first evaluation in the relevant folder of the moodle platform. By this way of evaluation suggestions for amendments were made by the pilot teachers. During the implementation phase pilot teachers piloted the resource using the HTML5 LOs. Pilot teachers then amended their first evaluation (Revision 1) following the piloting of the lesson. The final amendments were sent to SG members and uploaded to the relevant folder.

The evaluation of the platform was done by Group 3: all partners were asked to explore the platform. All the results of evaluation of Group 2 and Group 3 were presented at the meeting in Dublin, June 2015.

An edited volume was published as an online publication and an E-book including chapters concerning the teaching and learning resources in the specific subjects and the experiences made in the schools during the evaluation phase. The E-book also summarizes the aims and results of the project.

SUMMARY

During the project the partners noticed that the focus of the project moved more and more towards the online platform and the aligned functional requirements. An important requirement was that teachers could modify and reuse teaching and learning resources, not being forced to use produced ones that might not suit the curricula or the classroom situation concerning the student's skills and knowledge. Therefore this was an important issue for the implementation of the online platform. The online platform's conceptualisation and development for the distribution of resources presented some challenges. The requirements for this platform were closely related to the resources and the underlying concepts. Because both were developed parallel to one another during the course of the project, a close integration of both areas was necessary.

A further challenge was the determination of which subjects to include in the materials. Two aspects played a role here. On the one hand, the various partners and partner schools had equally varying interests. On the other hand, there were diverse educational plans within the participating EU countries, and therefore the same class level in different countries require varying teaching and learning resources. On a related note, another challenge was developing bilingual teaching and learning resources. Along with an appropriate difficulty level of content, the material must also be at an appropriate level regarding the students' language abilities.

The outcomes of INTACT support the following skills and competences: communication in a foreign language in the bilingual education, digital competence using digital technologies for the teaching and learning resources, learning to learn by working collaboratively and sharing the learning outcome with other students, social and civic competences as well as cultural awareness and expression by cooperating with other students from other countries when using the teaching and learning resources.

INTACT addresses specific objectives and priorities of EU's Lifelong Learning Programme (Comenius) for enhancing bilingual learning with ICT-based content in schools across Europe.

One important aspect in the project was the bilingual education. Several partners of the consortium are well experienced in bilingual education (e.g. Germany, Hungary) and thereby the bilingual aspects were essentially considered in all teaching and learning materials. In order to support the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning, the project implemented on the one hand interactive teaching and learning materials in different subjects embedded in bilingual settings. On the other hand, the project developed and implemented an online platform where the teaching and learning materials can be used across cultural borders.

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. (2008). Constructing Knowledge Together. Extract from *Tele collaborative Language Learning. A guidebook to moderating intercultural collaboration online*. In. Dooley, M (Ed.) (pp. 21-45) Bern: Peter Lang.
- INTACT (2015). *INTACT Platform*. Retrieved from <http://www.intactschools.eu>
- INTACT (2015). *INTACT Project*. Retrieved from <http://www.intact-comenius.eu>
- Kovács, J., & Trentinné Benkő, É. (2014). *The World at Their Feet. Children's Early Competence in Two Languages through Education*. Budapest: Eötvös József Könyv- és Lapkiadó Bt.
- Szabó, I. (2012). Template for an Example of Good Practice (MOLAN Network). In: G. Egger, Ch. Lechner (Eds.), *Primary CLIL Around Europe. Learning in Two Languages in Primary Education* (pp. 125-134). Marburg: Tectum Verlag.
- Szabó, I., & Lipóczy, S. (2014). Developing, Implementing and Piloting Interactive Teaching Resources in a European Context. In: A. Á. Major, L. Kovács, Z. C. Johanyák, R. Pap-Szigeti (Eds.), *Proceedings of TEAM 2014: 6th International Scientific and Expert Conference of the International TEAM Society* (pp. 227-232). Kecskemét: Kecskemét College, Faculty of Mechanical Engineering and Automation.
- Szabó, I., & Lipóczy, S. (2015). Teaching and Learning Foreign Languages with Interactive Methods. *GRADUS 2(1)*, 80-90.
- Van de Craen, P. (2011). *Multilingual Primary Education in Brussels*. In: *Handbook on Good Practice that Serves to Motivate Language Learners*. MOLAN network project. (pp. 45-49).