Deliverable D3 – An evaluation report about the user trials

Work Package

WP 3

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Abstract (for dissemination)

The scope of this deliverable is to present the approach adopted by the EDUCOMICS projects in Workpackage 3 “User trials and case studies”, and to report the main results of the activities carried on in this WP. The deliverable is structured in three main parts. Part I provides an overview of the work carried on in the WP, describing how the various activities were planned and coordinated, and introducing the pilot studies, the contexts where they took place, and their pedagogical goals. Part II provides a short reference material about all case studies, describing the main characteristics of each of them. Part III presents the details of the most relevant pilot studies.

Keywords List

Educational comics, digital comic books, web comics, multimedia storytelling, teacher training, evaluation, educational goal, pedagogical approach, lesson plan
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Introduction

The potential for Web comics to be used in education offers educators a means of using multiple digital media (text, images, audio and video) with their students in many curricular areas. The EU project EDUCOMICS, under the EC Life Long Learning Programme Comenius Action, aims at:

i) exploring how web comics can be used in the classroom in an attempt to enhance learning, engage and motivate students, and use technology in a practical and effective way;
ii) designing and implementing a proper strategy to support teachers in the effective adoption of web comics in real school contexts;
iii) indentifying benefits of this approach as well as factors that can potential prevent its adoption;
iv) offering recommendations for practice and research in this field

Withing the general scope of the project, the aim of Workpackage 3 (WP3) “User trials and case studies” is to carry on a set of pilot studies, engaging students and teachers in different EU countries in the use of web comics, in order to gather experience and empirical data, to support a better understanding of this educational medium, its learning benefits, the factors that can promote or prevent its adoption, and to identify best-practices and guidelines for teachers.

This deliverable reports the main results of the activities carried on in this WP, and is structured as in three parts.

Part I describes how the work was planned and organized, and provides an overview of the pilot studies, introducing the contexts where they took place, the pedagogical goals, and the process followed by teacher and students, the evaluation approach and its key results.

Part II provides the short descriptions of all 9 pilot studies. Each of them outlines the main characteristics of a study, following a similar structure, and is mainly intended as a “short reference” for teachers or researchers.

Detailed reports of Pilot studies #1-7 are included in Part III.

Considering the size of the material related to the case studies, and the need to make it easy accessible from the EDUCOMICS web site, we provide separate files for the short and long descriptions of each case study.
PART I: Overview of Pilot Studies

I.1: Pilot Studies at a glance

Table 1 provides an at a glance view of the pilot studies. Overall, they involved 9 schools, and 12 classes, for a total of 276 students and 25 teachers, in 6 different EU countries (Cyprus, Greece, Italy, Spain, UK, and Czech Republic).

EDUCOMICS Pilots considered a wide range of target groups, in terms of pupils age and school level (from primary to high school). They addressed different kinds of learning benefits and involved a variety of educational activities in different contexts, in the classroom and, in most cases, at home. They engaged students with technology from a minimum of 8 hours to a maximum of 30, along a relatively long period (up to 4 months). The knowledge subjects addressed by the pilot studies can be classified under two broad domains - science and linguistic skills/communication (either in students’ mother tongue language or in a foreign language).

Each case study has its own peculiarity and characterization, and provides a unique contribution to our understanding the use of digital comics in educational contexts. At the same time, all pilots share some common features: the macro-process - defined in the context of the project before the implementation of any pilot; a common subset of educational goals; the tool for digital comics authoring (Web Comic Creator); the preliminary training of the teachers involved; the macro-procedure of evaluation; some general recommendation for research and practice.

The rest of Part I of this deliverable will factor out these shared elements. The reader is referred to Part II and Part III to find further information of each case study and a detailed report of the activities undertaken by teachers, students, and the EDUCOMICS project team.
### TABLE 1: Case studies at a glance

<table>
<thead>
<tr>
<th>#</th>
<th>Country</th>
<th>School level</th>
<th>Stud. Age</th>
<th>Students Involved</th>
<th>Subject</th>
<th>Intended Educational Benefits (*)</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cyprus</td>
<td>Primary</td>
<td>11-12</td>
<td>17</td>
<td>Science</td>
<td>Promoting understanding of distinction between observation and inference</td>
<td>5 x 80 min sessions</td>
</tr>
<tr>
<td>2</td>
<td>Greece</td>
<td>Junior High</td>
<td>12-13</td>
<td>24</td>
<td>Modern Greek Language</td>
<td>Improvement of i) communication and narrative skills ii) critical thought and imagination</td>
<td>8 didactive hours (45 min each)</td>
</tr>
<tr>
<td>3</td>
<td>Italy</td>
<td>High School</td>
<td>12-13</td>
<td>26</td>
<td>Horror comic story in English</td>
<td>i) Improvement of communication skills in English ii) critical attitude towards ICT</td>
<td>6 weeks (4 hours per week – 2 at school and 2, at home)</td>
</tr>
<tr>
<td>4</td>
<td>Italy</td>
<td>Primary</td>
<td>7-8</td>
<td>23</td>
<td>Fantasy story</td>
<td>Improvement of narrative skill (temporal structuring of story elements)</td>
<td>4 weeks (3 hours per week at school)</td>
</tr>
<tr>
<td>5</td>
<td>Spain</td>
<td>Secondary School</td>
<td>15-16</td>
<td>50</td>
<td>Free comic story in English</td>
<td>Improvement of - communication and narrative skills in English - ICT skills - teamwork capability - creativity and imagination</td>
<td>17 teaching hours</td>
</tr>
<tr>
<td>6</td>
<td>Spain</td>
<td>Primary and Secondary School</td>
<td>9-10; 15-16</td>
<td>35</td>
<td>Free comic story in English</td>
<td>Same as above</td>
<td>4 months (1 day a week in class during 1st first month, then autonomous work at home)</td>
</tr>
<tr>
<td>7</td>
<td>Spain</td>
<td>Primary</td>
<td>7/8 9/10 11/12</td>
<td>15</td>
<td>Science (taught in English)</td>
<td>Same as above</td>
<td>10 teaching hours</td>
</tr>
<tr>
<td>8</td>
<td>Czech Rep.</td>
<td>Secondary/ Adult School</td>
<td>18-30</td>
<td>60</td>
<td>Free comic story in English</td>
<td>Improvement of communication skills in English as Foreign language Promoting creativity</td>
<td>4 rounds 2 hours each time</td>
</tr>
<tr>
<td>9</td>
<td>UK</td>
<td>Junior High</td>
<td>8-9</td>
<td>26</td>
<td>Free comic story in French and German</td>
<td>Improvement of communication skills in French and German as Foreign languages</td>
<td>4 weeks (3 hours per week at school)</td>
</tr>
</tbody>
</table>

(*) Benefits mentioned here concern the knowledge/skill sphere (in Bloom’s taxonomy). Benefits in the affective sphere (improvement of motivation and interest) are not mentioned being common to all case studies.
I.2 Educational Goals and Requirements

A fundamental activity in WP3 was the identification and analysis of the educational goals that digital comics can support in different contexts and situations. Some general educational principles were defined by the EDUCOMIC team since the beginning of WP3 work and informed the overall design of the case studies:

- To relate comic development activities to curricular learner’s work, using classroom tasks and research as integral parts of digital artefact development.
- To improve classroom practices as a means of increasing student achievement.
- To support the development of cooperation skills and the creation of collaborative teams of learners within a class.
- To foster a deepening of subject-matter knowledge; Provide students with sufficient time for inquiry, reflection, and mentoring on an ongoing basis.
- To create the conditions for students to develop further skills in the specific subject of the pilot, in the use of technologies, and other essential elements for their growth as students and persons.
- To promoting autonomy, motivation and creativity through a project-based learning approach (PBL).
- To enhance motivation for learning and develop positive attitudes towards classwork (and homework) learning activities.
- To increase students' technological skills.

Within the framework of these general principles, each pilot study developed its own set of specific requirements and educational needs, in relationship to the knowledge domain addressed, the characteristics of the educational context, the teachers’ and student profiles, the timing and organizational constraints of the classes.

Some further key issues/constraints were identified during the needs analysis of WP3:

- Relevance of curricular bounds (e.g., “How can the activities that I can carry on using these tools fit the curriculum?” “How can they be integrated within our normal workflow schedule?” “How can I diversify learners’ activities along the time to keep students’ engagement high?”);
- Need for social scalability (e.g., “Can I use these tools both for individual and whole class activities?”)
I.3 Process Issues

At overall project level, the work was organized around the three major tasks (see WP3 description in the project proposal);
- Task 3.1 Pilot Specification (Month 11 to Month 12)
- Task 3.2 Implementation of Pilot user trials and case studies (Month 12 to Month 17)
- Task 3.4 Evaluation (Month 17 to Month 18)

An expert team was formed in each EDUCOMIC country for the needs of the pilot study execution and assessment. The candidates for participating in the case studies were identified during the teachers’ training events reported in D2, as part of WP2, either recruiting directly the participants to these activities, or involving them as proxies to recruit colleagues willing to participate in the pilots.

In order to make the results of the whole set of case studies better comparable in terms of process and results, the EDUCOMICS project team agreed on a high level life cycle for pilots comprising the following activities (see Figure 1):

- Teachers’ training on educational uses of digital comics and enabling technology
- Identification of educational goals and requirements for the students/classes of the teachers (this work was initially performed by teachers only, then they shared and discuss their ideas with the EDUCOMICS local team)
- Teachers’ planning of students’ educational activities
- Students’ training on technology (e.g., Web Comic Creator, Search engines, multimedia editors, depending on pupils’ age and teachers’ educational goals)
- Students’ design of contents and narrative structured for the digital comic to be implemented (e.g., definition of characters, events, dialogues, storyboards,....)
- (paper and) digital content search and construction, and comic implementation
- Digital comic implementation and delivery
This lifecycle was not performed according to a strict sequential, “water fall” model, but unfolded along an iterative process in which the progress of some activities induced a revision/completion of previous tasks.

Figure 1: Typical Pilot study Life cycle

Figure 1 highlights that the complementary evaluation activity took place along the entire lifecycle, running in parallel with most teachers’ and students’ activities, as reported in section I.4.
Most of students’ activities took places in the school context – either the classroom or the computer lab. Still, in most cases teachers assigned some homework to pupils to complete and integrate the comic artefacts developed at school. Two specific case studies (#6 and #7, University of Granada – Spain) explore in particular the creation of web comics mainly as homework activities.

I.4 Evaluation

The evaluation activity was planned and organized in order to address a number of general research questions, to collect empirical data about them in different contexts, domain, and situations, and to abstract some general guidelines and contributions to research and practice.

From a procedural standpoint, the evaluation activity was pervasive across the entire life cycle of the pilot studies (as outlined in the previous section). Student and teachers organized, in most cases, “crit room” sessions in which they critically discussed together the work done.

EDUCOMICS local teams constantly worked with students and teachers both to validate/confute requirements and pedagogical hypothesis, and to collect and discuss data using different instruments: teachers and student’s questionnaires and semi-structured interviews, informal discussion sessions and focus groups; students’ diaries and rubrics; side-to-side observation (with visual/audio/textual recording of students’ behavior during the comic design and authoring process).

Figure 3 provides an at a glance view of the key research issues addressed during the evaluation work. Defined at the beginning of WP3 work, this check list has been used to guide the design and implementation of all evaluations in the various case studies. It provided a general framework to design questionnaires and interview structures, to define the data collection “forms” provided to students or teachers or used by EDUCOMICS evaluators, and to analyse and classify the results. Finally, it has been used as a conceptual grid to organize the reporting of the pilots (see PART II and PART III of this deliverable) and to facilitate the comparisons among the results achieved in different contexts.

The reader is referred to the detailed description of case studies in PART III of this deliverable to find the description of evaluation procedure and instruments adopted in each case study and a discussion of its results.
**GENERAL PEDAGOGICAL APPROACH**
the philosophy behind the activities implemented during the study

**PERCEIVED UTILITY AND EDUCATIONAL GOALS FULLFILMENT**
The benefits teachers wanted to achieve and the degree at which they have been achieved

**CHALLENGES**
The challenges faced during the study or envisioned for future activities

**OPERATIONAL GOALS**
Why given activities has been carried on in specific ways

**FITNESS TO CURRICULUM**
The degree at which the proposed activities are consistent/well integrated with the actual curriculum and school activities

**SUCCESS FACTORS**
The ingredients contributing to the success of the experience

**CRITICAL ISSUES**
Problems or difficulties encountered - technical, pedagogical, and organizational (e.g., need for better technological infrastructure, stronger technical support, more time and human resources, school institutional support, better training - on web comics, on technology, …) and how they were faced

**STUDENTS ATTITUDE TOWARDS THE PROPOSED ACTIVITIES**
Students’ participation, engagement, satisfaction, fun, …

**PROSPECTAL ADOPTION**
Intention for further adoption

**GENERAL SUGGESTIONS AND LESSONS LEARNED**
I.5 Discussion and Conclusions

Considering the wide range of domains, contexts, and targets addressed by our pilots, it is not surprising that there is a significant amount of variability in the findings of the different case studies. Still, we can draw some general considerations.

All case studies were regarded as successful by teachers and students, which encourage us to continue our research in this field. In particular, our findings suggest that:

- Digital comics have the potential to challenge students and motivate them towards creative construction of new knowledge and skills. As they progressively engage with the comic creation process, learners acquire planning, communication, collaboration, problem-solving, self-evaluation skills, and attitudes to critical thinking.

- Web comics represent a pedagogical strategy to encourage effective curricular innovation in various domains, including science and (foreign) language teaching and learning, also helping students develop autonomy and motivation and foster creativity.

- They are an excellent means to expose (young) students to ICT in a way that helps them to develop focused and structured technological skills.

- The low tech, flexible and fluid nature of the technology surrounding web comic creation allows it to be exploited in different physical contexts and integrated with conventional curricular activities - in the classroom, in technology enhanced spaces (computer labs) and at home.

Our case studies have also highlighted a number of critical issues, mainly in relationship to the specific tool adopted for the authoring process (Web Comic Creator) and, more generally, on the role of technology in educational contexts.

Web Comic Creator is extremely powerful and provides a significant amount of authoring functions. Still, it can be too sophisticated, especially for young children: in most cases observed by the project, they could not master such complexity and needed the scaffolding of adults (teachers or members of EDUCOMICS team). In addition, the tool has some general usability problems that may prevent teachers who have limited exposure to technology to adopt and use it. The technical configuration of the tool (at operating system level) may result incompatible with (low cost) freeware operating.
systems used in some public schools or with their network configuration (see examples in case studies 6 and 8).

From a more general perspective, the caveat that we need to keep in mind is that digital comic authoring technologies are mere tools: as such, they are good for some things and maybe not so good for other things, and, above all, they do not bring benefits unless they are integrated in an appropriate learning plan. Whatever the technology, learners’ activities should be designed with care and detail so that the final aim, which is enhancing learning, can be achieved.

In this respect, the value of EDUCOMICS case study work and reports is huge: here teachers and educators can find an enormous amount of material and examples that will inspire them, supporting the design of well structured and effective learning experiences involving digital comics technology.
PART II: Pilot Studies Short Descriptions (see separate documents)

- Pilot Study #1 (UNIVERSITY OF CYPRUS): Using digital comics to develop students’ ability to distinguish between observation and interpretation (elementary school – Cyprus)

- Pilot Study #2 (UPRC): Pilot Use of Educational Digital Comics in teaching Modern Greek Language in A class of Junior High school (Greece)

- Pilot Study #3 (POLIMI): Educational Digital Comics in a class at Junior High School (Italy)

- Pilot Study #4 (POLIMI): Educational Use of Digital Comics in a class at Primary School (Italy)

- Pilot Study #6 (University Of Granada): Pilot implementation of digital comics in the english as a foreign language classroom for 4th-year secondary school students (Spain)

- Pilot Study #7 (University Of Granada): Enhancing Teaching and Learning at Primary School with Digital Resources in the Classroom: A case study using ComicLab (Spain)

- Pilot Study #8 (Kindersite): Digital comics to develop students’ independent active language learning (Secondary/Adult school – Czech Republic)

- Pilot Study #9 (Kindersite): Use of Educational Digital Comics to support language learning in a group of UK students aged 12-13 (UK)
DELIVERABLE D3.2

Pilot Study #1 (UNIVERSITY OF CYPRUS)

Using digital comics to develop students’ ability to distinguish between observation and interpretation (elementary school – Cyprus)

Abstract

This study focused on promoting primary school students’ understanding of an aspect of the nature of science that pertains to the distinction between observation and inference. The purpose of the research was to investigate the successes and challenges of web comics as a medium that scaffolds the learning process and engages students in explicit epistemological discourse that draws on authentic stories from the history of science. The study reports on results from the pilot implementation of the activity sequence with a class of sixth graders that draw on various data sources such as written tasks, interviews, classroom observations, students’ web comic books.

**Subject:** Science  
**Age group:** 10-11  
**Level:** elementary school (fifth-sixth grade)  
**Number of students involved:** 17  
**Duration:** 4-5 x 80 minute lessons  
**ICT tools:** ComicLab by ItIsArt Ltd (http://www.itisart.com.gr)

**Pedagogical objectives**

Students are intended to understand differences between observations and interpretations and specifically appreciate:

- observations as descriptive statements about natural phenomena that are accessible through our senses
- interpretations as invented statements that provide explanatory frameworks for observations
- that a number of inferences can be made based on a specific observation; thus there is less chance for agreement on inferences
- that the validity of inferences can be assessed based on the extent to which they can account for the observations they are targeted at
- the distinction between discovery and invention and associate the former with observations and the later with inferences
- the idea that while scientists rely on observations they also need to use their creativity

**Process**

During the implementation students work in 3-4 member groups under the guidance provided by the learning materials and the teacher. Teaching does include any lecture, but is conducted through small autonomous, group investigations. Additionally, specific points of the activity sequence include epistemological discussions between each group and the teacher as well as some whole class discussions.
Part A: Familiarization with the tool
Students are acquainted with ComicLab using a learning guide.

Part B: Tricky Tracks (adaptation from Bell, 2008, pp. 72-78)
Students use a set of predesigned by the teacher incomplete comic strips. They are guided so as to complete them in order to develop a comic story to explain patterns of fossil footprints that are gradually revealed on a video projector. Their stories change as the teacher reveals more footprints. During this inquiry activity students will engage through questions posed by the comic characters on explicit epistemological discourse concerning the role of observation and interpretation. More specifically, they practice on making observations and interpretations. Additionally the story is appropriately structured so as to provide starting points for students to reflect and discuss in their group as well as with the teacher on the intended aspects of the distinction between an observation and an interpretation.

Part C: Scientific stories
Students are given specially structured stories concerning scientific concepts that were invented in order to interpret natural phenomena. Students are asked to transfer the stories in a digital comic format. Within this context students are engaged in discussions with the teacher so as to further elaborate the distinction between observations and inferences and to associate this with the nature of science and specifically with the way scientists work in order to invent interpretations for their observations on natural phenomena.

Evaluation
The research is evaluated with respect to the following aspects: (a) students’ beliefs and attitudes concerning web comics as a learning medium, (b) students’ awareness of the distinction between observation and interpretation. The evaluation stems from several data sources:

- Written tasks: students complete close-ended and open-ended tests prior to and after the implementation
- Oral tasks: some students (aprox. 30%) participate in semi-structured interviews prior to and after the implementation
- Video data of some groups’ work during the lessons
- Students’ webcomic books
- Teacher’s diary

Follow up
Publishing of the outcomes (comic books) via internet such as the EduComics website.

Links
Digital tools

Teaching resources
Further readings:

EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

Programs of comics integration in schools abroad
- The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/

Suggestions – lesson plans:
- ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

School magazine
- http://efivoidimosiografoi.pbworks.com

How to write a comic book
- http://www.wikihow.com/Write-a-Comic-Book
- http://www.wikihow.com/Make-a-Comic
Using Web Comics in Education 142424-LLP-1-2008-1-GR-COMENIUS-CMP

DELIVERABLE D3.2 – PART II – Short description of Pilot Study #2 (UNIVERSITY OF PIREUS)

DELIVERABLE D3.2
Pilot Study #2 (UPRC)

Pilot Use of Educational Digital Comics in teaching Modern Greek Language in A class of Junior High school (Greece)

Abstract
This case study deals with the creation of educational digital comics by the students as part of their learning activities in the course of Modern Greek Language on the theme “diet and nutrition habits”, which is included in the syllabus of Modern Greek Language for A-grade Greek high-school students (4th unit of school handbook of Language). Teaching was organised as a problem-based learning basis. Students, having watched as a starting point the film “Supersize me” directed by Morgan Spurlock about the negative physical and mental effects of consuming fast food, were asked to create a comic book collaboratively, in order to promote healthy alimentary habits in school community. The didactic scenario titled "Stories of Alimentary Madness in Comics" took advantage of the software tool Web Comic Book Creator.

Subject: Modern Greek Language  
Age group: 12-13  
Level: Intermediate  
Number of students involved: 24  
Duration: eight didactic hours (a didactic hour is 45 minutes)  
ICT Tools: ComicLab, MS Word, Internet Explorer, Wiki

Pedagogical Objectives
- Configuration of authentic communication conditions in learning community
- Production of multimodal texts in comics format meaningful for students, (situated learning), while contributing to the resolution of a real problem (problem - based learning) corresponding to their cultural experience; that is creation of comics from scratch (script, design, production, publishing) using Web Comic Book Creator collaboratively
- Familiarization with other modes of semiotic systems
- Expansion of their strategies in comprehension of multimodal texts
- Development of skills in narrative, using various semiotic codes and learning resources (multiliteracy)
- Understanding of linguistic structure elements as types of clauses, forms of noun phrases, punctuation points, and apply them in communication practice.
- Search of indicators of lexical cohesion and affinity in a text
- Study of vocabulary, grammar and syntax, paralinguistic elements of the oral and written language in a specific circumstance of communication
- Study of a plot designed with a narrative structure: exposition (setting, characters) conflict, rising action and climax, followed by a falling action and resolution.
• Determination of the term “scene”
• Study of narrative modes as point of view, voices, tenses
• Study of the role of dialogue and pictures which substitutes the description in the illustrated narration
• Cultivation of skills:
  i. intellectual (critical thought, creative imagination, analysis, composition, organisation etc),
  ii. communicative-social (collaborativity, interaction, self-activity, responsibility)
  iii. metacognitive (self reflection, evaluation)
• Raise awareness about the negative effects of a specific nutrition in everyone’s health and effort to help schoolmates adopt healthy alimentary habits.

Process
The programme of comics production took place in five (5) phases:

a) presentation of the digital tool and his operation in the laboratory of Information Technology
b) planning of scenario and organisation of the narration of a story (Theme, Setting, Characters, Plot-action, Dialogues) in the classroom
c) planning of action in each panel according to the scenario of the previous phase, transformation of the scenario in comics format by using the tool in laboratory of Information Technology
d) projection and evaluation of digital comics - evaluation of the whole activity and tool in the classroom
e) Students’ comics were published at the school magazine (wiki environment).

Students in all phases of designing narration, story and illustration studied in teams of two, taking advantage of work sheets, organised in order to support them in the cognitive scaffold.

Evaluation
Process and comic books were evaluated with criteria rubrics, according to the learning and instructional objectives
The instructional process and the authoring tool were evaluated by students with questionnaires.

Follow up
• Practice in collaborative writing of stories,
• Familiarization with team work
• Familiarization with more digital tools.
• Design and creation of more digital comics in authentic conditions of communication, in order to suggest solutions for other social problems in cross-curricular activities
• Development of reading and understanding strategies and skills of writing narrative/storytelling.
• Comparison of students’ comic books with others of well known authors
• Exploitation of various resources as school handbooks of Language, Internet, cognitive tools as the Web Comic Book Creator and comics.
• Publishing of the outcomes (comic books) via internet such as the EuroCreator website
• Every pupil gets a CD with comic books from the project

Links

Digital tools
• ComicLab by ItIsArt Ltd, (http://www.itisart.com.gr)

Teaching resources
EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

Programs of comics integration in schools abroad
• The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/
• Banchi di nuvole, http://www.banchidinuvole.org/

Suggestions – lesson plans:
• ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

School magazine
• http://efivoidimosiografoi.pbworks.com

How to write a comic book
• http://www.wikihow.com/Write-a-Comic-Book
• http://www.wikihow.com/Make-a-Comic
Abstract
This case study aims at exploring the educational use of digital comics by students aged 11-12 at a public Junior High School in Italy, as part of their learning activities concerning English as a foreign language. The students, organized in small groups, designed a set of digital horror comics in English—including text, images, recorded voices—and implemented them using different technological tools (Powerpoint, Web Comic Creator, and 1001stories¹), as a means to both exercise and improve their written and oral use of English and to critically understand the potential and drawbacks of different authoring tools.

Subject: English as a Foreign Language
Age group: 12-13
Number of students involved: 26
Level: Junior High school (seventh-eighth grade) - Beginners level in English
Duration: 6 weeks (4 hours per week – 2 at school and 2, at home)
ICT Tools: PowerPoint, ComicLab, Web Broser, Google, 1001stories¹

Pedagogical Objectives
• To improve linguistic skills in English as a foreign language, in particular:
  • to develop a basic capability of creating simple dialogues – in written and oral form
  • to extend student’s vocabulary
  • to learn the correct use of the past tense construct
• To enhance student’s motivation for and interest in learning English by allowing them to select a topic for their horror story and the multimedia elements to compose it
• To develop a critical attitude towards technology, understanding pros and cons of different tools (Powerpoint, Web Comic Book Creator, 1001stories) to create interactive narrative structures
• To develop a set of digital comic horror stories in English, integrating text, images, and sound (student’s recorded voices), delivering them in different “versions” (for Powerpoint, Web Comic Book Creator format, and 1001 stories format) and organize them on an online repository

Process

¹ 1001 stories is a multimedia storytelling tool developed at Politecnico di Milano for educational use. It supports a variety of narrative formats, including simple comic-like elements, and has been used by over 15000 students in Italy in the context of the Policultura project (www.policultura.it)
As a premise to the students’ activity, the class teacher received a preliminary training on digital comics and storytelling (see WP2) attending a seminar organized for teachers at school and studying the material produced by the project.

The activity was then organized into the following steps:

- definition of the pedagogical goals and design of the learning experience (by the teacher)
- project presentation to the students, task assignment to the students (design of a horror story in English, involving a mandatory use of the past tense construct), and organization of working groups (2-3 students per group)
- Students’ design of the narrative structure of their group story (on paper)
- Dialogue text writing (on paper) and images search (outside the classroom, surfing the web or using a digital camera)
- Content Validation by the teacher
- Voice recording of comic dialogs (balloon contents)
- Production of version 1 of the story – in Powerpoint
- Validation and revision
- Short tutorial on Web Comic Creator
- Production of version 2 of the story – in Web Comic Creator
- Short tutorial on 1001 stories authoring tool
- Production of version 3 of the story (using 1001 stories) and publishing of the results on the Internet

At the end, every student got a CD with the set of all stories (in the 3 versions) created by the class.

**Evaluation**
The authoring production process was constantly monitored by the Polimi Team, observing students experiences at school and reporting observations on a structured evaluation form designed for the project.

Key elements mainly reported considered the usability of the ICT tools and students’ cooperation behaviour. Learning and instructional objectives were evaluated using questionnaires submitted to students. Tests on the understanding of the past-tense construct were submitted by the teacher before and after the overall process.

**Follow up**
- Practice in collaborative writing of stories
- Development of reading and understanding strategies and skills of writing narrative/storytelling.
- Comparison of students’ comic books with others created in the EDUCOMICS project
- Publishing of the outcomes (comic books) via internet such as the EuroCreator website
- Every pupil gets a CD with all comic books created in the EDUCOMICS project
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #3 (POLITECNICO DI MILANO)

LINKS

Digital tools
- ComicLab by ItIsArt Ltd, (http://www.itisart.com.gr)
- 1001stories (www.policultura.it)

Online Repository of students’ horror stories

Teaching resources
EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

Programs of comics integration in schools abroad
- The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/
- Banchi di nuvole, http://www.banchidinuvole.org/

Suggestions – lesson plans:
- ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

How to write a comic book
- http://www.wikihow.com/Write-a-Comic-Book
- http://www.wikihow.com/Make-a-Comic
DETERMINABLE D3.2
Pilot Study #4 (POLIMI)

Educational Use of Digital Comics in a class at Primary School (Italy)

Abstract
This case study aims at exploring the educational use of digital comics by students aged 8-9 at a public primary School in Italy, as a learning activity aiming at improving children’s narrative and communication capability, and developing elementary ICT skills. The students, organized in small groups, designed a set of fantasy comics—including text and images—and implemented them initially using Powerpoint and then Web Comic Creator.

**Subject:** Fantasy storytelling

**Age group:** 7-8

**Level:** elementary school (third-fourth grade)

**Number of students involved:** 23

**Duration:** 17 didactic hours

**ICT Tools:** PowerPoint, ComicLab

**Pedagogical Objectives**
- Improvement of narrative skills in an playful, engaging way for children, with a special focus on
- Defining the temporal structure of a story (before, during, after scenes)
- Integrating multiple media: text in different semantic formats (i.e., balloon-like dialogues, comments) and images
- Development of collaboration capabilities
- Development of elementary technology skills
- Enhancing student’s motivation for and interest in storytelling

**Process**
As a premise to the students’ activity, the 2 teachers of the class received a preliminary training on digital comics and storytelling (see WP2) attending a seminar organized for them at school and studying the material produced by the project.

The activity was then organized into 2 main phases:

**Phase 1: working on paper and powerpoint**
- *definition of the pedagogical goals and design of the learning experience (by the teachers).* Teachers designed a narrative *meta-structure* for comics to be proposed to children as a *conceptual plot frame that children would filled with comics contents.* The agreed subject was a *fantasy tale.* Inspired by Propp’s theory on morphology of folk tales – Propp 1968), teachers defined a simple comics structure composed of a sequence of narrative “moments”: START; THEN...; AT SOME POINT...; AFTER A
WHILE...; FINALLY... POLIMI team then implemented this meta-plot in Powerpoint, creating a set of ppt “forms”, one for each narrative “moment”

- **children’s familiarization with multimedia storytelling**, using (non comics) interactive narratives in the school computer lab as well as simple web comics selected by POLIMI
- **conceiving the story on paper**
  - Children, organized in small groups of 2-3 persons conceived and created their comics on paper, as a classroom activity. POLIMI team provided them with prints of the powerpoint forms and of scene elements and characters. Children instantiated the meta plot as a comics, gluing images for characters and scene elements, drawing balloons for characters dialogues, and hand-writing text inside
- **From Paper to Digital (in ppt)**
  In the computer lab, children transferred the paper comics into a digital interactive multimedia format, using the Powepoint tool, under the supervision of teachers and the POLIMI team. Students implemented each moment according to their paper based design, inserting the proper images from the repository (digital characters and screen elements), creating and editing the ppt dialogue baloons.
- Validation and revision (by teachers)

**Phase 2: working on Web Comic Creator**
- Short tutorial to children on Web Comic Creator
- Production of version 2 of the story – using Web Comic Creator “customized” (and in Italian) by including all images and backgrounds used by children in their .ppt stories - a small repository of human and animal “characters and scene elements that children could reuse and integrate with comics textual elements

At the end, every student got a CD with the set of all stories (in the 2 versions – ppt and Web Comic Creator) created by the class.

**Evaluation**
The authoring production process was constantly monitored by the Polimi Team, observing students’ experiences at school and reporting observations on a structured evaluation form designed for the project.
Key elements mainly reported considered the usability of the ICT tools, students’ cooperation behaviour, and, at the affective level, engagement and interest.
Learning and instructional objectives were evaluated by means of
- **Group discussion with children**: Children and teachers discussed the resulting “products” comics and the overall experience
- **Questionnaires** submitted to students
- **Focus Group with teachers**: Polimi team discussed the experience with the group of teachers, focusing on both organizational and pedagogical aspects, and identifying some lessons learned for a wider scale adoption of web comics at school.
The main results can be summarized as follows:

- Complexity of Wec Comic Creator technology (Higher than ppt):
  even if children used a simplified version of the tool, the support of adults was needed in many situations due to the limited usability of some functionality
- The children’s outcome has a weak “comic flavor” (Limited dialogue, limited number of balloons)

- Children’s opinion:
  - Very positive feedbacks emerged from children’s questionnaires (86% highly satisfied; 68% want to do it again)
  - A constant enthusiasm was perceived during the activities, in spite of the difficulty in the use of the Wec Comic Creator tool

Teacher’s opinion:

- Good satisfaction; Noticed (but formally not “measured”) an improved level of narrative skills and collaborative attitude, more fluency in computer use
- Fundamental role of
  - Non digital classroom activities - story design and paper based creation
  - Narrative meta-structure – an approach smoothly integrated in the curriculum for our target age (“structured” storytelling, in some case applying Propp’s theory)

Follow up

- Practice in collaborative writing of stories
- Further use of digital comic tools for the development of reading and understanding strategies and skills of writing narrative/storytelling.
- Every pupil gets a CD with all comics created during the pilot study

LINKS

Digital tools
- ComicLab by ItIsArt Ltd, (http://www.itisart.com.gr)

Teaching resources
EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

Programs of comics integration in schools abroad
- The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/

Suggestions – lesson plans:
• ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

How to write a comic book
• http://www.wikihow.com/Write-a-Comic-Book
• http://www.wikihow.com/Make-a-Comic
Pilot Study #5 (UNIVERSITY OF GRANADA)

INCORPORATING DIGITAL COMICS IN THE LEARNING OF ENGLISH AS A FOREIGN LANGUAGE FOR 3rd-YEAR SECONDARY SCHOOL STUDENTS (SPAIN)

Abstract
A pilot study was carried out to explore the pedagogical potential of digital comics with learners of English in a bilingual public secondary school in Granada (Granada College). The target participants in the project were 3rd year students. Two classes in the 3rd year of Compulsory Secondary Education participated in the experience. The total number of students was 50. The methodological framework adopted has been Project-based learning and Task-based language teaching. Students were free to choose their topics and genres, from narrative stories to personal experiences, from natural science to culture and society. They worked collaboratively in pairs to complete a task in digital comic format chosen by themselves under the teacher’s supervision, and were encouraged to be creative and imaginative. For the creation of the digital comic book ComicLab 1.2. was used.

 Subject: ICT and English as a Foreign Language  
 Age group: 15  
 Level: secondary education  
 Number of students involved: 50  
 Duration: 17 hours  
 ICT Tools: ComicLab

Pedagogical Objectives
- To acquire the competence to use English in real-life situations for the development and maintenance of interpersonal relationships and to take part in interpersonal encounters through the sharing of factual and attitudinal information
- To develop communicative skills in order to acquire, record, and use information from a variety of aural and written sources
- To develop mastery over the English language as a linguistic system and to have some knowledge of how it works at the levels of phonology, morphology, and syntax
- To foster the development of critical thinking skills and the development of learning skills so that students can continue their education beyond the school setting
- To develop skills in the production of narrative of various semiotic codes and learning resources (multi-literacy).
- To develop ICT skills
- To enhance motivation by allowing students to select the topic and content of their tasks.
- To create an original digital comic book in English.

Process
Pilot teaching took place in three phases
First phase
• Attitudes-motivation questionnaire
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #5 (UNIVERSITY OF GRANADA)

- Power-point presentation on digital comics: what they are, what they contribute to learning, suggestions of possible topics, etc.
- Presentation of the tool Web Comic Book Creator and instructions for use
- Familiarization with the tool Web Comic Book Creator

Second phase
- Forming pairs and negotiating ideas for webcomic book.
- Initial completion of Project planning grid in pairs
- Negotiation with the teacher of topic, deadline, plan, language work.
- Learners complete the script of their project and discuss it with Learner diary
- They were asked to write a script of a comic book based on an incident of school violence as homework.

Third phase
- Development/creation by students of digital comics on the topic chosen.
- Learner diary
- Teacher corrective feedback
- Presentation to the class of Comic books created by students

Evaluation
- Attitudes/Motivation questionnaire
- Evaluation:
  - Peer assessment
  - Self-assessment
  - Teacher assessment
  - Overall evaluation

LINKS
Digital tools
- ComicLab by ItIsArt Ltd, (http://www.itisart.com.gr)

Teaching resources
EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

Online dictionaries and references
- Longman Online Dictionary of Contemporary English (http://www.ldoceonline.com)
- Reverso Online Dictionary (http://dictionary.reverso.net)
- Wikipedia (http://en.wikipedia.org)

Programs of comics integration in schools abroad
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DELIVERABLE D3.2 – PART II – Short description of Pilot Study #5 (UNIVERSITY OF GRANADA)

- The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/
- Banchi di nuvole, http://www.banchidinuvole.org/

Suggestions – lesson plans:
- ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

How to write a comic book
- http://www.wikihow.com/Write-a-Comic-Book
- http://www.wikihow.com/Make-a-Comic
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #6 (UNIVERSITY OF GRANADA)

PILOT IMPLEMENTATION OF DIGITAL COMICS IN THE ENGLISH AS A FOREIGN LANGUAGE CLASSROOM FOR 4th-YEAR SECONDARY SCHOOL STUDENTS (SPAIN)

Abstract
A pilot study was carried out to promote the use of web comics among secondary school students of English as a Foreign Language. The target participants in the project were 4th-year students from a public school. The learning method used was a task-based approach, where students had to work collaboratively to carry out a task chosen by themselves under the tutor’s supervision. Students were free to choose their topics and genres, from narrative stories to personal experiences, from natural science to culture and society. They were asked to use their imagination and creativity in creating a story in a comic book format while reviewing and enhancing their grammatical, lexical, stylistic and cultural knowledge of English. For the creation of the digital comic book ComicLab 1.2. was used.

Subject: ICT and English as a Foreign Language
Age group: 15-16
Level: secondary education
Number of students involved: 24
Duration: Four months (one day a week in class during the first month and autonomous work at home after that)
ICT Tools: ComicLab, Word, Mozilla Firefox or Internet Explorer, sound and video recorders and editors, image editors.

Pedagogical objectives
• Promote collaborative work in pairs or little groups.
• Enhance motivation by allowing students to select the topic and content of their tasks.
• Trigger reflective and critical thinking among the students, which should be useful in decision making.
• Help students to be organized and programme their work so as to successfully reach their goal.
• Develop the four language skills (reading, writing, listening and speaking) with the use of a tool that allows for the practice all of them.
• Help students acquire the necessary knowledge of grammar, vocabulary, spelling and phonology to carry out the task at the desired level, always taking into account the level of language competence expected for 4th year secondary school students (upper A2 - low B1).
• Practice creative writing and story-telling.
• Train students in the development of L1-L2 translation skills.
• Use digital tools (ICTs): sound and video recorder, video and audio editor, comic book creator (ComicLab 1.2.).
• Promote the use of the web for research purposes and as a resource, as for example, online references and dictionaries.
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #6 (UNIVERSITY OF GRANADA)

Process

The pilot experience was carried out in a four-month period, with one class a week devoted to the comic book at the initial stages. The programme was implemented following the steps outlined below:

a) Presentation of the pilot experience and the nature and aim of the tasks to be realised by the students.
b) Reflection about comic books and their potential as a learning tool.
c) Administration of a survey among students to learn about their motivation to learn English and their predisposition to using ICT tools and methods in their learning process.
d) Use of “ComicLab 1.2. User’s Manual” as learning material to make students get familiar with the basic terminology in Informatics, as well as the functioning of the digital tool.
e) Selection of volunteers who would like to participate in the experience, planning of tasks, and distribution of the ComicLab 1.2. programme and a Progress Sheet to keep a record of the work done.
f) Periodical revisions (a maximum of three) of the job done by the students, both of the comic book and the progress sheet, giving them feedback.
g) Submission of the comic book and the progress sheet including the assessment of their own work.
h) Projection of the comic book and evaluation of the whole task (by teacher, by peer).

Evaluation

Two kinds of evaluation were carried on:

a) Evaluation by students of the learning experience in terms of the relationship between the use of ComicLab 1.2 and motivation enhancement. This evaluation took place via the submission of a pre-task and post-task questionnaire in order to see whether the use of digital comics had a positive impact on the students’ motivation to learn English.
b) Evaluation by students (self and peer assessment) and teachers of the task performed. Self-assessment had to be done by filling out a questionnaire included in the Progress Sheet and submitted together with the final version of the comic book. Peer assessment evaluated the final product and the class presentation. Finally, teacher evaluation included both continuous and summative assessment.

Follow up

- Practice of collaborative work.
- Use of digital and web resources such as electronic dictionaries and reference books, Wikipedia, online monolingual and bilingual dictionaries.
- Presentation of the web comics to the rest of the class
- Further Evaluation of the experience

Comments

The project encountered one major drawback. All computers in public schools in the Andalusian Autonomous Region work with a freeware operating system called UBUNTU, which
is incompatible with MSWindows – the system used by ComicLab 1.2. Due to this major drawback, an alternative plan was devised. Only students who voluntarily wished to participate and had access to computers working with MSWindows were to continue in the learning experience. These students were to fill in a progress sheet as they advanced in the project and had to hand them in, together with their on-going comic books, to a supervisor who would make comments and corrections periodically. This way, a blended-learning approach was adopted, with a high amount of autonomous learning.

**LINKS**

*Digital tools*

*Teaching resources*
EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

*Online dictionaries and references*
- Reverso Online Dictionary [http://dictionary.reverso.net](http://dictionary.reverso.net)

*Programs of comics integration in schools abroad*
- The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/
- Banchi di nuvole, http://www.banchidinuvole.org/

*Suggestions – lesson plans:*
- ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

*How to write a comic book*
- http://www.wikihow.com/Write-a-Comic-Book
- http://www.wikihow.com/Make-a-Comic
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DELIVERABLE D3.2 – PART II – Short description of Pilot Study #7 (UNIVERSITY OF GRANADA)

DELIVERABLE D3.2

Pilot Study #7 (UNIVERSITY OF GRANADA)

Enhancing Teaching and Learning at Primary School with Digital Resources in the Classroom: A case study using ComicLab (SPAIN)

Abstract
A study case was conducted to explore the ways in which the introduction of new technologies in the classroom can enhance learning, motivate students and benefit teachers. The study was carried out in a Primary School in the area of Guadix, Granada (Spain). The students that took part in the project were from 3 different classes: 3rd (7/8 years old), 5th (9/10 years old) and 6th (11/12 years old) of Primary Education.

The introduction of the web comic book creator ComicLab in the classroom as a teaching resource aimed to engage them in using technology meaningfully and effectively in the English class as a means of producing comprehensible output, both written and spoken. Students were asked to read comics and observe critically the different features of the Comic books, after that they were asked to design their own comic in paper. They were free to choose their topics but encouraged to use English. After a couple of preparatory sessions students were taught how to use the digital comic book creator ComicLab and encouraged to work in small groups to design their own digital comic.

After completing the design of the comic as such they were given the opportunity to practise the dialogues, make adaptations and small changes and record themselves in order to attach an audio file to their comic.

Subject: English as a Foreign Language – Science taught in English
Age group: 7/8; 8/9; 9/10
Level: primary education
Number of students involved: 15
Duration: 10 hours
ICT Tools: ComicLab, Word

Pedagogical objectives:
The potential benefits of introducing digital comics in the classroom can be framed under the broad benefits of technology used with pedagogical aims:

- Technology can raise student’s motivation, and lead to changes in classroom roles and organization.
- Teachers can assume a role of facilitator thus freeing time to support individual learning processes.
- Technology can enhance student engagement and productivity.
- Technology can help students develop positive cooperative learning relationships, enabling them to work together creating presentations, and developing social skills such as debating, compromising, negotiating, etc.

More specifically, this pilot study aims at achieving the following educational benefits:
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #7 (UNIVERSITY OF GRANADA)

- Identify the factors which promote positive and motivating learning experiences
- Enhance autonomy by allowing students to select the topic and content of their tasks.
- Discover viable ways for students to become creative and active learners
- Foster the development of appropriate educational materials for language learning that are effective, interactive, enjoyable and inclusive.
- Develop ICT skills
- Encourage the production of meaningful output (written and oral)

Process:
- **Teachers’ Training:**
  - Several visits to school were organised to meet the teachers involved to show how online comics can be used in the classroom and to introduce them to ComicLab, discussing possibilities for its incorporation in their lesson plans.
  - Each teacher involved and willing to introduce ComicLab in the classroom was invited to the training sessions and given a portfolio with the ComicLab User’s Guide and a timeframe proposal. The latter was to be discussed with each teacher.

- **Defining Researching Motivation:**
  - Before introducing ComicLab in the classroom the teachers asked students to fill in a questionnaire on motivation and attitudes towards learning English. A similar questionnaire will be given to the students at the end of the research.

- **Technical Support and data gathering:**
  - Once the training sessions are over and the teachers decide to introduce ComicLab, the researcher attended several sessions to help the teacher with any technical difficulty. After these sessions, observation and data collection was started. Data was collected to track children’s learning, using methods such as observation and interviews.

- **ComicLab in the Classroom:**

  **SESSION 1:** *Promote a positive and motivating climate in the class.*
  Encourage students to read comics over the next couple of days and come up with ideas for their own comic for the next class. Make clear to them from the beginning that they will be “designers and artists” and that they will be free to choose the topic and content of their comic but that this has to be in English.

  *Introduction to ComicLab:* Show various examples and the interface of the software.

  **SESSION 2:** Students comment on their ideas and the comics they have read. As the comic they will produce has to be in English the teacher has to help them set realistic
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DELIVERABLE D3.2 – PART II – Short description of Pilot Study #7 (UNIVERSITY OF GRANADA)

goals. The whole idea is that they are engaged in the learning process so they need to be able to experience success.

Students are asked to work in groups and select the topic for their comic. Working in groups will demand negotiation and debate. The teacher has to help them in this process. They will decide on the different aspects of the comic: characters, theme, narrator, number of frames, etc.

First tutorial with the students: First introduction to the software

SESSION 3: Each group has already decided on their comic. They show their final idea to the teacher. If it is acceptable and realistic the teacher allows them access to the computer. It is important that the teacher encourages them to use English. Students can look for information about their topic on the internet, they can also look up vocabulary. After exploring the different clipart and backgrounds they start creating their comic.

SESSION 4 - 6: Students work on their comic. The teacher adopts the role of facilitator of the experience. The students are encouraged to look up for new words in dictionaries, books and the internet.

The teacher has to provide feedback on their students work and suggest necessary changes, suggest ideas, etc.

It is important that the children are reminded that they have to use English.

SESSION 7 - 8: Putting everything together. At this stage most of the comics are finished.

The students have now the opportunity to read and practise the dialogues, so it is the right time to focus on correct pronunciation. They will have the opportunity to record their voices and attach the audio file to the comic.

It is important that children feel comfortable and capable of doing the task, so the main role of the teacher at this stage is to support them and reward their performance giving them friendly feedback.

SESSION 9: Once the comics are done each group will be asked to show their comic to the rest of the class. If the principal, principal and students considerer it appropriate they can upload their comics in their school website.

LINKS
Digital tools

- ComicLab by ItsArt Ltd, (http://www.itisart.com.gr)

Teaching resources
EDUCOMICS Resources for teachers available on EDUCOMIC project web site
http://www.educomics.org/

Online dictionaries and references

- Longman Online Dictionary of Contemporary English (http://www.ldoceanline.com)
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DELIVERABLE D3.2 – PART II – Short description of Pilot Study #7 (UNIVERSITY OF GRANADA)

- Reverso Online Dictionary (http://dictionary.reverso.net)
- Wikipedia (http://en.wikipedia.org)

Programs of comics integration in schools abroad
- The Comic Book Project, Center for Educational Pathways, http://www.comicbookproject.org/
- Banchi di nuvole, http://www.banchidinuvole.org/

Suggestions – lesson plans:
- ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, http://www.readwritethink.org/

How to write a comic book
- http://www.wikihow.com/Write-a-Comic-Book
- http://www.wikihow.com/Make-a-Comic
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #8 (KINDERSITE)

Pilot Study #8 (KINDERSITE)

Digital comics to develop students’ independent active language learning (Secondary/Adult school – Czech Republic)

Abstract
This study focused on promoting students’ independent active learning at a Secondary/Adult school in Brno (Czech Republic). The purpose of the research was to check the options and the challenges of web comics as a medium in promoting the transfer of responsibility for the learning process to the students, maximizing the use of simple language for lower-leveled students language for the higher-leveled ones, lower students’ barriers and minimizing stress by connecting the study to the comic characters. This study was conducted on groups of 60 students working together in groups of 15 guided by the teacher. The students learned to implement a subject learned by assessing the tasks ahead and turning ideas into action by creating a comic strip. It was found that use of the tool promoted creativity and self-expression, language boundaries became lower up to a level students became proud of their activities.

Subject: English A2 of CEFR
Age group: 18 – 30
Level: Secondary/Adult school
Number of students involved: 60
Duration: 4 rounds 2 hours each time
ICT tools:
- Make Beliefs Comix http://www.makebeliefscomix.com/
- KiddoNet http://www.kiddonet.com/
- Strip Creator http://www.stripcreator.com/make.php
- Read Write Think http://www.readwritethink.org/files/resources/interactives/comic/

PEDAGOGICAL OBJECTIVES
- Support independent active learning, which is crucial in the process of acquiring L2.
- Enhance student’s motivation to learn languages by using an active learning tool.
- Transfer responsibility for the learning process to the real subjects of the studying process – on the students.
- Strengthen language skills through an enjoyable and fun way which is a strong motivator for the students.
- Communicate a message in a highly personalized way and creative design.
- Reflect about the topic, make a creative use of grammar and syntactical structures, and a range of vocabulary appropriate to a comic strip format.
- Maximise the use of simple language for lower-leveled students, and to use a variety of language registers for the higher-leveled ones.
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #8 (KINDERSITE)

- Lower students’ barriers to production and minimize stress connected to productive skills as this instrument allows them to express contents confidently through the comic characters.
- Develop creative ways for students to add audio and/or video to their comics.
- Increase students’ ICT skills.

PROCESS
Generally, a group of 15 students worked in each lesson guided by the teacher. The learning process included
- explanation of the goals,
- practical example of creating a comic strip,
- discussing the process and envisaging the results,
- assessing the task and its topic,
- and finally, turning ideas into action.

Steps:
1. The teacher presented to the class the new resource showing it on a projector screen connected to a PC with Internet access. He showed the students several websites which they can use to produce their own comics in order to give them opportunity to choose the website they like the best.
2. As an example, the teacher showed the students how to make a comic and created a sample one using the widest range of options for designing the comic to give them a clear idea of how to work with the comic strip creator.
3. After that, the teacher opened a discussion about how the students think the comics can work and on what themes. Several themes were brainstormed and discussed.
4. The teacher decided a theme and set a time limit to accomplish the task. He chose the grammar and vocabulary topic they had been studying in the last lesson.
5. As homework, the students practiced exploring the comic resource on their own computers, and finally, they produced their own comic strips. They were autonomous in choosing the characters, background, size, number of panels, and the content of the speech bubbles providing they respected the theme given.
6. Afterwards, they presented their printed creations to the class and corrected possible mistakes with help of the teacher. The printed versions which the teacher numbered were passed round the class. The teacher asked the students to note down the number of the comic strip the students liked best.
7. The three comic strips which received most votes were displayed on class notice board.

EVALUATION
The inner class evaluation was completed by the students themselves. According to stated criteria (adequacy of the comic strip content, use of grammar and vocabulary, original design and use of the comic tool – characters, speech bubbles, background, etc.) they chose the comics written by their classmates and decided which they liked best.

A deep evaluation was carried out by the teachers and methodical evaluators. The research was evaluated with respect to the result’s relevance to the projects mission and the assigned
homework theme. This means the results should clearly articulate the overall purpose of the homework, use different comic strip functions, include coherent and adequate speech bubbles content, and prove understanding and management of digital comic tools.

After checking the initial beliefs and assumptions and compared with the results, it was proved that the initial assumptions were achieved on most of the points, and were appreciated by the students who wish to repeat work with comic strips and carry it further.

The most interesting observations of the piloting are that:
1. the format allows creativity and self-expression
2. the format lowers boundaries to use of a target language in the CEFR levels tested as student experimentation before finalization is easily achieved
3. the discipline and restrictions of the format have a positive effect
4. the images included enable the stories created to be expressed more easily and completely than just text based stories
5. the supply of professional images and features by the digital comic tools allows students work to also look professional and something that, irrespective of level, they can be proud of.
6. the tools add ‘scaffolding’ to their work

Specifically, it was found out that:
- In general, students particularly enjoyed work with the comic strip creator and expressed their happiness with this tool and referred it as an easy, creative and enjoyable tool.
- It was noted that students with poorer language skills were especially happy using these tool because with limited capabilities in the language they were still able to produce real results.
- The open positive evaluation of results by all the peer group of students produced excellent motivation to continue and improving target language learning and also making comics.
- Students appreciated that the comic strip format can be completely adapted to their likes and needs and that they can work on them independently.
- It is interesting to observe the individualism and self-expression in the comic contents each student created. Motivation, their own creativeness and desire to express themselves stand behind their products.
- Great majority expressed the wish to continue using the tool and produce more comic strips and also make use of the additional comic tools like audio recordings.

FOLLOW UP
Use of web based digital tools brought the following results:
- The teacher observed differences between students in their attitude towards the comic strips: Although there were a few students who didn't appreciate this tool a vast majority of the students stated their complete satisfaction with it. Lower-level students particularly liked it because they were able to express themselves with funny and smart comics with limited vocabulary and grammar command;
- Advanced students utilized the tool as a challenging format for creative usage of their language skills in which they need to consider each word to produce the right content.
within the constraints of the format. Comic strip also advanced class and group cohesion irrespective of whether the students carried out the project in pairs or small groups or individually, as results and ideas were shared by the whole group.

- As a result of motivating effect of the comic format appealing for students, they pronounced their wish to continue with further developmental use of audio and video for language learning.
- Alongside these benefits, their desire to continue learning the language, and acquire new phrases, informal speech, increased noticeably. The production of comic strip speeches helped to improve student’s skills in communication and narrative skills. Also spelling awareness increased as the students are able to control a short phrase in a better way than in long written tasks.
- There was a noticeable impact of the comic tools on the student’s communication and technology skills. Students who took up the challenge to work with a new ICT tool showed an increase in ICT skills.

**LINKS**

*Digital tools*


*Teaching resources*


*Programs of comics integration in schools abroad*

- The Comic Book Project, Center for Educational Pathways, [http://www.comicbookproject.org/](http://www.comicbookproject.org/)

*Suggestions – lesson plans:*

- ReadWriteThink of NCTE INTERNATIONAL READING ASSOCIATIONS, [http://www.readwritethink.org/](http://www.readwritethink.org/)

*How to write a comic book*

- [http://www.wikihow.com/Write-a-Comic-Book](http://www.wikihow.com/Write-a-Comic-Book)
• http://www.wikihow.com/Make-a-Comic
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #9 (KINDERSITE)

DELIVERABLE D3.2
Pilot Study #9 (KINDERSITE)
Use of Educational Digital Comics to support language learning in a group of UK students aged 12-13 (UK)

Abstract
This study focused on a pilot programme to create educational digital comics to support learning of French and German was conducted in a secondary school in the north of England. The school is in a deprived area where 25% of students live in homes in which nobody is in employment. The ComicLab application was used as the tool to creat comic strips by the students. The students had a variety of tasks to complete using the ComicLab. The students had to identify vocabulary and phrases in French or German which they can use imaginatively to create a scenario suitable for production in a comic strip and were challenged to choose grammatical structures. The Students practise by preparing comic strips with audio and/or video, using the resource on their own computers in the computer room, choosing characters and finalising their choice of vocabulary, phrases and grammatical structures. The completed comic strips were then projected in the classroom and peer review and uploaded on the school VLE for use by peers and younger students.

Subject: French German ICT
Age group: 12-13
Level: CEF A2
Number of students involved: 26 (started)
Duration: Four weeks 3 hours per week at school
ICT tools:
Interactive whiteboard, “ComicLab” resource

School profile:
The school is in a deprived area where 25% of students live in homes in which nobody is in employment. Unusually for schools with this profile in England, the head teacher made the decision to highlight the study of foreign languages as a key skill to enhance higher education opportunities for students. The school offers French, German, Spanish and Mandarin Chinese during curriculum time and Italian and Latin, as part of their extra-curricular programme. Although the school is in an area of deprivation, it is a popular choice for parents. Attainment and achievement are very good and, like the majority of English secondary schools, it is well resourced with technology and computers. Teachers are used to integrating the use of ICT into their lessons.

Participating teacher:
The teacher who engaged in the pilot programme is an expert in the use of ICT in the teaching and learning of modern foreign languages. She delivers training to other teachers of languages and has published articles and papers on the integrated use of ICT.
Potential uses of the resource:
When analysing the possible use of the resource and planning students’ activities, the teacher saw great potential in “ComicLab”. She was particularly excited by the thought of students having the facility to create presentations which could be posted on the school VLE for viewing and sharing by their peers. Her session plans included opportunities for the students to prepare cartoons in a language of their choice so that they were using learned language for a specific purpose i.e. creating practice materials for their peers or younger students and promoting independent learning. She hoped that they could create resources to demonstrate grammatical points and that these resources could be utilised by other students to elicit grammar rules for themselves, thereby developing their PLTS (Personal, learning and thinking skills) as required by the English National Curriculum.

Initial teacher comments:
“What I did like very much was that it was very simple to use. The interface was simple and it worked like a dream on my laptop. The pupils were particularly impressed by the way the pages turned.”

Language teachers in the UK have been looking for ways in which their students can create comics in order to support their language learning for some time. They have been using available web based programmes. The teacher engaging in the trial made the following comment:
“My worry with a lot of these things is that they can help to develop pupils’ reading skills but are of no benefit to their listening skills. This is not the case with “ComicLab” because, with this resource, it is easy to insert audio files and video files and this means that it has a lot of capability.”

PEDAGOGICAL OBJECTIVES
- Student understanding of functions and possible uses of “Comic Lab” through modelling
- Student identification of vocabulary, syntax and grammar appropriate to transfer to multimodal texts in comic strip format
- Student understanding of how to maximise the use of simple language
- Student collaboration leading to production of multimodal texts using the tool to decide upon their script, characters and background design, leading to production
- Development of creative ways for students to add audio and/or video to their comics
- Critical analysis of production through reflection and self evaluation (of quality and accuracy of language and efficient use of the resource)
- Publication of end products in Virtual Learning Environment for peer review and ongoing use for learning by other students

PROCESS
Sessions were planned to take place during a four week period with one teacher led session per week plus time for collaborative planning and use of the tool by students, who would have further time to work together in a networked computer room whenever they could devote time to their project.
Plans included the following elements:
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #9 (KINDERSITE)

a. Presentation of the resource and modelling of comic production on interactive whiteboard.
b. Students explore elements of the resource with the support of help sheets.
c. Students collaborate in discussion of possible narratives and range of uses.
d. Students identify vocabulary and phrases in French or German which they can use imaginatively to create a scenario suitable for production in a comic strip. (choice of background, characters and story). They are challenged to choose grammatical structures.
e. Students practise using the resource on their own computers in the computer room, preparing their storyboard, choosing characters and finalising their choice of vocabulary, phrases and grammatical structures.
f. Students add audio and/or video to complete their digital comic.
g. Projection of the digital comics in the classroom and peer review.
h. Uploading of the completed comics on the school VLE for use by peers and younger students.
i. Evaluation of the resource by students through online questionnaire.

Steps:
1. The teacher presented to the class the new resource showing it on a projector screen connected to a PC with Internet access. He showed the students several websites which they can use to produce their own comics in order to give them opportunity to choose the website they like the best.
2. As an example, the teacher showed the students how to make a comic and created a sample one using the widest range of options for designing the comic to give them a clear idea of how to work with the comic strip creator.
3. After that, the teacher opened a discussion about how the students think the comics can work and on what themes. Several themes were brainstormed and discussed.
4. The teacher decided a theme and set a time limit to accomplish the task. He chose the grammar and vocabulary topic they had been studying in the last lesson.
5. As homework, the students practiced exploring the comic resource on their own computers, and finally, they produced their own comic strips. They were autonomous in choosing the characters, background, size, number of panels, and the content of the speech bubbles providing they respected the theme given.
6. Afterwards, they presented their printed creations to the class and corrected possible mistakes with help of the teacher. The printed versions which the teacher numbered were passed round the class. The teacher asked the students to note down the number of the comic strip the students liked best.
7. The three comic strips which received most votes were displayed on class notice board.

EVALUATION
The initial session to introduce the students to the resource and to model examples of digital comics was extremely well received by the students. Language teachers in the UK often find it difficult to reduce the gap between girls’ and boys’ achievement in the study of modern foreign languages. Research has shown that the integrated use of ICT in boy’s learning has been particularly successful in motivating and engaging boys in the language learning process. In the first session, the teacher noted that: “the boys were very impressed with the
programme”, but qualified her comment by adding that: “as ever, teachers need to ensure that they spend as much time ensuring that their language is correct as they do in making sure that it (the product of the integrated ICT resource) looks good.”

The students spent productive time in identifying language and grammar points in French or German which they could use in their digital comics. They collaborated in their choice of background and characters and practised pronunciation and register to match the characters chosen. They were excited about the possibilities offered by the resource. They appreciated the opportunity to create digital comics for the use of their peers and younger students and were pleased that there were plans for their efforts to be displayed on the school VLE.

Unfortunately, the trial was hampered by problems in loading the tool onto the computers available for student use in the school computer room. (It should be noted that most schools in the UK are very well resourced in ICT, but the networks are often managed by the local authorities linked to the schools. Technicians sometimes find it difficult to install programmes on school networks as protection is very high.)

In spite of considerable effort on the part of technicians, the problem remained unsolved. This problem and time constraints meant that the full number of students originally planned to take part in the trial were unable to complete the development of their digital comics. However, most of the aims expressed in the pedagogical objectives were fulfilled and a small group of 4 students was able to complete their project using the teacher’s laptop.

Students and the teacher expressed the views that:

- “ComicLab” is easy and enjoyable to use;
- The user guide is helpful with clear and simple instructions;
- The ease of use is particularly important for language learners as they need to devote less time to ICT and can concentrate on their use of language;
- Students of CEF level A2 can use “ComicLab” productively to improve their language learning and to use language for a real purpose e.g. to provide resources to support the learning of others;
- “ComicLab” is flexible and students appreciate the facility to personalise their presentations with their own imported images;
- “ComicLab” differs from many online sites for the creation of digital comics in that audio and video can be added;
- Being able to add sound to the students’ productions is essential for development of the full range of language learning skills;
- Creating presentations with “ComicLab” is particularly motivating for young boys learning languages, helping them to concentrate on how they can maximise and consolidate their language through (enjoyable) repetition;
- “ComicLab” supports independent learning and collaborative activities, which is important for language learning for young students, who can feel intimidated about speaking in another language. With this tool, they can speak confidently through their characters.

FOLLOW UP

- Continued practice in collaborative writing of comic strips
- Further developmental use of audio and video for language learning
- Use of web based digital tools
- Creation of digital comics to enhance language learning
DELIVERABLE D3.2 – PART II – Short description of Pilot Study #9 (KINDERSITE)

- Liaison with teachers at other schools regarding their use of digital comics for language learning

LINKS
Bill Zimmerman (January 2010) “Using digital comics for language learning”
http://www.elearnmag.org/subpage.cfm?section=articles&article=109-1

“Improving Scottish education: ICT in learning and teaching”

Bill Zimmerman’s www.makebeliefscomix.com
www.toondoo.com
www.makebeliefscomix.com
http://comiclife.com/education
PART III: Pilot Studies Detailed Reports (see separate documents)
The use of web comics in developing students’ understanding of the distinction between observation and inference

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Abstract
This study focused on promoting primary school students’ understanding of an aspect of the nature of science that pertains to the distinction between observation and inference. Observations are descriptive elements about natural phenomena that are accessible through senses (or extensions of senses) and about which several observers can reach consensus with relative ease. By contrast, inferences are statements about phenomena that are not “directly” accessible to the senses. A scientist can infer models or mechanisms that provide a self-consistent interpretation for observations of complex phenomena. The process of inferring is an attempt to explain or speculate about the observations. We have developed a teaching and learning sequence that engages students in the study of specific instances from the history of science with the use of web comics as an instructional medium for promoting the learning objective. The purpose of the research was to investigate the successes and challenges of web comics as a medium that scaffolds the learning process and engages students in explicit epistemological discourse that draws on authentic stories from the history of science. The study reports on results from the pilot implementation of the activity sequence with a class of sixth graders that draw on various data sources such as written tasks, interviews, classroom observations, students’ web comic books.
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1. Introduction
An important objective of science education is to promote scientific literacy. Helping students to develop an understanding of the Nature Of Science (NOS) is one of the primary goals of scientific literacy (AAAS, 1990; Millar & Osborne, 1998; NRC, 1996; Taber, 2008). NOS also known as epistemology of science, or science as a way of knowing, refers to the values and assumptions inherent to scientific knowledge and the development of scientific knowledge (Lederman & Lederman, 2004). Despite the fact that there is no agreement among philosophers, historians, and sociologists of science on a specific definition for NOS, there are some aspects or characteristics of the scientific enterprise accepted by a number of researchers (Abd-El-Khalick, Bell & Lederman, 1998; Lederman, 2007; Osborne, Collins, Ratcliffe, Millar, Duschl; 2003) that could be taught in science education. These aspects include understanding that scientific knowledge is tentative, empirically based, subjective, partly the product of human imagination and creativity, socially and culturally embedded. Two additional aspects are the distinctions between observations and inferences, and the functions of and relationships between, scientific theories and laws. This viewpoint is known as the consensus view in the epistemology of science.

This study focused on helping students develop an understanding of observation and inference and the distinction between the two. Both are products or outcomes of the scientific enterprise. Observations are descriptive elements about natural phenomena that are “directly” accessible to the senses (or extensions of the senses) and about which several observers can reach consensus with relative ease (Lederman, 2007). By contrast, inferences are statements about phenomena that are not “directly” accessible to the senses. A scientist can infer models or mechanisms that provide a self-consistent interpretation for observations of complex phenomena. The process of inferring is an attempt to explain or speculate about the observations (interpretation).

One important reason for understanding this aspect of epistemology of science is that it facilitates science learning per se. Driver et al. (1996) labeled this as the “science learning argument” for NOS instruction. Students cannot observe all phenomena directly thus they cannot rely only on observations to explain a phenomenon. Learners need to distinguish between observation and inference and eventually develop the skills of observing and inferring in order to construct explanations for phenomena (Hanuscin & Rogers, 2008). For example, when students study electrical circuits they cannot see electrical currents. Instead, they make inferences about the flow of current from their observations of the brightness of the bulb. Adding bulbs to a circuit in series, it can be observed that bulbs get dimmer but remain equally bright. From this, they may infer that the current has lessened although each of the bulbs receives the same amount of current. Combining observation (lights equally dim) and inference (current lessens but the same amount of current flows through each bulb), students can explain how resistance affects the flow of
current in a circuit. Furthermore, pointing out the significance of observing and inferring will help students understand how scientists generate knowledge about the world since research shows that students usually believe that scientists use only observations when developing explanations, as they do not understand the significance of inference to scientific work (Akerson & Abd-El-Khalick, 2005, Akerson & Volrich, 2006). It follows that there is a need for science educators to develop teaching and learning materials that will both teach science concepts and promote aspects of the nature of science.

Although science educators understand the significance of developing students’ understanding of nature of science, previous research efforts have shown that students possess inadequate views of nature of science regardless of the curricula, research interventions used to enhance their views and grade level (Crumb, 1965; Jungwirth, 1970; Meichtry, 1992; Khishfe & Lederman, 2006; Lederman, 2007). This might be due to the hypothesis that learning of nature of science occurs automatically as a result of studying science and engaging in inquiry activities (Abd-El-Khalick & Lederman, 2000; Khishfe & Lederman, 2006).

Considering the numerous attempts that have been taken to develop learners’ views of nature of science, there are different approaches of promoting epistemological understanding. The present study investigated the influence of an explicit, both integrated and nonintegrated teaching of the characteristics of science enterprise using historical cases. In an explicit integrated approach the goal of improving students’ understandings of nature of science is planned for and explicitly addressed in relation to the regular science content. Results from previous research have shown that an explicit approach is relatively more effective in improving students’ conceptions of nature of science than an implicit approach (Abd-El-Khalick & Lederman, 2000; Khishfe & Abd-El-Khalick, 2002; Lederman, 2007; Peters, in press). A recommended teaching strategy is to use historical instances, cases and vignettes as a context for teaching characteristics of the science enterprise (Abd-El-Khalick & Lederman, 2000; Khishfe & Abd-El-Khalick, 2002; McComas, 2008). However, results regarding the effectiveness of a historical approach are at best inconclusive (Khishfe & Abd-El-Khalick, 2002; Lederman, 2007) thus constituting an important reason for research.

Furthermore, research on developing elementary students’ ideas of nature of science using historical episodes is limited. In addition, McComas (2008) suggests that a science lesson including historical episodes could convert a simple recitation of facts into an authentic adventure while others (Solomon, 2002; Sutton, 1996) claimed that the introduction of human interest into the science classroom might enhance some understanding of the nature of science. These suggestions need to be empirically investigated. Research in using a historical case in developing elementary students’ understanding of nature of science would contribute fruitfully in this domain of science education research.

According to Sutton (1996) incorporating an authentic story from the history of science would introduce students both to the scientific ideas of a scientist and also the
exertion involved in persuading the scientific community and the society, more broadly, of the credibility of these ideas before becoming public knowledge. By becoming exposed to the language of scientists, students will have a better picture of the nature of the scientific enterprise (Sutton, 1996). Moreover, encouraging students to rephrase such language would provide them with a broader range of ordinary human language, including narratives, thus science lessons would be attractive to more students (Sutton, 1996; Avraamidou & Osborne, 2008; Boström, 2008). A narrative is a special kind of discourse that includes a variety of meanings that contain the telling of stories, and also knowing and knowledge (Solomon, 2002). Previous research suggests that learning science and helping students becoming literate readers and writers are reciprocal processes that promote learning in the two disciplines (Akerson & Flanigan, 2000; Casteel & Isom, 1994).

On this account, the present study sought to use webcomics as a teaching tool in order to engage students in epistemological discourse to develop learners’ understanding of aspects of nature of science. Comics are composed of chronological sequential images or pictures and they are usually accompanied by text narrative. Comics that can be viewed on the World Wide Web are called webcomics. Webcomics potentially constitute a tool for scaffolding the learning process since it can be used as a means for developing skills in researching, writing, nonverbal communication and reading comprehension (Versaci, 2001; Morisson, Bryan & Chilcoat, 2002; Yang, 2003). Moreover, some research evidence suggest that webcomics have the potential to motivate students, promote learner involvement, enable students to exchange ideas, construct knowledge collaboratively and also be used as a learning resource for informal assessment (Naylor et al., 2001). These suggestions need to be studied through empirical research for which appropriate curriculum material could be developed. Considering the above this case study aimed to answer the question: How can webcomics be used in the science classroom in order to engage students in epistemological discourse regarding the distinction between observation and inference?

2. Teacher and school Profile

The teacher that developed and implemented the learning activities had nine years of teaching experience with young learners in primary school settings. She was supported in designing and implementing these activities in terms of her master thesis of her graduate studies at the University of Cyprus in the “Learning in Science” program. During her in-service teaching she did not receive any additional training with respect to using ICT tools. The study was held at the school were the teacher was positioned for the school year 2009-2010. This school was an urban elementary school and the study was carried out with the participation of a sixth grade class of students (N=17) aged 11-12 years old.
3. Lesson plan description

3.1 Details
Subject: Science
Topic: Using digital comics to develop students’ ability to distinguish between observation and inference
Age group: 11-12
Level: elementary school (sixth grade)
Duration: 5 x 80 minute lessons
ICT tools: ComicLab

3.2 Learning objectives
Students are intended to develop their understanding with respect to the distinction between observations and inferences and specifically appreciate:

- observations as descriptive statements about natural phenomena that are accessible through our senses
- inferences as invented statements that provide explanatory frameworks for observations
- that it is possible to formulate a number of alternative inferences for a specific observation; disagreement on inferences is a productive scientific activity
- that disagreement on observations needs to be resolved through repetition of the data collection process and associate procedures
- that the validity of inferences can be assessed based on the extent to which they can account for observations
- the distinction between discovery and invention and associate the former with observations and the latter with inferences
- the idea that while scientists draw on observations they also need to use their creativity to formulate theoretical interpretations

3.3 General description of the teaching material
During the implementation of the learning activities, students work in groups of 3-4 members under the guidance provided by the teaching material and teachers. Research suggests that learning about the nature of science requires explicit discussion and reflection on the aspects of the scientific enterprise that are to be developed (Abd-El-Khalick & Lederman, 2000; Khishfe & Abd-El-Khalick, 2002; Lederman, 2007). The Physics by Inquiry
Pedagogy is the teaching and learning framework that is applied for instruction (McDermott et al., 1996). Within this framework, teaching does not include any lecture but it is conducted through small autonomous, group investigations in inquiry activities that are designed so as to highlight particular characteristics of scientific knowledge and initiate epistemological discourse within the group discussions. Through the Physics by Inquiry Pedagogy (McDermott et al., 1996) the teacher coordinates group and class discussions by posing questions and identifying difficulties experienced by students and helping students overcoming these difficulties by initiating discourse. In this explicit approach both integrated and nonintegrated activities were developed.

Nonintegrated activities consist of an adapted activity proposed by Bell (2008), which addresses differences between observation and inference among other aspects of the nature of science. In this activity students observe patterns of fossil tracks, make observations and inferences and in sequence revise their observations and inferences as more of the fossil is exposed. The specific activity is adapted so as to specifically address the learning goals that resulted from the analysis of the learning objectives as presented in the previous section. Another important adaptation made is that the whole activity is designed so as to be carried out using the ComicLab.

An incomplete set of comic strips are designed so that they present the story of four characters that are trying to explain patterns of fossil footprints revealed in a book that one character reads. During this exploration characters are engaged in a discourse and try to define and distinguish observation and inference. Students navigate through the comic book story and participate in the characters’ discussion by expressing their agreement or disagreement with a comic character. Students’ opinion is asked at various points where they are asked to complete dialogue balloons of a character. In this way learners do not hesitate to express their opinion since if it might later be concluded to be wrong, then the critique will be referred to the cartoon character (Stephenson & Warwick, 2002).

Literature review suggests that comics potentially constitute a tool for scaffolding the learning process since this tool can be used as a means for developing skills in researching, writing, nonverbal communication and reading comprehension (Versaci, 2001; Morisson et al., 2002; Yang, 2003). On this account in the third activity students are given the opportunity to create and share their own comic books (Morisson et al., 2002). Groups are given specially structured stories concerning scientific concepts that were invented in order to observe and interpret natural phenomena. In this integrated activity students are asked to transfer the stories in digital comic format using the webcomic medium that research suggests that it is an effective, promising, and instructional and plurimedia medium that combines text, imagery, hypermedia and streaming elements and all these are in favour of engaging students in explicit epistemological discourse by utilizing authentic stories from the history of science in order to develop students’ awareness of aspects of the nature of science (Yang, 2003; McCloud, 2006).
3.4 ComicLab

The teaching and learning activities were designed so as to be carried out using the ComicLab. ComicLab is a windows software application that can easily be used by young learners for creating digital comics offering a number of capabilities. Using ComicLab students could construct their own multimedia comic stories by inserting characters and boarders and adding hyperlinks, sounds and videos into the text balloons. ComicLab provides infinite canvas while panels as well as characters and boarders can be enlarged, minimised, flipped horizontally or vertically. In addition, text can be formatted while comic stories can be saved and further altered whenever is desired. Users of the ComicLab can easily export their comic books as interactive flipping books and/or PDF files. In addition, comic books can be published on the World Wide Web.

3.5 Description of the learning activities

The sequence of learning activities is divided in three parts.

PART A: FAMILIARIZATION WITH THE TOOL (1 X 80 MINUTE LESSON)

During the first part students are acquainted with ComicLab using a learning guide (Appendix 3). Students attend a workshop which includes a series of activities that aim to help pupils learn how to use the tool and become familiar with all the capabilities the tool offers. The teacher ensures that students follow all the instructions of the learning guide and provides help and guidance whenever it is necessary.

PART B: TRICKY TRACKS (2 X 80 MINUTE LESSON)

**Introduction:** Students read an introduction in a comic strip where the characters of the story that will follow are introduced (Appendix 4). Learners follow the instructions of a handout (Appendix 5).

**Activity 1:** Students use a set of predesigned incomplete comic strips prepared by the teacher (Appendix 6). After reading the comic strips students engage in a discussion guided by the teacher where they have to identify which character has presented information that is accessible through our senses. The aim of this activity is to help students conclude that information accessible through our senses is called ‘observations’ as well as differentiate observations from other statements that the characters mention.

**Activity 2:** In this activity students are guided so as to complete a set of predesigned incomplete comic strips in order to develop a comic story to explain patterns of fossil footprints that are gradually revealed in the story (Appendix 6). During this inquiry activity students will engage through questions posed by the comic characters on explicit epistemological discourse concerning the role of the observation and interpretation. Additionally, the story is appropriately structured so as to provide starting points for students to reflect and discuss in their group as well as with the teacher on the intended
aspects of the distinction between observation and interpretation. More specifically, students practice on making observations and interpretations, differentiate between statements of observation and interpretation as well as distinct between discovery and invention and associate the former with observations and the later with inferences. Additionally, the goal of this activity is for students to realize that the interpretation imparted for an observation is a product of invention and creativity. At the end of this activity, a class discussion follows where students review the definition of, and differences between observations and inferences.

Activity 3: This activity includes the third part of the predesigned incomplete comic strip story (Appendix 6). As in the previous activities learners are asked to help the characters of the story record observations and make interpretations. Additionally, the purpose of this activity is to engage students in epistemological discourse where they debate on which interpretation is wrong or right. The objective is for students to appreciate that the validity of inferences can be assessed based on the extent to which they reflect, and account for, the observations on which they are based. After completing the comic strips, a class discussion follows. During this discussion the goal is to challenge each group to reach consensus with the entire class both on observations and interpretations. Groups agree on the observations recorded but they experience difficulty in reaching consensus regarding interpretations. Learners should realize that a number of inferences can be made based on a specific observation thus there is less chance for agreement on inferences and in addition understand that observation data can lead to or support an inference rather than prove it absolutely. On the contrary, class discussion should help students realize that they can easily reach consensus about their observations since observations are descriptive statements that are accessible through our senses. After the discussion the last page of the predesigned comic strips is read by the students where the idea that scientists use both observations and interpretations in order to construct scientific knowledge is introduced by the characters of the story.

PART C: SCIENTIFIC STORIES (2 X 80 MINUTE LESSONS)

Activity 1: At the beginning of this activity on a video projector the entire fossil print pattern which was eventually revealed in the previous activities appears (Appendix 7). At the same time, a story about the fossil tracks prepared by the teacher is read aloud. It follows a class discussion during which students are asked to identify the observations recorded by the scientists of the story as well as to identify the interpretations made by the scientists of the story. The purpose is to review the definitions of observation and inference and exercise students in differentiate between the two. Additionally, one of the interpretations in the story is not supported by the observations recorded, thus a class discussion aims in evoking the differences between observation and interpretation. At the end of this discussion the
teacher connects the aspects of observation and interpretation of the scientific enterprise with the work of scientists and the development of scientific knowledge.

Activity 2: After the discussion groups are randomly given specially structured stories concerning scientific concepts that were invented in order to interpret natural phenomena. Each story is in a narrative form presenting observations and two interpretations proposed by scientists on a natural phenomenon. Stories derived from ecology and referred to dinosaurs’ extinction, to eels’ extinction from Cyprus and to Rosa chionistrae, a wild rose that flourishes only on the highest peak of Troodos mountain in Cyprus (Appendix 8). Students are asked to transfer the stories in digital comic format. Within this context students are engaged in discussions with the teacher so as to further elaborate the distinction between observations and inferences and to associate this with the nature of science and specifically with the way scientists work in order to invent interpretations for their observations on natural phenomena in the story each group reads. The aim is to further refine students’ understanding of the role of observation and inference in the construction of scientific knowledge. Additionally as they explore real science stories they apply their understanding of observation and interpretation to the development of scientific knowledge. On this account, learners’ are asked to create stories and communicate their understanding as regards observation and inference and the distinction between the two since students are informed by the teachers that the story composed by each group should present a story that could be used to address differences between observation and inference in another class. Therefore, students’ stories should incorporate the given episode form history of science and concurrently demonstrate what were the observations recorded for the natural phenomenon, what were the interpretations proposed by the two scientists and illustrate scientists’ debate on whether they agree on their observations or interpretations.

Activity 3: Each group presents their story to the class. After each group’s presentation a discussion follows where students are asked to state the observations recorded for the natural phenomenon of the story as well as the interpretations suggested by the scientists of the story. Learners also revise on the distinction between observation and inference by discussing which interpretation is correct in every story presented and whether it is possible to reach class consensus as regards scientists’ observations and interpretations.

3.6 Evaluation
The research is evaluated with respect to the following aspects: (a) students’ beliefs and attitudes concerning web comics as a learning medium, (b) students’ awareness of the distinction between observation and interpretation. The evaluation stems from several data sources:

- Written tasks: students complete close-ended and open-ended tests prior to and after the implementation
4. Implementation
The learning activities were tried with a class of sixth graders aged 11-12 years old (N=17). The implementation took place at an urban public elementary school in April-May 2010. During the implementation of the learning activities which lasted five 80-minute sessions, students worked in 3-member groups.

5. Data Collection
Multiple sources of data were collected prior to, during and after the implementation of the teaching and learning materials. Each participant (N=17) was sequentially administered both written tasks before implementation. Six of them were chosen randomly to be individually interviewed in order to clarify ambiguities, assess meanings that respondents ascribe to key terms and phrases, and explore respondents’ lines of thinking. The implementation followed which consisted of five eighty minutes lessons and was coordinated by two teachers. After the intervention the same written tasks were administered to all participants and interviews with the same students followed. Protocol written tasks after the implementation consisted of two parts.

5.1 Written tasks and interviews
The two written tasks used to evaluate students’ awareness with respect to the distinction between observation and interpretation prior to and after the implementation were developed by Papadouris (2009) and included both open and closed-ended tasks (Appendix 1). The use of open-ended items allows participants to elucidate their own views and the assumptions that underlie these views while helping to avoid the imposition of researchers’ views (Lederman et al. 1998).

The first written task focuses on assessing how students differentiate between observation and interpretation. The second written task evaluates students’ ability to distinguish between discovery and invention by connecting the first to recording empirical, observational data and the second with interpreting phenomena. Follow-up interviews (Appendix 2) were conducted with 30% of the students (N=6) for various reasons: (a) to further establish the validity of the open-ended tasks, (b) to provide opportunities to explore the respondents’ views in-depth and in addition, (c) to assure that the researchers’ interpretations on open-ended questions in the written tasks agree with those of the
participants. During the interviews students were asked to respond orally to tasks identical to the written ones. Additionally, during the interviews held after the implementation participants’ attitudes and beliefs concerning their experience with webcomics as a learning medium were evaluated (Appendix 2).

5.2 Video data
Group discussions and discussions between the group and the teacher, i.e., students’ engagement in epistemological discourse with respect to the aspects of observation and inference and the distinction between the two were videotaped for examining issues relating to the appropriateness of the activity sequence in promoting its learning objective. Also, all the activities where students use the webcomic tool were videotaped so as to investigate the tool’s potential contribution in teaching and learning.

5.3 Students’ webcomic books
Students’ webcomic pages that were constructed throughout the implementation of the learning material were collected as data and were analysed so as to document their progress and difficulties as the teaching process proceeded.

5.4 Teachers’ notes
In addition, teachers’ notes were kept in order to record difficulties with respect to the teaching material and its implementation thus providing a series of thoughts and ideas that allow the researcher to reflect on teaching practice.

5.5 Non participant observation
During the implementation a non participant observer recorded observations regarding students’ behavior, attitude and interaction with the webcomic tool as well as groups’ interactions and engagement in discussions.

6. Data Analysis
Data from all sources (interview transcripts, students’ webcomic pages, observation recorded by non participant observer, teachers’ notes) were all appropriately organized and analyzed with respect to investigating the research question of this pilot case study. Specifically, interviews were transcribed and all other data were gathered through the evaluation tasks. Additionally, the audiovisual material and observation sheets were analyzed. Concerning the written tasks students’ responses were compared prior to and after the pilot implementation, while the qualitative data were studies by the research group in order to outline interesting elements with respect to the research question. The research group then formulated specific aspects of webcomics contribution to learning. Analyzing data from multiple resources promoted reliability.
7. Major findings addressing the research question

This section presents and discusses the results of analyzing data derived from interviews after the implementation of the teaching material, videos and non participant observer notes recorded during the teaching process so as to give an insight of webcomics educative potentials in science education and particularly in promoting students’ understanding of the distinction between observation and inference. Data emerged from students’ webcomics that were constructed during lessons and teachers’ notes were used supplementary.

7.1 Development of epistemologically informed views concerning the distinction between observation and inference

Analysing data emerged from the webcomic book stories each group constructed (Part C of the activity sequence), lead to the conclusion that there was improvement in the learners’ understanding concerning the targeted aspects even though this improvement was not substantial as drawn from the previous results. Evidently, students’ could perceive observations and interpretations for a natural phenomenon in every story and in addition were able to rephrase information extracted regarding the addressed aspects using suitable words to express observations (e.g. see, notice, observe) and interpretations (e.g. believe, think, maybe). Additionally, pictures inserted were related to each story dialogue thus it could be inferred that students understood that interpretations (text) should be based on observations (pictures inserted). Therefore, it can be concluded that webcomics’ potential of pairing written and visual elements was of vital importance for the promotion of the specific learning objectives regarding observation and interpretation. A representative example of the above follows (Figure 4):
Moreover, analysis of students’ stories indicates that the learning objective of understanding that for a natural phenomenon a number of interpretations could be proposed for which we cannot easily reach consensus was for some students attainable. In addition, analysis of data derived from learners’ stories illustrates that the learning objective of understanding that for a natural phenomenon scientists could reach consensus more easily in relation to the observations they record was also accomplished. In the example that follows the group added a character that states that there are a number of interpretations for a natural phenomenon but there is only one observation to be recorded. Even though this is statement that should be considered as students’ misconception in students’ understanding of the distinction between observation and inference it might be the result of students’ attempt to comprehend the difference between the addressed aspects in a quantitative approach, i.e., for a specific observation more than one interpretations can be formulated.
Consequently, some groups had characters in their stories arguing about the different interpretations that had invented and concurrently heroes had reached consensus regarding the observations they had made. It could be assumed that even though participants’ improvement in understanding of the distinction between observation and inference was not substantial since there is no evidence derived from webcomic stories illustrating that students had associated observation with discovery and interpretation with invention the effectiveness of webcomic tool’s potential was of noteworthy significance.

7.2 Engagement in epistemological discourse

In the activity where students were asked to compose their own stories (Part C of the activity sequence described in a previous section), students were engaged in epistemological discourse concerning the characters’ discussion and which information should each character communicate regarding the two aspects. During the teaching process students were asked to explore an incomplete comic book story where characters are trying to distinguish between observation and interpretation (Part B of the activity sequence described in a previous section). During this exploitation it was observed that all of the
groups were actively engaged in scientific discourse about the addressed aspects since they had to answer to heroes’ questions with the aim of developing and refining students’ awareness of the specific aspects of the nature of science. An indicative example of students’ epistemological discourse follows:

- Student 1: (typing text in a character’s speech balloon) I can see ....can you help me?
- Student 2: In the picture I can see the feet of a frog....
- Student 1: They are not feet!!! We are not certain that what we observe are the feet of a frog.
- Student 3: These are tracks.
- Student 1: If we say that these are the feet of a frog it would mean that we are interpreting what we observe. In order to make an observation we should state only what we can see and in this case these are just prints or tracks.

7.3 Development of analytical and critical thinking skills

Moreover, in the third part of the learning activities students were asked to construct stories after they had read a story from the history of science. During this activity students in groups had to explain to their peers their reasoning for choosing a particular character to be added in the comic or for the selection of a specific background, so as to support the information obtained from the story in order to sustain in their stories scientists’ observations or interpretations. Students’ debate while constructing a story provokes thought and helps in the development of analytical and critical thinking skills. The non participant observer noted the following:

“The pictures they want to use are related to the story they have read. The fact that the girls of the group are justifying the use of a particular picture and not another indicates that they feel the need to persuade their classmates for their choice.”

7.4 Stimulate metacognition

Retelling a story from the history of science had the advantage of determining what is important from their readings in relation to the learning objectives to be attained and sustained. The activity of constructing a comic story required one to identify key ideas, summarize and reorganize information in a webcomic book format where understandings of the addressed nature of science aspects would have been reflected. Therefore, it can be concluded that comic book activities in the science classroom could prompt selfexplanation and in consequence develop metacognitive skills. Audio data documents a group discussion where students tried to recall information from the lesson concerning the difference between observation and inference in order to decide which information of the story they had read is classified as observation and which is classified as interpretation and which
process is carried out first and which follows. An example of group’s discussion with the teacher illustrating development of metacognitive skills follows.

Student 1: This part should be deleted(showing something that they have already written in their comic book story) and in its place an observation should be placed first and then the interpretation made for that observation.
Student 2: But it is already an observation.
Student 3: I think it should be deleted.
Student 2: (She probably reads the text in the speech balloon)Ok, we should write (she means in the speech balloon) “I observe that this plant can only be seen in mountains’ high peaks where it is very cold”.
Teacher: Have you written the observations recorded by scientists regarding wild roses?
Student 1: Yes, we have written the observations and now we are about to write the interpretations made for those observations.

In the above example it is obvious that the learners understood that for a natural phenomenon scientists should firstly make observations while interpretations should follow and account for those observations, indicating that metacognitive skills are developing during the construction of their stories.

7.5 Motivating
Evidence from students’ responses during interviews and video provides support that utilizing webcomics in science teaching motivates students’ during the lesson and promotes students’ active engagement within the learning process. Data derived from non participant observer notes states:

“....all students in this group want to actively participate in the construction of the webcomic story.”

In addition a representative quotation of a student’s interview transcript indicating webcomics motivating potential is the following:

“During the lesson the atmosphere of the classroom was positive and you felt that you wanted to learn more....”

Furthermore, students proposed that webcomics should be used in more subject lessons and justified their opinion by expressing that utilization of webcomics in the learning process makes the lesson more interesting, entertaining and fascinating than traditional forms of learning.

Researcher: Would you like to propose how webcomics could be used during the lesson?
Student: During the Greek Language subject.
Researcher: How could be used during the Language subject?
Student: Instead of reading texts in books we could read webcomics.
7.6 Cooperative learning
Analysis of data derived from all resources supports the argument that webcomics promote learning through cooperative learning. The purpose of constructing a webcomic story using information drawn from a story of the history of science required the development of positive interdependence among learners of each group so as to successfully achieve the completion of the assignment. Non participant observer’s notes state:

“After the initiation of the boy on the left, team members have a responsibility according to the requirements of the assignment.”

However, it might be concluded that students’ success in group cooperation was a result of each member’s character and personality since there were groups that could not work collaboratively. This inference is due to the fact that teachers realized that in some cases few students were not able to work cooperatively with the group. On the contrary interview evidence supports that webcomics enhance cooperative learning since a student who had expressed difficulties in cooperation with a group, in the particular activities where webcomics were utilised showed a more positive attitude in the group. This student during interview said:

Researcher: Do you think that the use of webcomics in the learning process eased group cooperation?
Student: Yes, because I personally find difficulties in working collaboratively with my classmates.....in the activities using webcomics I felt that it was like playing a game where we had to work all together towards winning. So, in the webcomics activities we had to work cooperatively in order to understand certain things.

7.7 Webcomic tool’s capabilities
Webcomic tool provides capabilities that enhanced students’ learning in the science classroom. The capability of selecting background, characters as well as pictures that are related to the context of their story provided an opportunity for learners to be creative and precise to what they wanted to communicate in relation to observations and interpretations mentioned in the stories they had read. In the webcomic format this is better facilitated by
integrating text with pictures. Characters could also be enlarged or diminished according to the requirements of the students-creators. Video transcripts provide evidence for this conclusion:

**Video transcript a:**
The student on the left is reading the story to the group: “According to this scientist this finding supports the opinion that dinosaurs disappeared when a meteorite crashed earth”. He continues to say: “We should insert this picture showing a meteorite”.

**Video transcript b:**
Student 1: We should insert a picture with a dark background.
Student 2: Why?
Student 1: Because when a meteorite crashes there is darkness everywhere.

However, this capability had also lead to students’ distraction of attention since some learners wasted time on selecting backgrounds even though a particular folder including pictures related to the story was at their disposal. On the contrary, some groups that had expressed their disappointment on the limited number of pictures each folder included and were allowed to search for pictures in a folder containing a vast variety of pictures were not destructed and managed to complete their assignment. However, some students faced a difficulty while they were trying to insert backgrounds or characters to their stories that resulted in student’s disappointment. It might be concluded that this difficulty would have been tackled if these two commands of the program regarding the insertion of characters or backgrounds were better designed.

An additional capability of the webcomic tool is that its format enforced students to contemplatively simplify their narratives so as to retain the essence. Students in groups discussed what is important to be included in the dialogue of the webcomic and consequently were refining their understanding concerning observation and interpretation.

Non participant observer’s notes state:
“The girl is saying to the boy showing a paragraph in her handout: 'We should not include all of these!' The boy on the left answers to her: 'Of course we should not. We will just write what it is important.'”

A representative example of a group’s story illustrating how students tried to keep the essence follows:
However, it should be mentioned that a group included in their story all the information presented in the story they had read. A possible explanation for this might be that most students possess the idea that a correct answer is the one that has a lot of information without questioning its context. This could be prevented if students were instructed that in their stories they should include only relevant information and that a comic book format requires limited text.

8. Recommendations for Practice
Considering the results discussed in the previous section the teaching material could be improved in order to better promote the learning objectives for which it was designed with respect to a better incorporation of webcomics in the learning process. Specifically, we hold the view that during the activity where students were asked to construct their own stories, it should have been clarified to the students that their stories should satisfy certain criteria concerning the storyline which must have full plot with exposition, rising action, climax, falling action and resolution. In addition, students should have been given longer period of time in order to construct their stories in order to take advantage of webcomics’ tool capability of adding hyperlinks, sounds and videos into the text balloons. Furthermore, students should have the opportunity of publishing their stories on the World Wide Web.

Some of the software’s capabilities proved to be a restraining factor during the learning process. Improvement of the webcomic tool’s functions might prove useful in facing these difficulties. Furthermore, once a character has been inserted to a story once the webcomic tool should have an option of copying and pasting that character to the follow
panels instead of repeating the same process each time the creator wants to use that particular character. In addition, creators should be able to change the title of their story even though they might have already written part of it. Moreover, when a user inserts text balloons these should appear in the panel that the creator processes instead of always appearing on the left upper section of the page. Since ComicLab was developed to be used by young learners it would be useful for a spell checker to be included.

9. Recommendations for Research

Developing epistemologically informed views about the nature of science is an important aim of science education (Abd-El-Khalick, Bell & Lederman, 1998; Lederman, 2007; Osborne et al., 2003). The purpose of the present study was to add to the efforts aimed at achieving this goal by determining the extent to which learners’ nature of science views can be enhanced through specially designed activities implemented during the teaching process and exploit the potential of webcomics towards this direction.

A main contribution of this study to the didactic of natural sciences is the development of the teaching material designed to enhance students’ understanding of the distinction between observation and inference. The teaching material was designed considering the existing literature on the different approaches of instruction thus the particular aspects that were addressed were explicitly instructed in both integrated and nonintegrated content (Abd-El-Khalick & Lederman, 2000; Khishfe & Abd-El-Khalick, 2002; Khishfe & Lederman; 2006, Khishfe & Lederman; 2007; Lederman, 2007; Peters, in press) using examples from the history of science since research (Abd-El-Khalick & Lederman, 2000; Adúriz-Bravo & Izquierdo, 2009; Clough & Olson, 2008; De Berg, 2008; Holton, 2003; Khishfe & Abd-El-Khalick, 2002; Leach, Hind & Ryder; 2003; McComas, 2008; Osborne et al, 2003) suggests that episodes from the history of science could generate discussions about the nature of science and could be useful for understanding its contextual nature. However, previous research have shown little or no improvement in learners’ views (Khishfe & Abd-El-Khalick, 2002; Leach, Hind & Ryder; 2003; Lederman, 2007) thus future research should focus in this area.

Additionally, the results of the present study suggest the need for further development of teaching innovations in the teaching of nature of science which will consider the teaching material of the present study as an initial version of the sequence of the learning activities that need to be revised and be further validated through research.

Utilizing webcomics in the design and implementation of the learning activities developed in this study has facilitated learning in various ways. Consistent with previous research, results have shown that using cartoons in science education promotes collaborative learning (Keogh & Naylor, 2004), motivates (Yang, 2003) and actively engages students in the learning process (Keogh, Naylor, de Boo & Feasy, 1999). In addition,
students’ involvement with webcomic activities students has engaged them in explicit epistemological discourse about the targeted nature of science aspect, i.e., the distinction between observation and inference. However, some of the software’s capabilities proved to be a restraining factor during the learning process. Improvement of the webcomic tool’s functions might prove useful in facing these difficulties.

Concluding, future research should focus on how students’ views of aspects of nature of science developed thus offering an insight on the change-in-views process upon review of the video tapes during implementation of the present study. In addition, this will give evidence on the effectiveness of the teaching material and the learning tool. Furthermore, more research is needed into the relative effectiveness of webcomic tool as a learning medium within different science disciplines and at different grade levels to establish generalizability of the findings.

10. Bibliography


DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)

Appendix 1: Written tasks (in Greek)

Έργο μέτρησης πεποιθήσεων και στάσεων μαθητών απέναντι στα ψηφιακά κόμικς (τελική αξιολόγηση)

Όνοματεπώνυμο: .......................................................................................................................... Τάξη: ........

Επίλεξε την απάντηση που σου ταιριάζει περισσότερο και απάντησε με συντομία στις ερωτήσεις ανοιχτού τύπου.

1. Διαβάζεις βιβλία στον ελεύθερο σου χρόνο;
   - [ ] Καθόλου
   - [ ] Σπάνια
   - [ ] Συχνά
   - [ ] Πολύ συχνά

2. Τι είδους βιβλία προτιμάς να διαβάζεις;
   - [ ] Αρχαιολογία. Αρχαιότητα. Ελληνική ιστορία
   - [ ] Γενικά βιβλία
   - [ ] Γλώσσα
   - [ ] Διεθνείς σχέσεις
   - [ ] Θρησκεία
   - [ ] Ιστορία. Γεωγραφία
   - [ ] Καλές τέχνες
   - [ ] Κοινωνικές επιστήμες
   - [ ] Φυσικές επιστήμες
   - [ ] Φιλοσοφία
   - [ ] Ψυχαγωγικές τέχνες
   - [ ] Άλλο.................................................................

3. Διαβάζεις γενικά κόμικς;
   - [ ] Καθόλου

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DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
Σπάνια

Μερικές φορές

Συχνά

Πολύ συχνά
4. Τι είδους κόμικς προτιμάς να διαβάζεις;

☐ ιστορικά
☐ σατιρικά
☐ περιπέτειας
☐ μυστηρίου
☐ κοινωνικά
☐ φιλοσοφικά
☐ ιστορικά
☐ εφηβικά
☐ φαντασίας
☐ αστυνομικά
☐ ψυχολογικά
☐ συμβολικά

Άλλο..........................................................................................................................................................................

..........................................................................................................................................................................

5. Σου αρέσει η ιδέα να διαβάζεις κόμικς σε ηλεκτρονικό υπολογιστή;

☐ Καθόλου
☐ Πολύ Λίγο
☐ Μέτρια
☐ Πολύ
☐ Πάρα Πολύ

6. Θα σου άρεσε να διδάσκεσαι τα μαθήματά σου με τη βοήθεια ψηφιακών κόμικς σε υπολογιστή;

☐ Καθόλου
☐ Πολύ Λίγο
☐ Μέτρια
☐ Πολύ
☐ Πάρα Πολύ

7. Πιστεύεις ότι το μάθημα έγινε πιο ευχάριστο με τα ψηφιακά κόμικς;

☐ Καθόλου
Πολύ Λίγο

Μέτρια

Πολύ

Πάρα Πολύ
8. Τα κόμικς που έφτιαξες με θέμα τη διάκριση παρατήρησης από την εξήγηση σε βοήθησαν να εμπλουτίσεις τις γνώσεις σου για το θέμα αυτό;

☐ Καθόλου
☐ Πολύ Λίγο
☐ Μέτρια
☐ Πολύ
☐ Πάρα Πολύ

9. Τα κόμικς που έφτιαξες σε βοήθησαν να κατανοήσεις πώς συνδέεται η επιστήμη με τη διάκριση παρατήρησης από την εξήγηση;

☐ Καθόλου
☐ Πολύ Λίγο
☐ Μέτρια
☐ Πολύ
☐ Πάρα Πολύ

10. Τι σου άρεσε ή τι σε δυσκόλεψε, όταν έφτιαχνες τα δικά σου ψηφιακά κόμικς.

................................................................................................................................................................
................................................................................................................................................................
................................................................................................................................................................
................................................................................................................................................................
................................................................................................................................................................

11. Το εργαλείο ComicLab είναι εύκολο στη χρήση του;

☐ Καθόλου
☐ Πολύ Λίγο
☐ Μέτρια
☐ Πολύ
Πάρα Πολύ
12. Θα ήθελες να αλλάξει κάτι στο εργαλείο, ώστε να σου αρέσει περισσότερο; Αν ναι, ποιες αλλαγές θα ήθελες να γίνουν;

________________________________________________________________________________________________________

________________________________________________________________________________________________________

________________________________________________________________________________________________________

13. Σε ποια μαθήματα και με ποιο τρόπο πιστεύει ότι θα μπορούσε να χρησιμοποιηθεί το εργαλείο ComicLab;

________________________________________________________________________________________________________

________________________________________________________________________________________________________

________________________________________________________________________________________________________

14. Ποια τα συναισθήματα και οι εντυπώσεις σου για το μάθημα με τη βοήθεια του εργαλείου ComicLab;

________________________________________________________________________________________________________

________________________________________________________________________________________________________

________________________________________________________________________________________________________
Διαβάστε προσεκτικά τις πιο κάτω δηλώσεις. Κάποιες από αυτές περιλαμβάνουν επιστημονικές εξήγησεις. Σημειώστε √ στο κουτάκι δίπλα από όσες δηλώσεις περιλαμβάνουν επιστημονικές εξήγησεις. Προσέξτε! Μπορεί να υπάρχουν και λανθασμένες εξήγησεις. Σημειώστε όλες τις εξήγησεις (σωστές ή λανθασμένες).

<table>
<thead>
<tr>
<th>Ένας λαμπτήρας που συνδέεται σε ένα κλειστό κύκλωμα, ανάβει επειδή περνά από αυτόν ηλεκτρικό ρεύμα.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Το παγωμένο νερό που υπήρχε στο ποτήρι ζεστάθηκε επειδή το αφήσαμε αρκετή ώρα έξω στο περιβάλλον μια καλοκαιρινή μέρα.</td>
</tr>
<tr>
<td>Μια μέλισσα έχει έξι πόδια.</td>
</tr>
<tr>
<td>Αν αφήσουμε μια πέτρα από κάποιο ύψος θα πέσει προς το έδαφος, λόγω της δύναμης με την οποία την τραβά η γη.</td>
</tr>
<tr>
<td>Το ηλεκτρονικό μου παιγνίδι σταμάτησε να λειτουργεί επειδή το άφησα αναμμένο για μεγάλο χρονικό διάστημα χωρίς να του αλλάξω μπαταρίες.</td>
</tr>
</tbody>
</table>

Φανταστείτε ότι πρέπει να βοηθήσετε ένα συμμαθητή σας, ώστε να συμπληρώσει αυτό το φύλλο εργασίας. Προτείνετε του ένα τρόπο για να αναγνωρίζει πότε μια δήλωση περιλαμβάνει επιστημονική εξήγηση και πότε όχι. Τι θα του λέγατε;
Έργο αξιολόγησης (α) ικανότητας διάκρισης ανάμεσα στην ανακάλυψη και την επινόηση και (β) της σύνδεσης της πρώτης με τις επιστημονικές παρατηρήσεις και της δεύτερης με τις επιστημονικές ερμηνείες (αρχική και τελική αξιολόγηση)

Όνομα: _____________________________________ Τάξη: ______

Ένας αρχαιολόγος ανακαλύπτει αρχαία αντικείμενα αφού τα αντικείμενα υπήρχαν πάντοτε εκεί και απλώς ήταν θέμα χρόνου κάποιος να κάνει ανασκαφές και να τα βρει.

Αντίθετα, ένας συνθέτης επινοεί τη μουσική για να πλαισιώσει τους στίχους ενός ποιήματος και να φτιαχτεί έτσι ένα τραγούδι. Η μουσική δεν υπήρχε κάπου για να τη βρει ο συνθέτης, αλλά τη δημιούργησε ο ίδιος χρησιμοποιώντας τη φαντασία του και τις μουσικές του ικανότητες.

Συμπληρώστε με την κατάλληλη λέξη (επινόησε ή ανακάλυψε) την καθεμία από τις πιο κάτω προτάσεις.

Ο Χριστόφορος Κολόμβος __________________________ την Αμερική

Ο μεγάλος ποιητής Οδυσσέας Ελύτης __________________________ στίχους και έφτιαξε ένα ποίημα
Συμπλήρωστε τις ακόλουθες δύο προτάσεις με την κατάλληλη λέξη (επινόησαν ή ανακάλυψαν).

Οι επιστήμονες ___________________________ ότι όταν αφήσουμε ένα πέτρινο αντικείμενο από κάποιο ύψος τότε πέφτει προς το έδαφος.

Εξήγησε γιατί αποφάσισες να συμπληρώσεις το κενό με αυτή τη λέξη.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

Οι επιστήμονες ___________________________ τη βαρύτητα και έτσι εξήγησαν γιατί ένα αντικείμενο πέφτει προς τα κάτω όταν αφεθεί ελεύθερο από κάποιο ύψος.

Εξήγησε γιατί αποφάσισες να συμπληρώσεις το κενό με αυτή τη λέξη.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
Appendix 2: Oral tasks (in Greek)

STUDENT INTERVIEW

PART A (only in post-interviews)
1. Σου άρεσαν τα μαθήματα; Για ποιο λόγο; Τι διαφορετικό είχε από τα άλλα μαθήματα;
2. Μπορείς να μου περιγράψεις το μάθημα που κάνατε; Πώς χρησιμοποιήσατε τα ψηφιακά κόμικς;
3. Πιστεύεις ότι η χρήση των ψηφιακών κόμικς βοήθησε την συνεργασία σου με τους συμμαθητές σου; Πώς θεωρείς ότι η χρήση των ψηφιακών κόμικς επηρέασε την ατμόσφαιρα της τάξης σου; (με καλό τρόπο; με κακό τρόπο);
4. Πώς θεωρείς ότι η χρήση των ψηφιακών κόμικς επηρέασε τις σχέσεις σου με τους συμμαθητές σου και την διασκάλα σου;
5. Θα ήθελες να χρησιμοποιείτε περισσότερο ή λιγότερο τα ψηφιακά κόμικς στα μαθήματα και με ποιο τρόπο;
6. Κατά τη διάρκεια των μαθημάτων υπήρχε κάποιο μάθημα ή δραστηριότητα που σου έκανε εντύπωση; Μπορείς να περιγράψεις ποιο ήταν και για ποιο λόγο σου έκανε εντύπωση;
7. Πιστεύεις ότι η χρήση των ψηφιακών κόμικς σε βοήθησε να κατανοήσεις καλύτερα το μάθημα; Με ποιο τρόπο; Μπορείς να μου πεις κάποια παραδείγματα;
8. Θα ήθελες να κάνεις προτείνεις κάποιους τρόπους χρήσης των ψηφιακών κόμικς στο μάθημα;

PART B (pre- and post-interviews)
Θα διαβάζω κάποιες προτάσεις και θα ήθελα από εσένα να μου λες κατά πόσο πιστεύεις ότι είναι παράδειγμα επιστημονικής ερμηνείας ή όχι. Θα ήθελα επίσης κάθε φορά να μου εξηγείς λίγο πώς σκέφτηκες την απάντησή σου. Λοιπόν. Η πρώτη πρόταση.

1. Ένας λαμπτήρας που συνδέεται σε ένα κλειστό κύκλωμα, ανάβει επειδή περνά από αυτόν ηλεκτρικό ρεύμα.
2. Το παγωμένο νερό που υπήρχε στο ποτήρι ζεστάθηκε επειδή το αφήσαμε αρκετή ώρα έξω στο περιβάλλον ένα καλοκαιρινό μέρα.
3. Μια μέλισσα έχει έξι πόδια.
4. Αν αφήσουμε μια πέτρα από κάποιο ύψος θα πέσει προς το έδαφος λόγω της δύναμης με την οποία την τραβά η γη.
5. Το ηλεκτρονικό μου παιγνίδι σταμάτησε να λειτουργεί επειδή το άφησα αναμμένο για μεγάλο χρονικό διάστημα χωρίς να του αλλάξω μπαταρίες.

Αν έπρεπε να εισηγηθείς έναν κανόνα σε κάποιο συμμαθητή σου για να μπορεί να αποφασίζει αν μια πρόταση είναι ή όχι επιστημονική ερμηνεία, τι θα του προτείνες;
Συμπλήρωσε τις ακόλουθες δύο προτάσεις με την κατάλληλη λέξη (επινόησαν ή ανακάλυψαν).

Οι επιστήμονες ___________________________ ότι όταν αφήσουμε ένα πέτρινο αντικείμενο από κάποιο ύψος τότε πέφτει προς το έδαφος.

Οι επιστήμονες ___________________________ τη βαρύτητα και έτσι εξήγησαν γιατί ένα αντικείμενο πέφτει προς τα κάτω όταν αφεθεί ελεύθερο από κάποιο ύψος.

Εξήγησε την απάντησή σου στην καθεμιά από τις προτάσεις πιο πάνω.
Γενικά δημογραφικά στοιχεία

a. Ηλικία
b. Εκπαίδευση (πτυχία)
c. Ειδική εκπαίδευση σε σχέση με θέματα πληροφορικής υποστήριξης της διδασκαλίας
d. Χρόνια διδακτικής προϋπηρεσίας

Περιβάλλον

1. Εκπαιδευτική βαθμίδα
2. Τάξη
3. Προφίλ σχολείου

Θέμα των δραστηριοτήτων με ψηφιακά κόμικς:

Ερωτήσεις

ΓΕΝΙΚΗ ΠΑΙΔΑΓΩΓΙΚΗ ΠΡΟΣΕΓΓΙΣΗ

• Μπορείς να περιγράψεις τη φιλοσοφία αναφορικά με την ενότητα που έχεις εφαρμόσει; (σκεπτικό αξιοποίηση των ψηφιακών κόμικς, παιδαγωγική προσέγγιση)

ΔΙΑΔΙΚΑΣΙΑ

• Ποιες δραστηριότητες έχεις εφαρμόσει; Μπορείς να εξηγήσεις πώς και γιατί επέλεξες τις δραστηριότητες που υλοποίησες;

ΣΤΟΧΟΣ

• Ποιους διδακτικούς στόχους ήθελες να πετύχεις;

ΑΞΙΟΛΟΓΗΣΗ

• Με ποιους τρόπους τα ψηφιακά κόμικς σε βοήθησαν να πετύχεις τους διδακτικούς σου στόχους; Μπορείς να δώσεις κάποια παραδείγματα;
• Ποιες προκλήσεις αντιμετώπισες; Μπορείς να δώσεις κάποια παραδείγματα;
• Ποια προβλήματα/δυσκολίες συνάντησες (όχι μόνο τεχνικές) και πώς τις ξεπέρασες; Μπορείς να αναφέρεις κάποια παραδείγματα;
• Με ποιους τρόπους η διαδικασία κατασκευής κόμικς βοήθησε στην επίτευξη των διδακτικών σου στόχων;
• Σε ποιο βαθμό το ergaleio αυτό καθαυτό (ComicLab) διευκόλυνε την επίτευξη των στόχων;
• Ποια ήταν η ανταπόκριση των μαθητών στις δραστηριότητες αξιοποίησης των ψηφιακών κόμικς;
  o Παρατήρησε κάποιες αλλαγές στη στάση ή την απόδοση των μαθητών κατά τη διδασκαλία των συγκεκριμένων μαθημάτων; Ποιες ήταν αυτές οι αλλαγές; Δώσε παραδείγματα για να εξηγήσεις τη θέση σου;
• Πιστεύεις ότι η ενσωμάτωση των ψηφιακών κόμικς βοήθησε στην εμπλοκή των μαθητών στα μάθημα; Αν ναι, με ποιους τρόπους συνέβηκε αυτό;
• Ποια είναι τα βασικά/κρίσιμα οργανωτικά θέματα που εντοπίζεις αναφορικά με τη χρήση ψηφιακών κόμικς; (Πότε είναι καταλληλότερη η χρήση τους; Τι προϋποθέτεται για μια επιτυχή ενσωμάτωσή τους; Π.χ., καλύτερη τεχνολογική υποδομή, πιο δυνατή τεχνική στήριξη, περισσότερο χρόνο και ανθρώπινη δυναμική, υποστήριξη από σχολείο, καλύτερη επιμόρφωση στα ψηφιακά κόμικς, στην τεχνολογία, ...) 
• Σε ποιο βαθμό θα έπρεπε δραστηριότητες αξιοποίησης ψηφιακών κόμικς να εντάσσονται στο αναλυτικό πρόγραμμα; 
• Σκοπεύεις να συνεχίσεις να αξιοποιείς ψηφιακά κόμικς σε μελλοντικά σου μαθήματα την επόμενη σχολική χρονιά; 
• Θα συνιστούσες μια παρόμοια διδακτική προσέγγιση σε συναδέλφους σου;

LESSONS LEARNED

• Τι διαφορετικό θα έκανες σε μελλοντικά αντίστοιχα μαθήματα;
• Ποιες άλλες/εναλλακτικές δραστηριότητες (ή ergaleia) θα ήθελες να υλοποιήσεις όσο αφορά την αξιοποίηση των ψηφιακών κόμικς;
• Θα ήθελες να κάνεις κάποιες εισηγήσεις για τη βελτίωση της διαδικασίας που ακολούθησες;
• Τι είδος μαθησιακές επιδιώξεις ως καταλληλότερα για το υλοποίηση δραστηριοτήτων μέσω ψηφιακών κόμικς;

Υπάρχει οτιδήποτε άλλο που θα ήθελες να μοιραστείς μαζί μας;
Appendix 3: ComicLab learning guide (Part A) (in Greek)

Ονοματεπώνυμο: ________________________________________________________________

Τάξη: Στ’2
ΜΕΡΟΣ Α: ΑΠΟΘΗΚΕΥΣΗ, ΚΛΕΙΣΜΟ, ΑΝΟΙΓΜΑ ΑΡΧΕΙΟΥ

1. Αποθήκευση ενός κόμικ
   a. Για να αποθηκεύσεις το αρχείο που υπάρχει ανοικτό πάτησε το κουμπί
      ![Αποθήκευση](image1)

   b. Σώσε το αρχείο στο Desktop μέσα στο φάκελο με το όνομα «ΕπιστήμηΣτ2». Δώσε του ένα όνομα που θα θυμάσαι.
   c. Πάτησε το κουμπί Αποθήκευση.

   d. Εμφανίζεται η ειδοποίηση. Πάτησε OK.

2. Κλείσιμο επεξεργασίας κόμικ
   a. Για να κλείσεις το αρχείο πάτησε .

   b. Εμφανίζεται η ειδοποίηση. Εφόσον έχεις ήδη αποθηκεύσει το αρχείο, τότε μπορείς να απαντήσεις Yes.

3. Άνοιγμα ενός κόμικ
   a. Για να ανοίξεις το αρχείο που μόλις έχεις κλείσει, τότε από την «Κύρια Οθόνη» του προγράμματος επέλεξε «Ανοίγμα από Αρχείο» που φαίνεται στην οθόνη:
b. Πήγαινε στο Desktop, στο φάκελο «ΕπιστήμηΣt2». Επέλεξε το αρχείο που έχεις σώσει προηγουμένως. Πάτησε «Ανοιγμα». 
ΜΕΡΟΣ Β: ΟΘΟΝΗ ΕΠΕΞΕΡΓΑΣΙΑΣ

Το ComicLab παρέχει όλα τα απαραίτητα εργαλεία για τη δημιουργία ηλεκτρονικών κόμικς.

4. ΚΑΡΕ

Μπορείς να διαγράψεις ένα καρέ με το κουμπί Διαγραφή Καρέ.

4. A. Διαγραφή καρέ

4. B. Επεξεργασία καρέ

Για να μπορείς να επεξεργαστείς ένα καρέ, χρειάζεται να πατήσεις το κουμπί Επεξεργασία Καρέ. Οι διαθέσιμες λειτουργίες για την επεξεργασία ενός καρέ είναι:
1. Αλλαγή μεγέθους
2. Οριζόντιο γύρισμα
3. Κάθετο γύρισμα
4. Περιστροφή καρέ
5. Μετακίνηση καρέ
4. Β. 1. Αλλαγή μεγέθους

Πατώντας ταυτόχρονα και το κουμπί Shift του πληκτρολογίου, τότε η αλλαγή μεγέθους του καρέ γίνεται διατηρώντας σταθερό το λόγο διαστάσεων.

4. Β. 2. Οριζόντιο γύρισμα

Κρατώντας πατημένη μια ενεργή γωνία, αν σύρεις το καρέ οριζόντια προς την απέναντι ενεργή γωνία, τότε το καρέ θα γυρίσει οριζόντια (horizontal flip).
Οριζόντια γυρισμένο καρέ

4. Β. 3. Κάθετο γύρισμα

Κρατώντας πατημένη μια ενεργή γωνία, αν σύρετε το καρέ κάθετα προς την απέναντι ενεργή γωνία το καρέ θα γυρίσει κάθετα (vertical flip).

Κάθετα γυρισμένο καρέ
4. Β. 4. Περιστροφή καρέ

Για να περιστρέψεις ένα καρέ, μετακινήσε το ποντίκι κοντά σε μια από τις ενεργές γωνίες μέχρι να εμφανιστεί το κυκλικό τόξο της περιστροφής. Έπειτα κράτησε πατημένο το αριστερό πλήκτρο του ποντικιού και περιστρέψε το καρέ μετακινώντας το ποντίκι.

Αν κρατάς ταυτόχρονα πατημένο το πλήκτρο Shift του πληκτρολογίου, τότε η περιστροφή θα γίνεται ανά 45 χρόνια.

4. Β. 5. Μετακίνηση καρέ

Μπορείς να μετακινήσεις ένα καρέ επιλέγοντάς το και σύροντάς.

4. Γ. Προσθήκη καρέ

Πατώντας το κουμπί Προσθήκη Καρέ, ένα νέο κενό καρέ προστίθεται στο κόμικ το οποίο μπορείς να επεξεργαστείς στη συνέχεια.
5. ΠΡΟΣΘΗΚΗ ΦΟΝΤΟΥ

Πατώντας το κουμπί Προσθήκη Φόντου, το ComicLab εμφανίζει το παράθυρο Ανοίγμα του αρχείου, μέσω του οποίου μπορείς να περιηγηθείς στα αρχεία του υπολογιστή (φακελος Landscape) και να εισάγεις κάποια εικόνα. Αφού επιλέξεις την εικόνα τότε πάτησε Άνοιγμα και στη συνέχεια μπορείς να τοποθετήσεις την εικόνα αυτή σε όποιο καρέ επιθυμείς.

6. ΧΑΡΑΚΤΗΡΕΣ

6. Α. Προσθήκη χαρακτήρα

Μπορείς να προσθέσεις ένα νέο χαρακτήρα στο κόμικ πατώντας το κουμπί Προσθήκη χαρακτήρα. Μπορείς τώρα να επεξεργαστείς το νέο χαρακτήρα.

6. Β. Επεξεργασία χαρακτήρα

Μπορείς να επεξεργαστείς ένα χαρακτήρα μόνο αφού το κουμπί Επεξεργασία χαρακτήρα. Οι διαθέσιμες λειτουργίες για την επεξεργασία ενός χαρακτήρα είναι:

1. Αλλαγή μεγέθους χαρακτήρα
2. Ορίζοντι γύρισμα χαρακτήρα
3. Κάθετο γύρισμα χαρακτήρα
4. Περιστροφή χαρακτήρα
5. Μετακίνηση χαρακτήρα

6.B.1 Αλλαγή μεγέθους χαρακτήρα

Η αλλαγή μεγέθους μας επιτρέπει να αλλάξουμε το πλάτος και το ύψος ενός χαρακτήρα κρατώντας και σύροντας τις ενεργές γωνίες του χαρακτήρα. Αν κρατάς ταυτόχρονα πατημένο και το κουμπί Shift του πληκτρολογίου, τότε η αλλαγή μεγέθους του χαρακτήρα γίνεται διατηρώντας σταθερό το λόγο διαστάσεων.

Ενεργές γωνίες για επεξεργασία χαρακτήρα

6.B.2 Οριζόντιο γύρισμα χαρακτήρα

Κρατώντας πατημένη μια ενεργή γωνία, αν σύρεις το χαρακτήρα οριζόντια προς την απέναντι ενεργή γωνία, ο χαρακτήρας θα γυρίσει οριζόντια (horizontal flip).

Οριζόντιο γύρισμα χαρακτήρα

6.B.3 Κάθετο γύρισμα χαρακτήρα

Κρατώντας πατημένη μια ενεργή γωνία, αν σύρεις το χαρακτήρα κάθετα προς την απέναντι ενεργή γωνία, τότε ο χαρακτήρας θα γυρίσει κάθετα.
Κάθετο γύρισμα χαρακτήρα

6.4 Περιστροφή χαρακτήρα
Για να περιστρέψεις ένα χαρακτήρα μετακινήσεις το ποντίκι κοντά σε μια από τις ενεργές γωνίες μέχρι να εμφανιστεί το κυκλικό τόξο περιστροφής. Έπειτα κράτησε πατημένο το αριστερό πλήκτρο του ποντικιού και περίστρεψε το χαρακτήρα μετακινώντας το ποντίκι.
Κρατώντας ταυτόχρονα πατημένο το πλήκτρο Shift του πληκτρολογίου, τότε η περιστροφή θα γίνεται ανά 45 μοίρες.

6.5 Μετακίνηση χαρακτήρα
Μπορείς να μετακινήσεις ένα χαρακτήρα επιλέγοντας τον και σύροντας.

6. Π. Διαγραφή χαρακτήρα
Μπορείς να διαγράψεις ένα χαρακτήρα με το κουμπί Διαγραφή Χαρακτήρα.

7. ΔΙΑΛΟΓΟΙ

7.Α. Προσθήκη Διαλόγου
Υπάρχουν 4 τύποι Προσθήκης Διαλόγου στο ComicLab

- Προσθήκη Διαλόγου Ομιλίας
- Προσθήκη Διαλόγου Σκέψης
- Προσθήκη Διαλόγου Ψιθυρίσματος
- Προσθήκη Διαλόγου Λεζάντας

7.8. Επεξεργασία Διαλόγου

Μπορείς να επεξεργαστείς ένα διάλογο με το κουμπί Επεξεργασία Διαλόγου. Οι διαθέσιμες λειτουργίες για την επεξεργασία ενός διαλόγου είναι:

1. Αλλαγή μεγέθους διαλόγου
2. Μπάρα εργασίας κειμένου
3. Μετακίνηση διαλόγου

7. Β. 1. Αλλαγή μεγέθους διαλόγου

Η αλλαγή μεγέθους μας επιτρέπει να αλλάξουμε το πλάτος και το ύψος ενός διαλόγου κρατώντας και σύροντας τις ενεργές γωνίες του διαλόγου.

7. Β. 2. Μπάρα εργασίας κειμένου

Επιλέγοντας το κείμενο ενός διαλόγου εμφανίζεται η Μπάρα εργασίας κειμένου.
Χρησιμοποιώντας τη μπάρα μπορείς να αλλάξεις:
- το μέγεθος του κειμένου
- το χρώμα του κειμένου
- τον τύπο του κειμένου: έντονα, πλάγια, υπογραμμισμένα γράμματα
Μπορείτε ακόμη να εισάγετε έναν υπερσύνδεσμο ως εξής:
a) επιλέξτε το κείμενο πάνω στο οποίο θέλετε να μπει ο υπερσύνδεσμος
β) πατάτε το κουμπί UR
γ) εισάγετε την ηλεκτρονική διεύθυνση
d) και τέλος πατάτε OK

7. Β. 3. Μετακίνηση διαλόγου
Μπορείτε να μετακινήσετε ένα διάλογο επιλέγοντάς τον και σύροντας.

7. Γ. Διαγραφή Διαλόγου
Μπορείτε να διαγράψετε ένα διάλογο με το κουμπί Διαγραφή Διαλόγου

8. ΠΟΛΥΜΕΣΑ

8.Α. Προσθήκη Πολυμέσων
Πατώντας το κουμπί Προσθήκη Πολυμέσων εμφανίζεται το παράθυρο Ανοίγματος αρχείου. Στη συνέχεια μπορείτε να επιλέξετε το αρχείο ήχου ή το βίντεο που θέλετε.

Όταν προσθέτετε ένα αρχείο ήχου εμφανίζεται το εικονίδιο .

Όταν προσθέτετε ένα αρχείο βίντεο εμφανίζεται το εικονίδιο .

8.8. Διαγραφή Πολυμέσων

Μπορείτε να διαγράψετε ένα αρχείο ήχου ή βίντεο με το κουμπί Διαγραφή Πολυμέσων.

8.8. Προεπισκόπηση Πολυμέσων

Μπορείτε να κάνετε προεπισκόπηση ενός αρχείου ήχου ή βίντεο κρατώντας πατημένο το κουμπί Shift και κάνοντας κλικ πάνω στο αρχείο.

8.8. Μετακίνηση Πολυμέσων

Μπορείτε να μετακινήσετε ένα αρχείο ήχου ή βίντεο επιλέγοντάς το και σύροντας.

9. Διαχείριση Σελίδων

Στην «Οθόνη Επεξεργασίας» πατήστε Προσθήκη Σελίδας για να προσθέσετε μια νέα σελίδα στο κόμικ σας.

Πατήστε στο κουμπί Διαγραφή Σελίδας για να διαγράψετε μια σελίδα από το κόμικ σας.

10. Πλοήγηση στις Σελίδες
Αν το κόμικ σας περιλαμβάνει πολλές σελίδες, μπορείτε εύκολα να περιηγηθείτε σε αυτές χρησιμοποιώντας τα κουμπιά Προηγούμενη Σελίδα και Επόμενη Σελίδα. Η τρέχουσα σελίδα και το σύνολο των σελίδων φαίνονται στο σημείο.

11. Πληροφορίες για το μέγεθος και τη θέση αντικειμένων

Ένας εναλλακτικός τρόπος να αλλάξετε σε ένα Καρέ, Χαρακτήρα ή Διάλογο τις διαστάσεις και τη θέση τους είναι εισάγοντας μια τιμή στο κατάλληλο πεδίο του κουτιού Ιδιοτήτων.

12. Αν έχεις κάνει κάποια αλλαγή στο κόμικ και θέλεις να το αποθηκεύσεις, τότε:

a. πάτησε ξανά
b. επέλεξε το αρχείο που είχες αποθηκεύσει
c. πάτησε Αποθήκευση
d. θα εμφανιστεί η ερώτηση

![Storage Icon]
e. απάντησε Yes

f. εμφανίζεται η ειδοποίηση
g. πάτησε OK
Appendix 4: Introduction to the comic characters (Part B) (in Greek)
Α. Εκτελείτε τις οδηγίες προσεκτικά. Κάθε φορά που εκτελείτε μία οδηγία βάλτε ✓ στο κουτάκι.

Γνωριμία με τους ήρωες

1. Ανοίξτε το φάιλ με την ονομασία «Γνωριμία με τους ήρωες» που υπάρχει στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □
2. Διαβάστε. □
3. Κλείστε το φάιλ πατώντας «Κλείσιμο». Στο κουτάκι διαλόγου που θα εμφανισθεί απαντήστε «Yes». □

Άσκηση 1

1. Ανοίξτε το φάιλ με την ονομασία «Άσκηση 1» που υπάρχει στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □
2. Διαβάστε την ιστορία. □
3. Συμπλήρωσε το μπαλόνι διαλόγου του Κώστα αφού πρώτα συζητήσετε στην ομάδα σας και συμφωνήσετε για τις απαντήσεις σας. □
4. Μην προχωρήσετε αν δε μιλήσετε με μία δασκάλα. □
5. Αποθηκεύσετε το φάιλ με το όνομα «Άσκηση 1» στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □
6. Κλείστε το αρχείο. Στο κουτάκι διαλόγου που θα εμφανισθεί απαντήστε «Yes». □
Άσκηση 2
Σελίδα 1
1. Ανοίξτε το φάιλ με την ονομασία «Άσκηση 2» που υπάρχει στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □
2. Διαβάστε την συνέχεια της ιστορίας. □
3. Διαβάστε τα σχόλια που έχει πει ο Σταύρος. Συζητήστε στην ομάδα σας και πείτε ποια από αυτά είναι παρατηρήσεις και γιατί. □
4. Μην προχωρήσετε αν δε μιλήσετε με μία δασκάλα. STOP □

Σελίδα 2
5. Διαβάστε τη συνέχεια της ιστορίας. □

Σελίδα 3
6. Στη σελίδα 3 συμπληρώστε το μπαλόνι διαλόγου της Ρέας αφού πρώτα συζητήσετε στην ομάδα σας την ερώτηση του Σταύρου. □
7. Μην προχωρήσετε αν δε μιλήσετε με μία δασκάλα. STOP □

Σελίδα 4
8. Στη σελίδα 4 συμπληρώστε το μπαλόνι διαλόγου της Ρέας αφού πρώτα συζητήσετε στην ομάδα σας την ερώτηση του Σταύρου. □
9. Αποθηκεύστε το φάιλ με το όνομα «Άσκηση 2» στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □
Σελίδα 5
10. Διαβάστε τη συνέχεια της ιστορίας.

Σελίδα 6
11. Στη σελίδα 6 προσθέστε ένα καρέ με το Σταύρο. Γράψτε την απάντησή σας στην ερώτηση της Ρέας αφού πρώτα συζητήσετε στην ομάδα σας.

Σελίδα 7
12. Στη σελίδα 7 συζητήστε στην ομάδα σας την ερώτηση της Ρέας και γράψτε την απάντησή σας στο μπαλόνι διαλόγου του Σταύρου.
13. Μην προχωρήσετε αν δε μιλήσετε με μία δασκάλα.

Σελίδα 8
14. Διαβάστε τη συνέχεια της ιστορίας.
15. Στη σελίδα 8 προσθέστε ένα καρέ με ήρωες της ιστορίας και γράψτε όσες παρατηρήσεις θέλετε για την εικόνα αφού πρώτα συζητήσετε στην ομάδα σας.
16. Διαβάστε τη συνέχεια της ιστορίας.

Σελίδα 9
Σελίδα 8 

17. Στη σελίδα 8 προσθέστε ένα καρέ με ήρωες της ιστορίας και γράψτε όσες εξηγήσεις θέλετε. □

18. Αποθηκεύστε το φάιλ με το όνομα «Άσκηση 2» στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □

19. Μην προχωρήστε. Ακολουθεί συζήτηση με όλες τις ομάδες στην τάξη.

Άσκηση 3

1. Ανοίξτε το φάιλ με την ονομασία «Άσκηση 3» που υπάρχει στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop. □

2. Διαβάστε τη συνέχεια της ιστορίας. □

Σελίδα 2

3. Στη σελίδα 2 προσθέστε ήρωες της ιστορίας στα καρέ και γράψτε όσες παρατηρήσεις θέλετε για τη δεύτερη εικόνα που τους έχει δείξει ο Σταύρος. □

Σελίδα 3

4. Διαβάστε τη συνέχεια της ιστορίας. □

5. Συζητήστε στην ομάδα σας την ερώτηση που κάνει η Ρέα. □

6. Συμπληρώστε το μπαλόνι διαλόγου του Γιάννη με την απάντησή σας. □

7. Μην προχωρήσετε αν δε μιλήσετε με μία δασκάλα.
Σελίδα 4

8. Διαβάστε τη συνέχεια της ιστορίας. □
9. Συζητήστε στην ομάδα σας τις δύο ερωτήσεις που κάνει ο Σταύρος. □
10. Συμπληρώστε τα δύο μπαλόνια διαλόγου του Κώστα με την απάντησή σας. □
11. Μην προχωρήσετε αν δε μιλήσετε με μία δασκάλα.
12. Διαβάστε τη συνέχεια της ιστορίας. □

Σελίδα 5

13. Γράψτε μία παρατήρηση στο μπαλόνι διαλόγου του ήρωα. □
14. Αποθηκεύστε το φάιλ με το όνομα «Άσκηση 3» στο φάκελο «Επιστήμη Στ 2» που βρίσκεται στο desktop. □

Σελίδα 6

15. Διαβάστε τη συνέχεια της ιστορίας.
16. Γράψτε μία εξήγηση για την ίδια εικόνα στο μπαλόνι διαλόγου του ήρωα. □
17. Μην προχωρήσετε. □ Ακολουθεί συζήτηση με όλες τις ομάδες στην τάξη.
Σελίδα 7

18. Διαβάστε τη συνέχεια της ιστορίας.

19. Συζητήστε στην ομάδα σας αυτό που λέει ο Σταύρος και ο Γιάννης.

20. Απαντήστε στην ερώτηση του Κώστα. Γράψτε την απάντησή σας στο μπαλόνι διαλόγου της Ρέας.

21. Διαβάστε τη συνέχεια της ιστορίας.

Σελίδα 8

22. Αποθηκεύστε το φάιλ με το όνομα «Άσκηση 2» στο φάκελο «ΕπιστήμηΣτ2» που βρίσκεται στο desktop.
Appendix 6: Screenshots of ‘Tricky tracks’ webcomics (Part B) (in Greek)

ACTIVITY 1
ACTIVITY 2
Using Web Comics in Education 142424-LLP-1-2008-1-GR-COMENIUS-CMP

DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
Using Web Comics in Education 142424-LLP-1-
2008-1-GRCOMENIUS-CMP

DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
Using Web Comics in Education 142424-LLP-1-
2008-1-GR-COMENIUS-CMP

DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
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DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)

ACTIVITY 3
DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
There are a few insights that are important.

STOP
Using Web Comics in Education 142424-LLP-1-2008-1-GR-COMENIUS-CMP

DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
Using Web Comics in Education 142424-LLP-1-
2008-1-GR-COMENIUS-CMP

DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
Το μυστήριο με τα ίχνη

Πριν από αρκετά χρόνια οι παλαιοντολόγοι εντόπισαν τα σημαδάκια δύο διαφορετικών μεγεθών τα οποία πλησιάζουν το ένα το άλλο. Σε κάποιο σημείο συναντιούνται, ανακατεύονται και στη συνέχεια τα μεγάλα σημαδάκια συνεχίζουν το δρόμο τους, ενώ τα μικρά σημαδάκια δεν παρατηρούνται πια.

Ένας επιστήμονας υποστήριξε ότι πρόκειται για πουλιά του ίδιου είδους που ζούσαν εκείνο τον καιρό. Τα ίχνη δείχνουν ένα μεγάλο και ένα μικρό πουλί τα οποία περπατούν και συναντούν το ένα το άλλο. Το μικρό πουλί κρατά το στόμα του φαγητό και για το λόγο αυτό το μεγάλο του επιτίθεται. Το μικρό πουλί για να γλιτώσει ανοίγει τα φτερά του και πετά ψηλά στον ουρανό χωρίς να του κλέψει το μεγαλύτερο πουλί το φαγητό του.

Σύμφωνα με κάποιο άλλο παλαιοντολόγο πρόκειται για ίχνη δεινοσαύρων. Τα μεγάλα σημαδάκια ανήκουν στο δεινόσαυρο αλμπερτόσαυρο ο οποίος είναι σαρκοφάγος. Τα μικρά σημαδάκια ανήκουν στο δεινόσαυρο εντμοντόσαυρο ο οποίος είναι φυτοφάγος. Ο αλμπερτόσαυρος πλησιάζει τον εντμοντόσαυρο, του επιτίθεται, τον σκοτώνει και τον τρώει. Έπειτα, ο αλμπερτόσαυρος συνεχίζει να βρει κι άλλη τροφή.
Ένας τρίτος επιστήμονας υποστήριξε ότι πρόκειται για ίχνη δύο ζώων, ένα μεγάλο και ένα μικρότερο, τα οποία περπατούν προς μία πηγή νερού. Όταν φτάνουν στην πηγή πίνουν νερό και αρχίζουν το παιχνίδι. Μετά φεύγουν και τα δύο πάλι περπατώντας.
Appendix 8: Scientific stories (Part C, activity 2) (in Greek)

Οδηγίες

1. Διαβάστε την ιστορία.

Γιατί εξαφανίστηκαν οι δεινόσαυροι;

Οι δεινόσαυροι κυριάρχησαν στη Γη για 150 εκατομμύρια χρόνια περίπου. Οι δεινόσαυροι εξαφανίστηκαν πριν από περίπου 65 εκατομμύρια χρόνια. Υπάρχουν διαφορετικές απόψεις για το πώς εξαφανίστηκαν οι δεινόσαυροι. Πρόσφατα οι επιστήμονες βρήκαν στρώμα πλούσιο σε ιρίδιο κοντά στα γεωλογικά στρώματα της περιόδου που εξαφανίστηκαν οι δεινόσαυροι.

Σύμφωνα με τον επιστήμονα Λούις Άλβαρεζ, αυτό το εύρημα υποστηρίζει την άποψή του ότι οι δεινόσαυροι πέθαναν όταν η Γη χτυπήθηκε από ένα μετεωρίτη (οι μετεωρίτες περίχουν αρκετές ποσότητες ιρίδιου). Η σύγκρουση απελευθέρωσε τεράστιες ποσότητες ιρίδιου στον αέρα που έκρυψαν το φως του Ήλιου με αποτέλεσμα να επικρατήσει μαυρίλα και βαρύς χειμώνας για μερικά χρόνια στη Γη, οπότε η βλάστηση εξαφανίστηκε. Οι δεινόσαυροι πέθαναν από την πείνα και το υπερβολικό κρύο.

Σύμφωνα με τον επιστήμονα Νόρμαν Μακλεόντ, οι δεινόσαυροι πέθαναν λόγω των δύσκολων κλιματικών αλλαγών που προκλήθηκαν λόγω μιας πολύ σιωπηρής ηφαιστειακής εκρήξεως (μεγάλες ποσότητες ιρίδιου βρίσκονται στον πυρήνα της Γης). Οι ηφαιστειακές εκρήξεις γέμισαν την ατμόσφαιρα με πολλά δηλητήρια αέρια. Αυτή υποστηρίζει ότι οι δεινόσαυροι πέθαναν λόγω της αύξησης της τερμικής δόσης της Γης μεταξύ των δηλητηριώδων αερίων και της υπερβολικής ζέστης.

2. Να φτιάξετε ένα κόμικ στο οποίο να δημιουργήσετε την ιστορία που διαβάσατε. Χρησιμοποιήστε τις εικόνες και τους χαρακτήρες που βρίσκεται στο desktop.

Για να είναι καλή η ιστορία σας, χρειάζεται κάποιος που διαβάζει το κόμικ σας να μάθει:

- Ποιες παρατηρήσεις έκαναν οι δύο επιστήμονες ιστορία για το θέμα που εξαφανίστηκαν;
- Ποιες εξηγήσεις έδωσαν οι επιστήμονες;
- Μπόρεσαν να συμφωνήσουν στις παρατηρήσεις τους; Γιατί;
- Μπόρεσαν να συμφωνήσουν στις εξηγήσεις τους; Γιατί;

Παρουσιάστε την ιστορία στους συμμαθητές σας.
Οδηγίες
1. Διαβάστε την ιστορία.

Γιατί εξαφανίστηκαν τα χέλια από την Κύπρο:

Πριν από χιλιάδες χρόνια, αρκετά χέλια έφταναν στα παράλια της Κύπρου, ανέβαιναν σε ποταμούς και ζούσαν σε λιμνούλες. Υπάρχουν διαφορετικές απόψεις για τις αιτίες που προκάλεσαν την εξαφάνισή τους. Πρόσφατα οι επιστήμονες στην Κύπρο εντόπισαν ίχνη από οστά ψαριού σε μια ελώδη περιοχή, τα οποία διαπιστώθηκε ότι ανήκουν σε χέλι.

Σύμφωνα με το Δανό επιστήμονα Ιωάννη Σμιτ, τα οστά που εντοπίστηκαν ανήκουν σε χέλι εκείνης της εποχής που ζούσε σε λίμνη, η οποία αποξηράνθηκε. Η αλογίστη χρήση εντομοκτόνων προκάλεσε τη μείωση των εντόμων που αποτελούν τη βασική τροφή των χελιών. Έτσι, κατά την άποψη της, τα οστά που εντοπίστηκαν ανήκουν σε χέλι που πέθανε από έλλειψη τροφής.

2. Να φτιάξετε ένα κόμικ στο οποίο να διηγηθείτε την ιστορία που διαβάσατε.

Για να είναι καλή η ιστορία σας, χρειάζεται κάποιος που διαβάζει το κόμικ σας να μάθει:

- Ποιες παρατηρήσεις έκαναν και οι δύο επιστήμονες για το θέμα που συζητείται;
- Ποιες εξηγήσεις εδώσαν οι επιστήμονες;
- Μπόρεσαν να συμφωνήσουν στις παρατηρήσεις τους; Γιατί;
- Μπόρεσαν να συμφωνήσουν στις εξηγήσεις τους; Γιατί;
Παρουσιάστε την ιστορία στους συμμαθητές σας.
Οδηγίες

1. Διαβάστε την ιστορία.

Γιατί τα φυτά της αγριοτριανταφυλλιάς συναντούνται μόνο στην κορυφή της Χιονίστρας;

Η αγριοτριανταφυλλιά (Rosa chionistrae) είναι ένα από τα ενδημικά φυτά της Κύπρου. Εκφράστηκαν διάφορες απόψεις που προσπαθούν να εξηγήσουν γιατί τα συγκεκριμένα φυτά συναντούνται πλέον μόνο στην κορυφή της Χιονίστρας, το ψηλότερο σημείο της οροσειράς του Τροόδους. Επίσης, πρόσφατα, εντοπίστηκε ένα φυτό αγριοτριανταφυλλιάς σε μια άλλη, χαμηλότερη κορυφή του Τροόδους, τον Κύκκο.

Σύμφωνα με τη φυτολόγο, Θεοδώρα Δημητριάδου, ο λόγος που μέχρι σήμερα τα φυτά συναντιούνταν μόνο εκεί είναι εξαιτίας της χιονόπτωσης στην κορυφή της Χιονίστρας. Πριν από εκατοντάδες χρόνια, υπήρχαν αγριοτριανταφυλλιές και σε άλλες βουνοκορφές της οροσειράς του Τροόδους, γιατί οι χαμηλές θερμοκρασίες και η χιονόπτωση που υπήρχαν τότε, δημιουργούσαν τις κατάλληλες συνθήκες για να φυτρώσουν αγριοτριανταφυλλιές. Το φυτό που εντοπίστηκε πρόσφατα σε χαμηλότερη κορυφή στον Κύκκο, φύτρωσε τυχαία χάρη στην πολύ χαμηλή θερμοκρασία που καταγράφηκε πρόσφατα στην κορυφή του Κύκκου.

Σύμφωνα με μια βοτανολόγο, τη Ροδούλα Χατζηλοΐζου το φυτό αυτό έχει εξαφανιστεί λόγω της χρήσης του για κατασκευή φαρμάκων. Η περιοχή του Κύκκου, αλλά και άλλες περιοχές όπου φύτρωνε παλαιότερα το φυτό, είναι πιο εύκολα προσβάσιμες από τους ανθρώπους, σε αντίθεση με την κορυφή της Χιονίστρας που είναι πιο απομακρυσμένη, Άνθρωποι που πήγαιναν στο δάσος Κύκκου, έκοβαν τα φυτά για να κατασκευάσουν ένα φάρμακο για δερματικές παθήσεις. Το φυτό που εντοπίστηκε πρόσφατα στην κορυφή του Κύκκου ξέμεινε τυχαία.

2. Να φτιάξετε ένα κόμικ στο οποίο να διηγηθείτε την ιστορία που διαβάσατε. Χρησιμοποιήστε τις εικόνες και τους χαρακτήρες που βρίσκονται στο φάκελο με ονομα «Εικόνες για ιστορία με αγριοτριανταφυλλιά» που βρίσκεται στο desktop.

Για να είναι καλή η ιστορία σας, χρειάζεται κάποιος που διαβάζει το κόμικ σας να μάθει:

- Ποιες παρατηρήσεις έκαναν και οι δύο επιστήμονες για το θέμα που συζητείται;
- Ποιες εξηγήσεις εδώσαν οι επιστήμονες;
- Μπόρεσαν να συμφωνήσουν στις παρατηρήσεις τους; Γιατί;
- Μπόρεσαν να συμφωνήσουν στις εξηγήσεις τους; Γιατί;

Παρουσιάστε την ιστορία στους συμμαθητές σας.
DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Study #1 (UNIVERSITY OF CYPRUS)
Pilot Case Study on the Use of Web Comics in Modern Greek Language Teaching

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Context
This case study was undertaken during the 2008-2009 school year at the Varvakeio Experimental High School in Athens, Greece. Twenty-four students from the A grade, i.e., ages 12 to 13, were called to perform collaborative learning tasks around Web comics on the topic of “diet and nutrition habits,” a topic that is included in the syllabus of Modern Greek Language for A-grade Greek high-school students. All students had solid computing skills and an elementary level of English-language knowledge. Data about the reading habits of students were collected using a questionnaire. Student participants were asked to rate on a scale of 1 to 5 (1 being never and 5 being very often) their level of interest in reading a book or a comic in their leisure time.

As expected, students preferred to read comics more than books in their free time. Seventeen out of 24 students (70.83%) read books quite often in their free time while 19 out of 24 (79.17%) preferred to read printed comics. The types of comics that had the highest level of interest for students were adventure, mystery, and satire (62%, 50%, and 50%, respectively). We should note that the percentage of students who rarely read books in general (reluctant readers) was significant, i.e., seven out of 24 students (29%). However, after the end of this case study, 23 out of 24 students (95.83%) claimed that they preferred to use digital comics as an instructional medium.

Learning Scenario
Students were asked in their Modern Greek Language course to practice digital storytelling and to design and create digital comics in authentic conditions of communication, based on their preferences and experiences. Given the topic of “diet and nutrition habits,” they were asked to communicate this specific message: “Make your classmates aware of the negative consequences of bad eating habits and persuade them to adopt a healthy alimentary habit.”
For eight didactic hours during two weeks (a didactic hour is 45 minutes), students played the roles of scriptwriters, illustrators, and peer reviewers of digital comics at school, as well as at home, and became familiar with various modes of semiotic systems, apart from the verbal system. Teachers attempted to help students expand their strategies for the comprehension of multimodal texts and to develop skills in the production of a narrative using various semiotic codes and learning resources (i.e., the development of multiliteracy).

Thus a learning scenario was prepared with specific learning objectives:

- Production of multimodal texts (digital stories) in the form of Web comics meaningful for students (situated learning), while contributing to the resolution of a real problem (problem-based learning) corresponding to their cultural experiences;
- Development of skills for comic book plot design using Freytag’s specific narrative structure: exposition (setting, characters), conflict, rising action, and climax/turning point, followed by a falling action and resolution/denouement;
- Familiarization with other modes of semiotic systems other than simple text;
- Development of narrative skills, using various semiotic codes and learning resources;
- Understanding of linguistic structural elements, such as types of clauses, forms of noun phrases, points of punctuation, and application of them in the practice of communication via Web comics;
- Use of lexical cohesion and lexical affinity in the text of the Web comic and its plot;
- Use of vocabulary, grammar and syntax, and paralinguistic elements of oral and written language in the specific case of communication via Web comics.

Also, the teacher tried via this case study to promote the acquisition of skills, such as:

i. intellectual: critical thinking, creative imagination, analysis, composition, organization, etc.;
ii. communicative-social: collaboration, interaction, responsibility;
iii. metacognitive: self-reflection, evaluation.

The learning scenario was developed, taking into consideration situated learning theory (Lave & Wenger, 2000). Having watched as a starting point the film *Supersize Me*, directed by Morgan Spurlock, about the negative physical and mental effects of consuming fast food, students were asked first to express themselves orally about the film, and then to design collaboratively (in teams of two members) and create digital stories in Web comics format in order to solve the aforementioned given problem.

During comics creation, students used various learning resources, such as similar films, textbooks on language and home economics, and Web sites that either the teacher suggested or they found on their own. In order to make the comics creation process easier, the ComicLab authoring tool was used. ComicLab is an easy, stand-
alone, drag-and-drop authoring tool for creating digital stories in Web comics format. Students created their comics either in the school lab or at home.

The comics creation process was divided into five phases: (1) presentation of the features of the interactive ComicLab tool at the school laboratory; (2) planning of the comics’ scripts in the classroom and organization of the narration of digital stories in comics format, i.e., specification of the main theme, setting, characters/actors, plot-action, and dialogue; (3) planning of the action in each panel of the comic, according to the script of the previous phase, and transformation of the script into Web comics format, using the ComicLab software tool at the school laboratory; (4) upload of the Web comics onto the school wiki and peer review of the Web comics; and (5) evaluation in the classroom of both the learning scenario and tools.

Teachers prepared worksheets as cognitive scaffolds and gave them to students in order to guide them during the comics creation process. These worksheets included questions such as:

- The central idea of your story: What are you trying to say?
- The main characters: What are the names of your main characters? Who are the stars of your comic? Describe your main character’s personality (funny, honest, etc.).
- The storyline and the sequence of the events: What happens in your story?
- The order of events: Use transition words such as first, next, then, and finally.

**ComicLab Tool**

As noted above, for the production of the Web comics students used an innovative authoring tool called ComicLab, produced by ITisART.Ltd (see Figure 1). ComicLab has its own library of pictures and clip art that students could use. Also, students could incorporate into their comics pictures from the Internet or scanned copies of their own drawings. ComicLab offers students without talent in illustration or sketching the opportunity to compose their own comics by dragging and dropping ready-made graphical characters (clip art) onto pictures (backgrounds) on the various panels of a page. A Web comic could have as many pages and as many panels per page as the student wishes. Students could also choose from a variety of speech balloons according to the message and “talking style” that they wanted to use, i.e., whispering, loud talking, etc.
Another innovative feature of ComicLab is that it allows the user to add hyperlinks in the speech balloon text. Also, the students could add video or audio files in order to give their stories more multimedia effects. The output of the comics creation process were Web comics in the form an interactive flip book, which could be uploaded to any Web site. Thus ComicLab allows a student to create multimedia-rich digital stories in a Web comics format. Such a combination of interactivity and multimedia provides a new impulse in digital storytelling to students by making them more active members of learning process.

**Evaluation Techniques**

A mixed-method evaluation approach was adopted in this case study. A simple anonymous questionnaire was given to the students at the end of this case study, which included three items about demographic data, five items about the effectiveness of the learning process measured on a five-point Likert scale, and four open questions for allowing students to detail the pros and cons of the use of Web comics in the learning process, as well as to describe any usability problems they had with ComicLab.

The main questions about the effectiveness of the case study were:

- Would you like being taught school courses with the help of digital comics?
- Do you believe that teaching with digital comics was more pleasant than more traditional teaching?
- Did self-made comics on the subject of alimentary habits help enrich your knowledge of it?
- Did self-made comics help you identify the modern alimentary habits of adolescents and adults?
- Did self-made comics help you draw conclusions on the importance of changing the bad alimentary habits of adolescents and adults?
- Was the ComicLab tool easy to use when creating your comic?
Also, the comics that students produced were analyzed using an assessment rubric specifically designed for similar case studies (Petropoulou et al. page number). A rubric is a representative, qualitative scoring tool that lists a student's performance levels at learning tasks, based on the sum of a full range of criteria, rather than a single numerical score. It is a very useful medium for analyzing and quantifying students’ performances and their achievements of learning objectives. Rubrics are regarded as an effective assessment tool of evaluation and a very valuable and useful tool for teachers (Petropoulou, Vassilikopoulou & Retalis, 2009).

Table 1 contains a snapshot of the assessment rubric that was used. The criteria assessed are shown on the vertical axis, and the gradations of the qualitative levels of performance are shown on the horizontal axis.

Finally, after completing the learning scenario, the teacher asked students their opinions of it.

Table 1. A snapshot of the assessment rubric that was used in the pilot study

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EXCELLENT (1)</th>
<th>VERY GOOD (2)</th>
<th>MEDIocre (3)</th>
<th>WEAK (4)</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIALOGUE &amp; CAPTIONS</td>
<td>Dialogue and captions promote the development of plot and are thoroughly comprehensible.</td>
<td>Dialogue and captions are mostly relevant to the story and are comprehensible.</td>
<td>Dialogue and captions were relevant to the story, though in certain points they are not comprehensible.</td>
<td>Insufficient dialogue and irrelevant captions.</td>
<td></td>
</tr>
<tr>
<td>FUNCTIONAL USE OF LANGUAGE</td>
<td>Use of language on the levels of syntax, vocabulary, and punctuation is over 70% correct, as far as communication of heroes is concerned.</td>
<td>Correct use of language in 50% to 70% of content.</td>
<td>Correct use of language in less than 50% of content.</td>
<td>Many Grammatical and syntactic errors.</td>
<td></td>
</tr>
</tbody>
</table>

Findings
The overwhelming majority of the students (23 out of 24 — 95.83%) preferred that their courses to be taught with the help of digital comics. Twenty-two out of 24 students (91.67%) also stated that the course became more pleasant. Concerning the comprehension of topic "alimentary habits," 79% of students believed that the particular scenario contributed to the enrichment of their knowledge from enough to very much (too much: 13%; very much: 29%; enough: 37%). The overwhelming majority (92%) confirmed that the creation of digital comics helped them to comprehend better the way in which the narration of a story is organized (too much: 17%; very much: 58%; enough: 17%). Also, 96% of the students responded that the scenario enriched their knowledge of punctuation, types of clauses, and operation of noun phrases in the practice of communication (too much: 21%; very much: 33%; enough: 42%).
It should be noted that two students who formed one team did not manage to submit their comic on time. They submitted an unfinished comic story, saying that they needed more time for such a task. One of the students in this group liked the learning scenario very much, while the other one did not like it. Thus there was a problem in the collaboration that could have been avoided or solved by the teacher.

Although students claimed to the teacher that they spent much time on this learning scenario, they did not complain, with the exception of the student who did not manage to finish his task on time. ComicLab proved to be a very user-friendly tool. Thirty percent of the students said that it was usable enough, 25% commented that it was very usable, and 29% reported that it was extremely usable. Twenty-one students out of 24 (62.50%) declared that they would change nothing. The students appreciated the features that the tool offers — its graphic design as well as the pictures, i.e., backgrounds and characters that accompany the tool. Only three students asked for more clip art about superheroes and background images; these students also asked about the possibility of allowing the user to copy and paste clip art.

Particularly impressive is the fact that all 24 participating students felt very positively about this case study saying, for example, "it was a different course," it was "amusing without losing its value," and it "allowed me to activate my imagination." One student said he "felt the joy of creation."

All the students but four produced interesting comics integrating visual and verbal modes as entities in the narrative. Two teams out of 11 submitted very nice comics with exceptional ideas, interesting plot, clarity of space and time, very clear character personalities, and very good use of the Greek language. (A screenshot of a comic page is shown in Figure 2.) The four students who did not produce interesting comics, taking advantage of their cultural experiences, looked deep into the problem and offered non-visual stories as solutions to the problem of nutritional habits. The comics of four teams were very good, and three of them were mediocre because their themes were not original enough or they did not address the given problem. Finally, the comics of two teams were weak, though the visual representation of narration (artistic point of view) in these students’ comics was quite good, which confirms the familiarity of children with the dominant visual culture.
Figure 2. A screenshot of a comic page

Table 2 shows analytically the number of teams that managed to reach a specific level of performance in the various evaluation criteria that were measured via the assessment rubric.
Table 2. Number of teams that reached a specific level of performance at the various evaluation criteria

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Level of performance</th>
<th>EXCELLENT</th>
<th>VERY GOOD</th>
<th>MEDIocre</th>
<th>WEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEME (what)</td>
<td></td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>PLOT: &quot;How&quot; &quot;Why&quot;</td>
<td></td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>UNITY OF PLACE OF TIME IN SCENES: &quot;When&quot; &quot;Where&quot;</td>
<td></td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>CHARACTERS: &quot;Who &quot;: appearance, personality, behavior</td>
<td></td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>DIALOGUES AND CAPTIONS</td>
<td></td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>FUNCTIONAL USE OF LANGUAGE</td>
<td></td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>EFFECTIVENESS AND RECEPTIBILITY</td>
<td></td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>ARTISTIC POINT OF VIEW/ILLUSTRATION</td>
<td></td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>COLLABORATIVE PRODUCTION NARRATIVE MULTIMODAL TEXT IN AUTHENTIC CONDITIONS OF COMMUNICATION</td>
<td></td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>STRUCTURE OF NARRATIVE</td>
<td></td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>CHARACTERISTICS OF A SCENE (UNITY OF PLACE, TIME, CHARACTERS)</td>
<td></td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>USE OF NOUN PHRASES FOR THE CREATION OF TITLES</td>
<td></td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>SYNTACTIC SCHEMES: TYPES OF CLAUSES (noun-adverbial), STRUCTURE, RELATION WITH OTHERS(Subordinate/dependent-independent/main)</td>
<td></td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>USE OF PUNCTUATION POINTS IN ATTRIBUTING CHARACTERISTICS OF ORAL SPEECH</td>
<td></td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>RECOGNITION OF MAIN, ADDITIONAL OR DECORATIVE ROLE OF PICTURE IN MULTIMODAL TEXT</td>
<td></td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>DEVELOPMENT OF COLLABORATION, COMMUNICATION AND EVALUATION SKILLS</td>
<td></td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

From the data presented in Table 2, students faced difficulties with:

- Structure of the plot and clear presentation of the time and space of the action;
- Collaborative production of a multimodal narrative with a simple multimodal text as a result;
- Effective connection between picture and text;
- Structure of narrative.
Unfortunately, for eight teams, even though they delivered their work on time, they took only partial advantage of the given worksheets and had weak attendance. The teacher argued that this weak performance was due to the lack of time for performing such a sequence of learning tasks. Also, this learning scenario was a difficult experience for students who were not accustomed to working on projects in groups. Finally, students demonstrated mastery of particular linguistic elements, which was an important and very positive finding of this case study. Most of the students managed to use syntax rules and syntactic schemes correctly according to the circumstances of communication. Also, the use of punctuation in attributing characteristics of oral communication was proper and exact for most students.

Concluding Remarks
This case study examined whether the educational use of Web comics is a powerful, innovative instructional medium. The study was part of a research initiative called EduComics, which promotes the design of authentic learning scenarios in which students become Web comic authors, i.e., write the script and design the storyboard to create original Web comics, either individually or in collaboration. In this particular study, teachers asked students to play the roles of creators, rather than merely become receivers of information.

This case study was generally regarded as successful. The findings from the data analysis encouraged us to continue our research. It was shown that Web comics can be used in language teaching because they are a medium broadly accepted by the students. It was found that the comics creation process helps students to acquire linguistic skills and to apply their imaginations and use their cultural experiences for creating multimodal texts. Of course, this research is still in its infancy, and no firm conclusions or suggestions about the didactics of modern Greek language can be made. This learning scenario will be reused in a series of high-school courses, such as ancient Greek language and history, in order to gather comparative data. Emphasis will be given to strengthening students’ collaboration skills and to the use of worksheets as scaffolds, as students faced problems in these areas in the presented case study.
APPENDICES

Appendix 1A. ASSESSMENT RUBRIC OF COMICS

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EXCELLENT 1</th>
<th>VERY GOOD 2</th>
<th>MEDIocre 3</th>
<th>WEAK 4</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEME(what)</td>
<td>original idea, took advantage of cultural experience and looked deep in problem’s solution</td>
<td>Interesting theme, took advantage of cultural experience and looked satisfactory in problem’s solution</td>
<td>ordinary idea, took advantage of cultural experience and looked on the surface of problem’s solution</td>
<td>weak idea, took no advantage of cultural experience and did not look in problem’s solution</td>
<td></td>
</tr>
<tr>
<td>PLOT: &quot;How&quot; &quot;Why&quot;</td>
<td>the parts of plot are completely developed</td>
<td>the parts of plot are well developed</td>
<td>the parts of plot are low developed</td>
<td>the parts of plot are insufficiently developed</td>
<td></td>
</tr>
<tr>
<td>UNITY OF PLACE OF TIME IN SCENES: &quot;When&quot; &quot;Where&quot;</td>
<td>place and time was determined with clarity</td>
<td>place and time are sufficiently determined</td>
<td>place and time are insufficiently determined</td>
<td>place and time were insufficiently determined or not determined</td>
<td></td>
</tr>
<tr>
<td>CHARACTERS: &quot;Who&quot;; appearance, personality, behavior</td>
<td>characters develop completely and are described in detail. The reader learns about them with accuracy.</td>
<td>characters develop and are described with enough details, reader has a good idea about them</td>
<td>characters develop and are described with few details. reader has a vague idea about them</td>
<td>characters do not develop sufficiently (they are just named).</td>
<td></td>
</tr>
<tr>
<td>DIALOGUES AND CAPTIONS</td>
<td>The dialogues and captions promote the development of plot and are absolutely comprehensible.</td>
<td>The dialogues and captions are mostly relative with the story and are comprehensible.</td>
<td>their dialogues were quite relative with the story, while in certain points they do not become comprehensible,</td>
<td>Insufficient dialogues and irrelevant captions</td>
<td></td>
</tr>
<tr>
<td>FUNCTIONAL USE OF LANGUAGE (HATZISAVVJDIS)</td>
<td>use of language in the level of syntax, vocabulary, punctuation is over 70% correct as far as communication of heroes is concerned.</td>
<td>correct use of language in 50-70% percentage</td>
<td>correct use of language in below 50% percentage</td>
<td>Many grammatical and syntactic errors</td>
<td></td>
</tr>
</tbody>
</table>
EFFECTIVENESS AND RECEPTIBILITY

communication objectives and the intentions of students - authors of text are completely concernible and the aim of comics is achieved.

the communication objectives are clear and intentions of students - authors achieved quite well the aim of comic.

communication objectives and the intentions of students- authors are not clear enough and the intentions of students - authors do not achieve completely the aim of comic.

ARTISTIC POINT OF VIEW/ILLUSTRATION

artistic style of pictures follows story mode. Picture and text are in complete harmony.

artistic style ties up very well with story mode. Picture and text collaborate very well.

artistic style neither add nor removes something from the story mode.

Artistic style does not suit with style of story. Picture and text do match.

Appendix 1B. ASSESSMENT RUBRIC OF LEARNING AND DIDACTIC OBJECTIVES ACHIEVEMENT

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EXCELLENT</th>
<th>VERY GOOD</th>
<th>MEDIocre</th>
<th>WEAK</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLLABORATIVE PRODUCTION NARRATIVE MULTIMODAL TEXT IN AUTHENTIC CONDITIONS OF COMMUNICATI ON</td>
<td>collaborative production is complete, interesting and narrative multimodal text is appropriate with harmonious connection between picture and text.</td>
<td>narrative multimodal text is appropriate. Tight connection between picture and text.</td>
<td>collaborative production of multimodal narrative with a simple multimodal text with no effective connection between picture and text.</td>
<td>Weakness in collaboration, and in production of multimodal narrative</td>
<td></td>
</tr>
<tr>
<td>STRUCTURE OF NARRATIVE</td>
<td>narrative is satisfactory, structural elements are developed</td>
<td>narrative is insufficient, structural elements are partially developed</td>
<td>narrative and structural elements are ill developed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHARACTERISTICS OF A SCENE (UNITY OF PLACE, TIME, CHARACTERS</td>
<td>narrative scenes are complete and narrative scenes are quite complete</td>
<td>narrative scenes are insufficient</td>
<td>narrative scenes are inadequate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USE OF NOUN PHRASES FOR THE CREATION OF</td>
<td>use of noun phrases for the creation of titles is</td>
<td>use of noun phrases for the creation of titles is insufficient</td>
<td>use of noun phrases for the creation of titles is insufficient</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TITLES

<table>
<thead>
<tr>
<th>Thorough and communicative</th>
<th>Appropriate and sufficient</th>
<th>Weak</th>
</tr>
</thead>
</table>

#### SYNTACTIC SCHEMES: TYPES OF CLAUSES (noun-adverbial), STRUCTURE, RELATION WITH OTHERS (Subordinate/dependent-independent/main)

<table>
<thead>
<tr>
<th>Use of syntactic schemes is perfect, in relation to the communicative situation.</th>
<th>Use of Syntactic schemes is correct in relation to the communicative situation.</th>
<th>Mediocre respect of Syntactic schemes.</th>
<th>Incorrect use of Syntactic schemes</th>
</tr>
</thead>
</table>

#### USE OF PUNCTUATION POINTS IN ATTRIBUTING CHARACTERISTICS OF ORAL SPEECH

<table>
<thead>
<tr>
<th>Use of punctuation points in attributing characteristics of oral text is proper and exact</th>
<th>Use of punctuation points in attributing characteristics of oral text is very good</th>
<th>Use of punctuation points in attributing characteristics of oral text is mediocre</th>
<th>Use of punctuation points in attributing characteristics of oral text is careless and incorrect</th>
</tr>
</thead>
</table>

#### RECOGNITION OF MAIN, ADDITIONAL OR DECORATIVE ROLE OF PICTURE IN MULTIMODAL TEXT

<table>
<thead>
<tr>
<th>Picture was sovereign and functioned as an integral part of the produced comic</th>
<th>Picture functioned additionally, as a part out of the total</th>
<th>Picture had rather secondary role.</th>
<th>Picture had simply decorative role</th>
</tr>
</thead>
</table>

#### DEVELOPMENT OF COLLABORATION, COMMUNICATION AND EVALUATION SKILLS

<table>
<thead>
<tr>
<th>Team delivered completed work in time, was methodical in the completion and exploitation of working sheets about comics and attended actively the oral evaluation</th>
<th>Team delivered work in time, and completed working sheets about comics and attended the oral evaluation</th>
<th>Even though they delivered sample of their work within deadline, they took partially advantage of working sheets and had weak attendance</th>
<th>Team did not deliver work in time. Insufficient working sheets. Low attendance</th>
</tr>
</thead>
</table>
Appendix 2. Questionnaire

Questionnaire
a. Select the answer you prefer b. answer the open questions in brief.

1. Do you read books in your leisure time?
   - Never
   - Seldom
   - Sometimes
   - Often
   - Very often

2. Which type of books do you like reading?

   - Archaeology-Greek history
   - General books
   - Language
   - International relations
   - Religion
   - History- Geography
   - Fine arts
   - Social sciences

   - Folklore
   - Literature
   - Technology
   - Philosophy
   - Natural sciences
   - Recreational arts
   - other...

3. Do you generally read Comics?
   - Never
   - Seldom
   - Sometimes
   - Often
   - Very often

4. Which type of comics do you prefer reading?

   - historical
   - comical
   - adventure
   - mystery
   - social

   - war
   - adolescent
   - fantasy
   - police
   - psychological
5. Do you like the idea of reading comics on a computer?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much

6. Would you like being taught school courses with the help of digital comics on a computer?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much

7. Do you believe that teaching with digital comics was more pleasant?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much

8. Did self-made comics on the subject of alimentary habits help you enrich your knowledge on it?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much

9. Did self-made comics help you identify cases of modern alimentary habits of adolescents and adults?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much
10. Did self-made comics help you draw conclusions on the importance of changing bad alimentary habits of adolescents and adults?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much

11. What did you like most or what did you consider complicated, when you made your own digital comics.

………………………………………………………………………………………..
………………………………………………………………………………………..
………………………………………………………………………………………..
………………………………………………………………………………………..
………………………………………………………………………………………..

12. Is the “ComicLab” tool user friendly?
☐ Not at all
☐ Very little
☐ So and so
☐ Very much
☐ Too much

13. Would you like to change anything in the tool, so that you would like it more? If yes, what kind of changes would you suggest?

……………………………………………………………………………………..
……………………………………………………………………………………..
……………………………………………………………………………………..
……………………………………………………………………………………..
……………………………………………………………………………………..

14. In which courses and in what way do you believe that “ComicLab” tool could be used?

……………………………………………………………………………………..
……………………………………………………………………………………..
……………………………………………………………………………………..
……………………………………………………………………………………..
……………………………………………………………………………………..
15. What are your feelings and your impressions as well, as far as the lesson with the help of “ComicLab” tool is concerned?

Thank you for your collaboration
Educational Use of Digital Comics at Primary and Secondary School: 
A Multi-tool Approach

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ABSTRACT
We present two case studies that were carried on in Italy, in the context of the EDUCOMICS project, to explore the education potential of digital comics in schools at different levels – primary and junior high. We involved 23 young students aged 8-9 and 26 pupils aged 12-13. Educational goals include the improvement of students’ narrative and communication capability (in Italian and, for older pupils, in English as Foreign Language), cooperation skills, and ICT ability. Students were organized in small groups, and worked together (mainly at school) along all phases of development, from the narrative concept to implementation. What characterizes these studies w.r.t. other pilots carried on in EDUCOMICS is the use of different development tools, from pencils&paper (to sketch the story “concept” and the preliminary dialogues), to Powerpoint to create an offline design prototype, to Web Comics Creator to build a web version. Junior high school students, and a small group of primary school children also created a hypertextual version of their narratives using 1001stories, a free authoring tool developed at HOC lab at Politecnico di Milano.

INTRODUCTION
Comics is a popular literary “genre”, widely used at school, especially for young students, to engage learners either as “consumers” of narratives created by others, or as “creators” of their own stories. As any storytelling activity, these experiences are generally acknowledged as a means to facilitate meaning making, promote the development of cognitive and communication skills, and enforce interrelationships among peers and among students and adults. Interactive multimedia technology, now increasingly adopted in European schools, holds a potential for complementing “traditional” paper-based comic creation with digital, interactive, web based comics. When learners play with technology as “narrators”, the benefits extend beyond those carried on by traditional comic authoring: multimedia and interactivity foster new forms of creativity, increase engagement, enjoyment, and fun, promote goal-oriented attitudes, and support collaborative work more efficiently.

One of the purposes of the EDUCOMICS project is to implement this concept and provide some empirical evidence for it. This has been achieved by carrying on a set of pilot studies that explored the educational potential of digital comics and involved over 250 students from primary to high school in 9 European countries.
This document reports two studies carried on in Italy, in schools at different levels – primary and junior high, involving respectively 23 children aged 8-9 and 26 pupils aged 12-13. Young pupils created a set of fantasy digital comics– including text and images – inspired to paper based and CD-based stories they had read and discussed in the classroom. Older students built a set of digital “horror comics” in English – including text, images, and recorded voices.

As we discuss in the rest of this document, the two studies share some commonalities in term of goals and process, regardless the different contexts and outcomes produced by students. For both studies, educational objectives included the improvement of narrative and communication capability, cooperation capability, and ICT skills. For older students, we also explored digital comics as a means to both exercise and improve written and oral skills in English as a Foreign Language. In both cases, students were organized in small groups, and worked together (mainly at school) along all phases of development, from the definition of the narrative concept and storyboard to implementation.

What characterizes these studies w.r.t. other pilots carried on in EDUCOMICS is the use of different development tools, from pencils&paper (to sketch the “concept” and the preliminary dialogues), to Powerpoint to create an off line prototype, to Web Comics Creator to build a web version. Junior high school students, and a small group of primary school children also created a hypertextual version of their narratives using 1001stories, a free authoring tool developed at HOC lab at Politecnico di Milano. This multi-tool approach was mainly intended as a means to expose students to different technologies and help them critically understand the potential and drawbacks of different authoring tools.

THE PROCESS
The educational experience carried on in the two studies unfolded along an iterative flow of activities depicted in figure 1.
Figure 1 – The process of activities in the Italian pilot studies
As a premise to the students’ activity, the class teacher received a preliminary training on digital comics and storytelling (see WP2) attending a presentation of the EDUCOMICS project and web comics in general, of Webcomics Book Creator tool, and studying the material produced by the project. Later, educators discussed organizational and educational requirements for carrying on the project, defined the pedagogical goals and planned the activities in terms of time, human resources, digital resources. This step was followed by a project presentation to the students, introducing them to digital comics and authoring technology.

Organized in small groups (2-3 students per group), students’ designed their narrative on paper, creating the narrative structure, writing the descriptions of the various scenes, sketching backgrounds and characters, composing the texts of the dialogues. After teachers’ validation of content, digital images were created (either searching them on the web, or scanning drawings, or composing elements using Paint), e digital Comics - version 1 – were created in Powerpoint. Once these “prototypes” were validated by teachers, students created version 2 of their comics, in Web Comic Creator. A small group of young students (selected among the one more skilled in technology) and junior high school pupils, extended the text+visual material of their comic with audio – basically, reading the relevant dialogues and, in some cases, the short description of each scene. These students were also involved in the creation of a hypertextual version of their comic (version 3) using 1001stories.

1001 stories is a multimedia authoring tool developed at Politecnico di Milano for educational purposes, and has been used by over 15000 students in Italy in the context of the Policultura project (www.policultura.it). The narrative format of 1001stories artifacts is based on a two levels structure: (1) a short narrative, consisting of a number of narrative moments or topics; (2) a long narrative, consisting of the “topics” plus their sub-narrative moment or sub-topics. In the educational version of 1001stories, each topic or subtopic is composed by a text, an audio, and a slideshow of images with their captions, which are displayed in sequence automatically synchronized with the audio track. This general format is flexible and generic enough to be used for different genres, including comics, as we discuss in the examples reported in the following sections. At the end, every student got a CD with the set of all stories (in the 3 versions) created by the class.

Details of the primary school process

Pedagogical Objectives
Primary school teachers defined the following pedagogical goals for their students:

- Improvement of narrative skills in an playful, engaging way for children, with a special focus on
  - Understanding the temporal structure of a story (before, during, after scenes)
  - Learning how to integrate multiple media: text in different semantic formats (i.e., balloon-like dialogues, comments) and images
  - Development of collaboration capabilities
  - Development of elementary technology skills
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DELIVERABLE D3.2 – PART III – Detailed Report of Pilot Studies #3 and #4 (POLITECNICO DI MILANO)

- Enhancing student’s motivation for and interest in storytelling

To support the above goals, teachers designed a narrative *meta-structure* for comics to be proposed to children as a *conceptual plot frame that children would filled with comics contents*. The agreed subject was a *fantasy tale*. Inspired by Propp’s theory on morphology of folk tales – Propp 1968), teachers defined a simple comics structure composed of a sequence of narrative “moments”: START; THEN...; AT SOME POINT...; AFTER A WHILE...; FINALLY...

POLIMI team then implemented this meta-plot in Powerpoint, creating a set of ppt “forms”, one for each narrative “moment” (see figure 2)

![Figure 2: Comics meta-structure (on the bottom box: instructions for filling it in powerpoint)](image)

POLIMI team also provided children with prints of scene elements and characters, as in figure 3, to reduce the effort of scanning children’s drawings (see figure 4)
Childrens’ activities

Initially, children instantiated the meta plot on paper, creating their comics, gluing images for characters and scene elements, drawing balloons for characters dialogues, and hand-writing text inside. In some case, the conceived the comic plot from a known subject (e.g., a story in a book read at school, or explored on a CD - see figure 4)
Figure 4: Children conceiving the comics plot from a known subject (“The Booted Cat”): paper based artefacts

The comics authoring tool used by children to transform paper comic into digital artefacts was a “customized” Powerpoint created by POLIMI. The reason for this choice was that Powerpoint is widely used in Italian normal school environments, and children and teachers were familiar with it.

The “tool” simulates in Powerpoint a simplified version of WebComics Creator, providing with a small repository of human and animal “characters and scene elements that children
could reuse to build their story, integrating these elements with powerpoint balloons. A unit in a comic strip is rendered through by a ppt slide.

Students implemented each moment of their comic according to their paper based design, inserting the proper images from the repository (digital characters and screen elements), creating and editing the ppt dialogue balloons (figure 5)

Activities continued with children doing some hands-on activities on Web Comic Creator (in Italian) and proceeded to create version 2 of the story. Web Comic Creator was “customized” by including all images and backgrounds used by children for in their .ppt stories (human and animal “characters and scene elements that children could reuse and integrate with comics textual elements, e.g., balloons and short descriptions.

An example of their outcomes is shown in figure 6.
Ten children were randomly selected to build a variant of their story using 1001story tool (the reason for not involving the entire class was the fact that only a subset of the computers at school are connected to the internet, and 1001story is a web based service). With the help of teachers they did a minor restructuring of their comic, to adapt it to the 1001format, and created version 3 of it (see Fig. 7).
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1001stories version: Intermediate paper products (above) and final implementation (below)

Figure 7: 1001stories version of children’s comics
Details of Junior High school process

Pedagogical Objectives
Also for primary school children, the educational objectives for junior high school students included the improvement of narrative and communication capability, cooperation capability, and ICT skills. For older students, teachers focused on the use of digital comics as a means to both exercise and improve written and oral skills in English as a Foreign Language, in particular to develop a basic capability of creating simple dialogues, to extend student’s vocabulary, and to learn the correct use of the past tense construct. As a further goal, the activities aimed at developing a critical attitude towards technology, understanding pros and cons of different tools (Powerpoint, Web Comic Book Creator, 1001stories) to create interactive narrative structures.

Students’ activities
To meet the above goals, teachers planned a set of activities that engaged students in the development of a set of digital comic stories in English, integrating text, images, and sound (student’s recorded voices). Students were constrained to use as much as possible the past tense in their dialogues and in the description of scenes. They delivered their comics in different “versions” (Powerpoint, Web Comic Book Creator format, and 1001 stories format), also organizing them on an online repository. To enhance motivation for and interest in learning English, students were allowed to freely select the genre for their story – shared among the whole class - and the topic - specific to each group. Pupils negotiated among them, and with the teachers, the general “genre”, selecting “horror”, and proposing to “revisit” well known tales (e.g., Cindarella) by transforming them into a “horror comic stories”.

Figure 8: Junior High “The horror story of Cindarella” Comic - Powerpoint version
The process followed at high school was similar to the one at primary school, progressively moving from paper based design to a more and more sophisticated digital artifact. The main difference w.r.t. the primary school process was a more intense use of sound (recorded voices). Students recorded all dialogues and scene descriptions in English, as well as a narrative version of the whole comic story, and linked the audio files to the Web Comic Creator and the 1001stories artifact. Examples of these progressive artifacts are shown in figure 8 and 9 a-9b.

Figure 9 (a): Junior High “The horror story of Cindarella” Comic – Web Comic Creator version

(†)Hypermedia Link to the online hypermedia version implemented using 1001stories tool:
Figure 9 (b): Junior High “The horror story of Cindarella” Comic – Web Comic Creator version
Figure 10: Junior High “The horror story of Cindarella” Comic – 1001stories version

Figure 11: Junior High – The online line repository of horror stories (1001stories versions)
EVALUATION

The key elements that we aimed at evaluate the usability of technology (also comparing the different authoring tools), students’ cooperation behavior, engagement and interest, overall satisfaction by students and teachers, and improving of communication and linguistic skills.

Data Collection Method
The evaluation activity was pervasive across the entire life cycle of the two pilot studies. The design and authoring production process was constantly monitored by the Polimi Team, observing students’ experiences at school, taking pictures and video recordings of the various sessions, and reporting observations on a structured evaluation form designed for the project. The same method was applied to collect data from group discussion with children, in which children and teachers discussed the resulting “products” comics and the overall experience.

The observation approach was complemented by other methods:

Questionnaires submitted to students (see figure 12 and see annexes 1 and 2)

Focus groups and Semi-structured with teachers: Polimi team discussed the experience with the group of teachers, focusing on both organizational and pedagogical aspects, and identifying some lessons learned for a wider scale adoption of web comics at school. Each teacher was then individually interviewed using the guidelines of the data collection and analysis form described in annex 3.

For junior high school students, tests on the understanding of the past-tense construct and the acquisition of new terms were submitted by the teacher before and after the overall process.

Figure 12: Students filling the questionnaire: primary school (left) and junior high (right)
Key results
The main results of the evaluation can be summarized as follows:

Usability
The complexity of Web Comic Creator was perceived as much higher than powerpoint (students were largely autonomous in the use of the latter) and higher than 1001stories tool. This is specially true for young children: the support of adults was needed almost constantly in the use of Web Comic Creator. As a result, the students’ outcomes have a weak “comic flavor” (limited dialogue, limited number of balloons). Adults’ support was required in 30% of the cases for 1001stories.

Engagement
In spite of some usability drawbacks, the degree of engagement and active participation by all students (including those usually less interested in school activities) was always very high. While working on their comics tasks in the computer lab, students were not distracted by the surroundings: they seldom moved from their place, nor talked about subjects other than the comics they were building. Sometimes they did not realize when the bell rang and it was break or lunch time.

Cooperation
Field observations detected a high level of cooperative behavior, even though primary school students showed some difficulties in managing team work. The questionnaire results concerning cooperation are consistent with these observations. Group cooperation was perceived as “difficult” by 17% of kids, “rather difficult” by 39% of kids, and “easy” by 54%. In contrast, teachers reported that the overall experience was beneficial for improving cooperation attitudes: in following conventional laboratory sessions, kids manifested a more disciplined cooperation behavior than they were used to before the EDUCOMICS experience.

Students satisfaction
Very positive feedbacks emerged from students questionnaires at both levels of education (89% highly satisfied—see figure 13; 68% want to do it again), with no significant differences between primary and junior high schools.

Teachers’ satisfaction and learning benefits
Teachers’ opinion on the overall experience was extremely good. Primary school teachers noticed (although they did not formally “measured” it) an improved level of narrative skills, and more fluency in computer use. English tests submitted to junior high students, before and after the experience, pinpoint an improvement of vocabulary (increased number of words understood by students) and a deeper understanding of the use of the past tense construct.

During focus groups and interview, teachers pinpointed that

• For primary school children, a fundamental role is played by the narrative meta-structure provided by teachers – an approach which is consistent with other curricular activities for this target age: “structured” storytelling, in some case applying Propp’s theory, is quite common in Italian primary school. Activities organized according to a clear, predefined semantic structure improve capability of
structuring the story concepts. Performing them by using both tangible, non digital means in the classroom and computer based tools enforces this benefit;

- For junior high school students, a fundamental learning benefits is brought by the use of sound. To create the voice elements linked to comics (both in Web Creator and in 1001stories), students had to read loudly and record the dialogues of the comics, the descriptions of the scenes, and a linear version of the entire “story”. This task was oftentimes repeated several times, with mutual tests performed across groups, as students want to achieve the best possible result (aware of the fact that their product would then be published on the web and accessible by everybody). For most students, this process unlock the shininess of many students in English reading and talking, and they become much more fluent than they used to be before the experience. In this respect, a tool like 1001stories, which privileges the use of sound (and images) over textual media, seems to promote these benefits more intensively than Web Comic Creator (where sound is an optional).

![Figure 13: Students’ satisfaction measures (averaged between primary and high school)](image-url)
Ciao bambini! Vi vorrei fare alcune domande sulla storia che abbiamo inventato insieme, così saprò se vi sono simpatico e forse …. diventerò meno timido!

Quanti anni hai? .................

Quale classe frequenti? .................

Qualche volta leggi fumetti?  
☐ SI  ☐ NO  
Sono i tuoi libri preferiti?  
☐ SI  ☐ NO  ☐ COSI’ E COSI’

A casa qualche volta usi il computer?
SI
☑ Da solo
☑ Con un adulto
☑ Con mio fratello o sorella
☑ Con i miei amici

NO

Se qualche volta usi il computer a casa, che cosa fai?
☑ Gioco
☑ Scrivo
☑ Disegno
☑ Ascolto una storia
☑ Faccio altre cose, ad esempio: .................................................................

SATISFACTION

Ti è piaciuto questo progetto di inventare il vostro fumetto e poi metterlo nel computer?
☑ ☺ ☺
☑ ☺
☑ ☹
☑ ☹

Vorresti rifare il progetto l’anno prossimo?
☑ ☺ ☺
☑ ☺
☑ ☹
COLLABORATION
Avete fatto fatica a mettervi d’accordo quando lavoravate con il computer?

EASE OF USE
Hai trovato difficile capire come funziona il programma del computer che hai usato per scrivere la storia?

Hai trovato difficile capire come INSERIRE LE IMMAGINI?

Hai trovato difficile capire come SCRIVERE con il programma che abbiamo usato?
Hai trovato difficile scrivere le nuvolette dei fumetti?

☐ 😞

☐ 😊 😊

☐ 😊

☐ 😞

☐ 😞

GENERAL DIFFICULTY
Cosa hai trovato più difficile da fare con il computer?

………………………………………………………………………………………………………………
………………………………………………………………………………………………………………
………………………………………………………………………………………………………………

WHAT WAS MORE LIKED
Cosa ti è piaciuto di più? .................................................................

WHAT WAS MORE DISLIKED
Cosa ti è piaciuto di meno più?

…………………………………………………………………………

VISUAL REPRESENTATION OF THE EXPERIENCE
Fai per favore un disegno che descriva il progetto, o quello che ti e’ piaciuto di piu’ o di meno
ANNEX 2. Students’ Questionnaire (Junior High School)

School............
Class .................
DATE: .................

PROFILING

How old are you? ................. You are ☐ boy ☐ girl

Do you read comics? ☐ SI ☐ NO

Are comics your favourite reading, or do you prefer other kind of books?
☐ SI ☐ NO, I prefer other kinds of books

Can you use a computer at home? ☐ yes ☐ no

If yes, how frequently do you use the computer at home?
☐ every day <1 hour
☐ every day > 1 hour
☐ 3-4 times a week
☐ once times a week
☐ never

What do you use the computer for?
☐ Playing
☐ Writing
☐ Doing a school research
☐ Downloading music/movies
☐ Connect with my friends
☐ Other (please specify) ................................................
SATISFACTION

Did you enjoy creating your digital comics?
- Very much!!
- Yes
- No
- Not at all!

WHAT WAS MORE LIKED
What did you like MORE in this project
…………………………………………………………………………

WHAT WAS MORE DISLIKED
What did you like LESS in this project
…………………………………………………………………………

Did you like the idea of publishing your comics on the web?
- Very much!!
- Yes
- No
- Not at all!

Did you like the idea of having multiple versions of your horror story (powerpoint, web comic, 1001story web narrative)
- Very much!!
- Yes
- No
- Not at all!

Would you do a similar project again next year?
- Very much!!
- Yes
- No
- Not at all!

PERCEIVED LEARNING BENEFITS

Do you think you improve your English skill?
- Very much!!
- Yes
- No
- Not at all!

If yes: you think you improved:
- your vocabulary
- your use of verbs
- your use of past tense
- your understanding of sentence structure
- other (please specify)

Do you think you improved your knowledge about computer and computer tools?
- Very much!!
- Yes
- No
- Not at all!
PERCEIVED UTILITY OF DIGITAL COMICS

Do you think digital comics are useful for improving learning of subjects other than English?
- Yes
- No
- I don’t know

If yes: can you please suggest a subject

COLLABORATION & TEAM WORK – PERCEIVED DIFFICULTY AND LEARNING BENEFITS

Was it difficult to work together within your group?
- Very much!!
- Yes
- No
- Not at all!

What was particularly difficult in team work?

What was particularly pleasant in team work?

Do you think you understand better how to work in a group?
- Very much!!
- Yes
- No
- Not at all!

TECHNOLOGY: EASE OF USE

How easy did you find the use of Web Comic Creator?
- Very much!!
- Yes
- No
- Not at all!

What was particularly complex
- Managing background
- Managing characters
- Managing dialogues
- Including audio
- Including internet links
# ANNEX 3: Teacher’s Interview/Interpretation schema

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>DESCRIPTION</th>
<th>RATIONALE</th>
<th>HINTS (possible starting questions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Context</td>
<td>Main characteristic of the context where the school is situated (from an economical, sociological, cultural point of view).</td>
<td>Understanding preliminary information about school and its territory</td>
<td>What kind of context is your school in...? (institutional environment...)</td>
</tr>
<tr>
<td>2) Class &amp; students profile</td>
<td>Class and students’ profile description.</td>
<td>Preliminary understanding about the class and its learners</td>
<td>How many learners? - Class description - Subgroups description ant their characteristics</td>
</tr>
<tr>
<td>3) Teacher’s profile</td>
<td>Investigate about the pedagogical profile and attitude of the teacher</td>
<td>Understanding the “pedagogy” of the teacher helps to put in a proper context the answers to the other questions</td>
<td>Compared with your expectations, what was (predominantly) your role during the project/activities?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- An “instructor” (where the teacher conceives the learners as “passive” during the learning process”)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- An “animator” (where the teacher allows the learners to be able to collaborate with others in the learning process and not to view learning as an isolating experience)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- A “facilitator” (where the teacher empowers its learners to make shape their own learning process, to have control over what is learnt and the direction of the learning.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Why did you choose to be an instructor/animator or facilitator? Which where the reasons behind this choice?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ What kind of pedagogy did you feel to follow/ “put in practice” during your teaching practices? Why? Which were the opportunities, problems and treats?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Please explain in depth your teacher’s role both in the project and for each activity carried out.</td>
</tr>
</tbody>
</table>
4) Motivations

Investigate the reasons behind the idea of engaging the class in an educational activity somehow based on ICT

<table>
<thead>
<tr>
<th>It is a way to elicit the goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why did you decide to create this project/activity?</td>
</tr>
<tr>
<td>Which were the main pedagogical and technical ideas behind your project?</td>
</tr>
</tbody>
</table>

5) Benefits

Investigate the teachers’ perceptions of the benefits achieved by the students

<table>
<thead>
<tr>
<th>Identification of what went well and why. Benefits may have been planned from the beginning, identified later or never rationalized as goals.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What kind of benefits did you think your students achieved with this activity?</td>
</tr>
<tr>
<td>Could you describe them at some level of detail?</td>
</tr>
<tr>
<td>What did you perceive as being the crucial steps (or actions or “tricks”) to achieve them?</td>
</tr>
<tr>
<td>Did you perceive some differences for specific groups of pupils or individuals?</td>
</tr>
<tr>
<td>Did you initially plan these benefits? Or did you identify later?</td>
</tr>
</tbody>
</table>

6) Problems

To investigate what problems [pedagogical, organizational, …] they experienced and how they solved them

<table>
<thead>
<tr>
<th>Identification of what went wrong and why. Problems could have been initially identified, identified later or never rationalized as problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was there any problem [pedagogical, organizational, technical...] in the course of activities?</td>
</tr>
<tr>
<td>What kind of solutions did you design to overcome these problems?</td>
</tr>
<tr>
<td>Did you perceive some differences for specific groups of pupils or individuals?</td>
</tr>
</tbody>
</table>

7) Organization

A “tale” (as long and detailed as possible) on how the activity was organized in the class

It is a way to understand how things went and how much “actors” were involved.

<table>
<thead>
<tr>
<th>Compared with your expectations, did you respect the preliminary hypothesis about organization?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did you organize the work in class?</td>
</tr>
<tr>
<td>How did you organize the task and workflow for the students?</td>
</tr>
<tr>
<td>If you have involved other teacher, how did you organize the involvement of them?</td>
</tr>
<tr>
<td>How this organization was influenced by the presence of students with diverse needs?</td>
</tr>
</tbody>
</table>
## 8) Inclusion

<table>
<thead>
<tr>
<th>Organization measures for dealing with diverse needs organization involving the school (e.g. the lab, other teachers, overall scheduling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of if/how diverse needs was perceived by the teacher and about the strategies to dealing with them.</td>
</tr>
</tbody>
</table>
| • Compared with your expectations, to what extent you have allowed the best pupils to reach the highest possible goals?  
• To what extent you have helped the “needy” pupils to do their best?  
• To what extent you have got an average progress (a compromise between the first two) to assign a double goal (high for the best and lower for the needy)?  
• Did you identify in your class subgroups (individuals) with diverse (special) needs of any kind (psychological, level intelligence, level of background, level of skills, type of personality, diversity of any kind, disability, ..)?  
• Could you describe (without names) these subgroups (individuals) and what type of diverse needs characterized them?  
• In what sense these diversities have allowed to affect the activities carried out?  
• Did you have follow/discover a strategy for dealing with them? |

## 9) Involvement of third parties

| To investigate about the (possible) involvement of third parties: parents, the school in general, the community at large, other institutions (e.g. a museum being visited). |
| To understand the level of participations and connection between school, family and territory. |
| • To what extent were [parents, other teachers, school in general, other institutions...] involved?  
• Did you identify any problems/benefits related this involvement? |
### 10) Personal growth

To investigate about possible carrying on ICT based pedagogical activity may foster the professional “growth” of teachers

To pave a way for understanding how teacher perceive their personal growth

- Compared with you expectations, what kind of knowledge/skills did you acquire in this project/activity?
- Did you acquire unexpected skills?
- Did you identify any problems? Which?
- Please specify possible strategies/hints to avoid them.

### 11) Experience reproduction scenario

Investigate how and where the project carried out could be reproduced

A possible way to understand how “significant” and useful the experience was for the teachers/class was

- Do you think you may reproduce this experience? How?
- How should absolutely do to guarantee the success of this kind of experiences? And what should absolutely avoid?
- How this project could be sustainable?

### 12) Interesting anecdotes

Investigate whatever happened and was important, positively or negatively

Usually anecdotes are the only way to detect serendipitous benefits or problems

- Did anything else interesting happen?

### 13) Global evaluation

Summative evaluations of the experience

Push teachers to give an overall assessment of the experience

- Name the 2 biggest problems and the 2 most pleasant aspects overall
- Name 5 keywords related to the experience
Enhancing autonomy and creativity in bilingual secondary education through web comics: a case study

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Abstract
A pilot study was carried out to explore the pedagogical potential of digital comics with learners of English in a bilingual public secondary school (Granada College, Spain). The target participants in the project were 3rd year students. Two classes (50 students) in the 3rd year of Compulsory Secondary Education participated in the experience. The methodological framework adopted has been Project-based learning and Task-based language teaching. Students were free to choose their topics and genres, from narrative stories to personal experiences, from natural science to culture and society. They worked collaboratively in pairs to complete a task in digital comic format chosen by themselves under the teacher’s supervision, and were encouraged to be creative and imaginative. For the creation of the digital comic book ComicLab 1.2. was used.

1 Background to the case
This case reports the use of web comics in a bilingual school in the area of Granada (Spain). Two classes in the 3rd year of Compulsory Secondary Education participated in the experience. The total number of students was 50. Two subjects were involved - ICT and English, though in this case we just report the experience in the teaching of English. Students worked on the creation of their web comics during the second and third semesters of 2010. The total number of class sessions dedicated to the development of the web comics was 17. Students also worked at home when they felt they had to. Pedagogically, the teacher opted for a Project-based learning framework (PBL). Students were free to choose their topics and genres, from narrative stories to personal experiences, from natural science to culture and society. The learners and the teacher negotiated the deadline and some other circumstances such as the use of English in the classroom. Learners worked collaboratively in pairs to complete a task in digital comic format chosen by themselves under the teacher’s supervision. Students were encouraged to be creative and imaginative in their web comics, using a multimodal approach. For the creation of the digital comic book ComicLab 1.2. was used.

Now we would like to encourage readers to work through this report, bearing in mind that new technologies are not important for what they are but for what they can actually contribute to learning. In this sense, new technologies have to serve major learning goals such as autonomy, motivation, and creativity.
2 Theoretical background: autonomy, motivation and creativity in project-based learning (PBL)

2.1 Autonomy

Autonomy typically refers to the freedom of an individual to make personal choices and generally also to the ability to deal in a responsible way with that freedom of choice one enjoys. The notion of autonomy in learning has long been part of a wide range of educational philosophies and has recently been identified in educational policy as crucial to the development of Lifelong Learning in “the learning society”. Furthermore, it is often regarded as a defining trait of all sustained learning that attains long-term success. There is a considerable agreement among educators that autonomy ought to be taken as a highly desirable goal of education. For Piaget (1965), the ultimate aim of education is for the individual to develop the autonomy of thought to create new, original ideas rather than just recycle old ones. Autonomy is both a goal of education and an educational approach to secure that goal.

Although individuals develop autonomy in a natural way, teaching can actually foster or hamper its development (Jiménez Raya, forthcoming). Pedagogy for autonomy requires the existence of a pedagogical framework that enables the learner to work autonomously, taking on responsibilities for learning decisions. Within pedagogy as discipline, the notion of autonomy is often formulated in terms that imply familiarity with concepts such as personal responsibility, self-esteem, self-awareness, and self-determination, among others. It cannot be overstressed that the autonomy is not a matter of all or nothing. There are degrees of student involvement that the individual teacher can encourage depending on the specific teaching situation.

As an educational aim, the development of autonomy is “the development of a kind of person whose thought and action in important areas of his life are to be explained by reference to his own choices, decisions, reflections, deliberations—in short, his own activity of mind” (Dearden, 1972: 70).

Jiménez Raya, Lamb & Vieira (2007: 1) define both teacher and learner autonomy as “the competence to develop as a self-determined, socially responsible and critically aware participant in (and beyond) educational environments, within a vision of education as (inter)personal empowerment and social transformation.”

The definition above shows the following features/premises:

- It is anchored on a democratic view of education, which places emphasis on (inter)personal empowerment and social transformation as cross-disciplinary educational goals. This way autonomy becomes a collective interest and a democratic ideal, so that teacher and learner autonomy are like two sides of the same coin.
- It is broad enough to accommodate various practical approaches.
- Both learner and teacher autonomy are viewed as a competence. The notion of competence involves attitudinal dispositions, knowledge, and abilities to develop self-determination, social responsibility and critical awareness.
Autonomy is not an absolute concept. Autonomy is best understood as a continuum in which different degrees of self-management and self-regulation are possible at different moments and in diverse aspects of learning.

Autonomy denotes a proactive and interactive role.

Autonomy is desirable and feasible in a formal education context. (Jiménez Raya, 2009)

### 2.2 Creativity

In this case study, the teacher placed learners in the role of creators, rather than mere receivers of information. In project-based learning, teenagers write, read, listen to and speak about their personal experiences and interests in creative and imaginative ways, thereby engaging them in the learning process and motivating them to succeed, while developing their autonomy. Hence, creating the conditions that support creativity should be an explicit part of teaching English as a foreign language because, as Fullan (2003) states, the ethical principle of education is to make a positive difference to students’ lives. We should also bear in mind that the purpose of education is to help learners develop their potential as fully as possible.

It is generally accepted that creativity is essential to the well being of our countries and to the prosperity and proper functioning of our organisations. Nowadays, citizens work in an uncertain world that demands from individuals the capacity to move from the known to the unknown. Educators, therefore, have to strive to find effective ways of helping youngsters develop their capacity to use their skills, knowledge, and capabilities in constructive and novel ways in order to tackle complex problems.

Several studies reveal the following features of creativity (Jackson, 2005a, 2005b):

- **Being imaginative, i.e.,** generating new ideas, thinking out of the box, looking beyond the obvious.
- **Being original.** This embodies: invention, reconstruction, recontextualization, redefinition, and doing things that have been done before but differently.
- **Being curious with an enquiring disposition, i.e.,** willingness to experiment, explore and take risks i.e. the attitude and motivation to engage in exploration and the ability to search purposefully in appropriate ways in order to find and discover.
- **Being resourceful, i.e.,** the capacity to use what one’s knowledge, capability, relationships, powers to convince and influence.
- **Being able to combine, connect, synthesise.**
- **Being able to think critically and analytically** to distinguish relevant aspects and ideas from those that are not.
- **Being able to represent ideas and communicate them to others, i.e.,** the capacity to explain something in meaningful ways, to create stories, communicate ideas and show people possibilities, opportunities and solutions in ways that make sense to them and capture their imagination.

### 5.2.3 Motivation
Whether students are intrinsically motivated has a significant impact on learning outcomes. Students work longer, harder and with more vigour and intensity when they are motivated than when they are not. Intrinsically motivated students tend to put more effort into learning, to process information more deeply, and to learn more. When confronted with difficult learning tasks, they tend to use more learning and decision-making strategies, appearing to be more intellectually engaged. Learners who are intrinsically motivated to learn tend to prefer tasks that are moderately challenging -- not too easy and not so difficult that they cannot succeed. Learners who are not intrinsically motivated tend to seek tasks that are low in the degree of difficulty. They often put forth what can be considered a minimal amount of effort to "be rewarded" or simply "to get by."

Lubasa (1984) mentions such driving elements as interest, freedom of choice, and confidence about being on the right route and argues, further, that motivation is goal-oriented and supported by perseverance. Among the factors that influence perseverance we can find the pleasure of being a member of a group, the satisfaction of group interaction, the pleasure of struggling with a task or problem, and the satisfaction resulting from solving it. For Newmann (1989) engagement is "psychological investment," involving connection, attachment, and integration in particular settings with other people, tasks, and objects; on the contrary, disengagement is isolation, separation, detachment, and fragmentation. The pervasiveness of disengagement, especially at the secondary level, is alarming.

Language learning experiences, while anchored in the learner's world, must stretch students' sights into new worlds and connect them with others through communication. Classroom climate is important. If students experience the classroom as a caring, supportive place where there is a sense of belonging and everyone is valued and respected, they will tend to participate more fully in the process of learning.

Various task dimensions can also foster motivation to learn. Ideally, tasks should be challenging but achievable. Relevance also promotes motivation, as does "contextualising" learning, that is, helping students to see how skills can be applied in the real world. Tasks that involve "a moderate amount of discrepancy or incongruity" are beneficial because they stimulate students' curiosity, an intrinsic motivator (Lepper, 1988).

...a robust model of motivation for learning includes principles addressing three major aspects of learning situations: (1) the social milieu in which the learning takes place (especially, the degree to which it is supportive vs. threatening); (2) the learner's attributions, expectations, and self-efficacy perceptions (prospects for achieving learning goals, implications of success or failure); and (3) the degree to which the learner values the opportunity to engage in the learning activity and acquire the knowledge or skills that it develops.

3 Web comics in project-based learning in a bilingual school

In the project-based classroom, the students socialise through a series of individual or group activities that involve the concurrent learning of language, content, and skills (Slater et al.,
2006). Through the completion of a series of authentic tasks, PBL collectively engages ELT learners in the development of an end product/web comic (Stoller, 2006). PBL practitioners suggest that meaningful language use and purposeful communication are fostered through the attainment of this end product (Levy, 1997; Ribé & Vidal, 1993; Slater et al., 2006). In addition, learning activities that are interdisciplinary, long-term, and learner-centred are emphasised. Project-based learning has its roots in the constructivist approach evolved from the work of psychologists and educators such as Lev Vygotsky, Jerome Bruner, Jean Piaget, and John Dewey. Constructivism views learning as the result of mental construction; that is, learners learn by constructing new ideas or concepts based on their current and previous knowledge (Karlin & Viani, 2001).

*We take this approach so as to balance formal instruction with learner-centred sessions where the students move ahead on their own. (Teacher)*

Most important, students find projects fun, motivating, and challenging because they play an active role in choosing the project and in the entire planning process. With the final goal of developing a project, students work together on a series of tasks and actively engage in collecting and processing of information. In project-based learning, work typically extends beyond the walls of the traditional classroom, students are often asked to access new information via Internet or library research, surveys, or interviews. The two-fold orientation of project work towards process and product allows learners to apply their linguistic and cultural knowledge to real-life situations (Sidman-Taveau & Milner-Bolotin, 2004).

The projects created by students had to be in the shape of a comic book. Students were free to choose their topics and genres, from narrative stories to personal experiences, from natural science to culture and society but in a comic format. The learners and the teacher negotiated the deadline and some other circumstances such as the use of English in the classroom. Learners worked collaboratively in pairs to develop their digital comic format chosen by themselves under the teacher’s supervision. Students were encouraged to be creative and imaginative in their web comics, using a multimodal approach. For the creation of the digital comic book ComicLab 1.2 was used. A total of 17 sessions were devoted to the creation of the web comic, either in the IT classroom or in the usual classroom. Students also worked at home when they felt they had to.

To begin with, as the teacher states, a powerpoint presentation was used to motivate students. *At the beginning I gave a Powerpoint Presentation setting out all the options but, at the same time, inviting students to get involved themselves, from choosing the theme of their comic to deciding on evaluation criteria to some extent. This approach can be easy or challenging. It depends on the group of students involved, even more the reason why the teacher should be at the centre of decision-making about the syllabus, as long as this gives students the opportunity to exploit their participation. (Teacher)*

In this presentation, the teacher emphasised the following features of web comics:
Learner agency and ownership (“Whose webcomic? My webcomic)
Creativity
What a webcomic is
Ideas for webcomics
Reasons for creating a webcomic

Immediately after, students were asked whether they wanted to produce a web comic. Their positive answer gave rise to a negotiation phase, in which they negotiated the deadline, the use of English in class, topic, the completion of the diary, and the project planning grid. Negotiation can be described as classroom interaction that involves the negotiation of the curriculum, and thereby enables learners to develop their skills as managers of learning. In the development of learner autonomy it becomes central and crucial rather than peripheral and optional (Jiménez Raya, 2010). In this negotiation process, the teacher insisted on encouraging learners to be creative and imaginative, making sure there was an emphasis on multimodality. The results and the students’ reports on their diaries prove that this objective was achieved:

We are, again, adding our own stuff to the story, so it’s more “ours”, as same as we did with the bioshock one. (Learner diary)
We’ve made quite a huge progress in our written story because we carefully read of the story we were writing about and we found new ideas for it to make it kind of more “original” new characters, scenery and situations were added. (Learner diary)

The next step in the process was the formation of pairs and the brainstorming of ideas for their web comic. Learners were allowed to choose the topic. In fact, several students decided to develop a magazine. In the next session, students were introduced to ComicLab. This was a relatively easy task for students, due to their ability with computers. On this day the teacher writes:

In the second session I introduced them to the software via projection but I felt that since they are much more up-to-date with the technology, I needed only have explained just some of the features. They learned very quickly how to manage the software: installing it, experimenting with the tools and options, i.e.: how to add, modify, delete, etc. Some students even started looking for photos for the initial frames.

A very important point to mention in these reflections is just how quickly the normally much more passive students raced ahead and worked independently while those who were more interactive spent most of this second session just individually browsing and researching for material without any initial plan. (Teacher)

Just on the second day, the teacher began to notice changes in students. From this, we can see a clear connection between ICT and learner autonomy, ICT and motivation.

The next step was the explanation of the Project planning and evaluation grid. Students were given both a hardcopy and an electronic one. Then the teacher explained the content in detail, the rationale and what they were expected to achieve.

Before students move any further on the computer it is essential that I see they’re negotiating an initial outline in their pairs or small groups, possibly in a classroom
without computer access. They need to complete the initial fields on their planning sheet. The teacher needs to explain this requirement and then take a back seat and just monitor unobtrusively. (Teacher)

In the following quotation from a student’s diary we can read how the students worked on the story before actually working with ComicLab.

*We’ve made quite a huge progress in our written story because we carefully read of the story we were writing about and we found new ideas for it to make it kind of more “original” new characters, scenery and situations were added.* (Learner diary)

After completing their project (web comics), students self-evaluated their projects. This enabled the students to focus on their learning process and allowed them to see their progress. The Project planning and evaluation grid was crucial in this task. The completion of this grid may become an activity frowned upon by learners but it gives them a sense of accomplishment and further instills responsibility for learning.

It would be wrong to assume that there were no problems. As in every aspect of human activity, there were bumps in the road. However, a bump in the road is either an obstacle to be overcome or an opportunity to be enjoyed...

Apart from some technical difficulties the learning process also proved challenging at times. I found it difficult to prohibit the use of L1. Since I was teaching a monolingual class combined with the fact that the teacher took a backseat role in the project, it might be fair to say that as far as student-student reaction is concerned less L2 was used. Of course, input was increased dramatically. Only when I was close to students did they actually speak to themselves in L2. To overcome this hurdle I rewarded those who used L2 at all times and kept a record and evaluated learners on it. At the beginning of the project I had agreed with students that they could choose 60% of the evaluation criteria. Most chose the option of finishing a good comic followed by use of English, so that helped.

*I also had problems persuading students to distribute their learning time more effectively. In the end I believe I achieved it as learner autonomy increased.* (Teacher)

Students also write about some of the problems they face in their diaries. Some of the problems are related with technology, while others have to do with the difficulty they face when it comes to actually being able to develop successfully their original idea of the comic.

Very little progress this day, we get bored of Kyle’s story, we waste the day looking for a new story, useless day. (Learner diary)

The following day, however, things seem to change. In fact, the students successfully completed their new web comic.

Strange enough, we decide to make a new story, because “the canterville house’s ghost” (the book) just fell onto Luis’s head while he was taking care of his own business on the shelves.
The story is looking pretty good we started looking for some characters and landscapes given by the program which fit our requirements, but while starting the comic we decided to put real photograph landscapes instead of the ones given by the program, we downloaded them from Google, and we afterwards change their settings to look spooky or whatever. (Learner diary)

4 Conclusion

Web comics that have depth, duration, and complexity will challenge students and motivate them towards construction of new knowledge. As they gather information, learners acquire planning, communication, collaboration, problem-solving, and self-evaluation skills as we can read in the following excerpt from the teacher’s diary:

On a scale of one to four the learners in the project primarily chose 3 in answer to the question how much they had achieved their objectives. They all believe to have collaborated positively in group and pair work and recognise its benefits. Most agreed that they had met deadlines effectively. Many believed that the comic was acceptable for their level of proficiency. The poorest skills practised appear to be listening. Next time I will be sure to enhance this skill and guide students to better exposure. (Teacher)

In the experimentation phase, we have obtained evidence supporting the validity of web comics in education as a pedagogical strategy to encourage effective curricular innovation in language teaching, develop autonomy, enhance student motivation, foster creativity, develop media literacy skills, and actually enhance the learning of English in line with current pedagogical principles. In the evaluation phase, the students themselves mentioned, according to the teacher, their major achievements:

Here is a list of what the STUDENTS believed to have achieved:

- We learned how to manage computer software better
- Finishing a long project
- Solving problems as they arose
- Learned specific vocabulary not found in the textbook
- Asking questions
- Agreeing and disagreeing
- Helping others and being helped. (Teacher diary)

Therefore, we can conclude that new instructional media such as web comics are able to enhance the quality of learning processes. The evaluation of the experience so far indicates that ICT provides opportunities to develop collaboration, creativity, active engagement and responsibility in the learning process, communication skills, leading, simultaneously, to noteworthy changes in teachers’ and students’ attitudes and roles.

All in all, I might have learned more than the students. This third generation task has allowed me as a teacher to take a backseat role and focus on learners’ individual needs and deal with them, something I could not do in the normal language classroom.

I feel that the project was worthwhile and positive and I would definitely make changes next time. (Teacher)
Homework assignments using web comics: An Exploratory Study at Secondary and Primary School

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Abstract
Two exploratory studies were carried out to test the extent to which the creation of web comics as a homework assignment could have positive effects on the learners’ perception of homework and enhance their motivation. Two educational institutions, both in the province of Granada (Spain), participated in the research project: One was a private bilingual primary school on the outskirts of Granada city, and the other one, a state secondary school 20km away from the same city. Fifteen sixth-form primary school students participated in the first case, and from the latter, a total of twenty fourth-form secondary school students volunteered to do the homework using web comics and to answer the subsequent questionnaire. This document reports in detail the pedagogical approach, the process followed by teachers and students, and the evaluation carried on by the EDUCOMICS team at University of Granada.

1 Theoretical background

Homework has been defined as tasks assigned to learners by their teachers that are to be done outside of school time without the presence and direction of the teacher (Cooper, 1989; Milgram & Hong, 2000). Typically, homework is individually done at home and it is designed so that students can review and practise material that has been learned at school. However, homework can also be used “to provide students with the opportunity to amplify, elaborate, and enrich previously learned information, [or] to prepare, in advance, material to be learned in the following classes” (Milgram & Hong, 2000: 5)

The homework debate has been a hot issue for years in education and the answer to the above question depends on the type of homework and on the view of learning underlying homework activities. Milgram and Hong (2000) explain it in the following terms:
Homework is a powerful tool that can contribute to the advancement of children’s education and knowledge or it can do more damage than good to these enterprises. The difference between the two outcomes depends on the quality of the decisions as to how homework is implemented. Homework, if properly used, may be the most effective and cost-efficient way to solve some of the most difficult educational problems. Proper use of homework can lead to significant improvement in academic achievement. Homework is an ongoing enterprise in all academic settings, it is there to be used and does not have to be discovered or invented. However, in its current form it is often part of the problem and not part of the solution. In order for homework to become a positive and powerful force in education, change will have to take place about how homework is understood, how it is used in schools, and how it is done at home. (Milgram & Hong, 2000: 17)

From a traditional perspective, it is not uncommon to hear students say that homework is tiring and boring, and that they do it out of obligation, no matter how important they might consider it to be for the learning process. Teachers know how much students moan about, or try to avoid, homework. The reason for this is that homework is assigned inconsiderately and constantly, it is boring, or simply students did not have a say about it.

Learners may be right if we think about the type of activities usually assigned as homework. Regarding purpose in foreign language learning, homework is usually assigned in order to extend the time students are in contact with the target language. The goal is typically to reinforce the lesson of the day, as Milgram and Hong (2000) finely put it, and in fact this is usually the type of homework activities found in most workbooks.

However, teachers who regularly negotiate with their students would vehemently shake their heads were you to suggest that learners will always say no to homework – or to anything that requires effort. They will say straight away that this is not always the case. Undoubtedly, most of us would agree that when students are treated with respect and homework assignments are worth doing, most learners would relish a challenge. In other words, what is actually true of education in general is true of homework in particular.
In general terms, it is currently acknowledged that homework is beneficial for students for the following reasons:

- It encourages learning responsibility (autonomy)
- It helps learners to develop time management skills
- It develops study habits
- It extends classroom time to finish projects

Regarding the first point, as already explained in previous chapters, learner autonomy is considered to be an essential component in the learning process. In this line, Jiménez Raya, Lamb, and Vieira (2007) maintain that significant relationships have been found between the development of learner autonomy and a number of positive learning gains such as a sense of enjoyment and vitality, intrinsic motivation, perceived competence, preference for optimally difficult work, striving for conceptual understanding, critical awareness of learning processes, cooperative attitudes, decision-making abilities, and willingness to learn. (Jiménez-Raya, Lamb, & Vieira, 2007: 4)

So, the obvious conclusion is that homework should be conceived and designed in such a way that students can put forth all their potential as autonomous learners in order to achieve the above positive outcomes. In this line, there are other homework possibilities that are in line with current educational thinking, among which we can mention:

- Projects to extend learning
- Preparation for new material
- Tasks that enhance creativity and imagination

In all cases, homework is not just a review and practice of learning objects previously introduced in the classroom, but rather an implementation of acquired concepts and skills in projects pursuing some goal or tasks to get acquainted with upcoming topics and contents. Some teachers have described how students got more interested in doing their homework by implementing learner-centred tasks and activities, such as doing research on a topic and making a class presentation of it; choosing a film, make a summary of it and present it in class; interviewing someone and telling the class about it; writing a poem and reading it in class, and so on. (Vieira, personal communication).
One step further in the learner-centred homework design is the possibility of realising it by making use of computer technology. As Milgram and Hong (2000) point out,

[a] systematic use of computer technology for homework design offers other exciting possibilities for individualizing homework for students [and] teachers should recognize that computers can be the homework tool of choice for many learners and should use them in planning individualized homework assignments. (Milgram & Hong, 2000: 169)

Younger generations of students are immersed in a computerised world and have a high mastery of computer technology as well as information and communication technology (ICT) tools. Nowadays, most young people have a webmail account, are members of a virtual social network such as Facebook, Orkut or Tuenti, participate in weblogs and wikis, chat with other people on the Internet, and play games both online and offline. So, it is possible to conceive that the use of computer technology for their homework assignments might enhance their motivation and one way to implement ICT in homework assignment could be by means of web comics.

In the following section, two studies are presented in which the potential of web comics as homework was investigated to see whether it had a positive effect on the learners’ attitude towards this unpopular part of school tasks.

2 Exploring the use of web comics as a homework tool

Two exploratory studies were carried out to test the extent to which the creation of web comics as a homework assignment could have positive effects on the learners’ perception of homework and enhance their motivation. Two educational institutions, both in the province of Granada (Spain), participated in the research project: One was a private bilingual school on the outskirts of Granada city, and the other one, a state secondary school 20km away from the same city. Fifteen sixth-form primary school students participated in the first case, and from the latter, a total of twenty fourth-form secondary school students volunteered to do the homework using web comics and to answer the subsequent questionnaire.

2.1 Goals of the present study and research questions
As Milgram and Hong (2000: 17) say, “homework [might] become a positive and powerful force in education” if properly used, and many of its benefits have already been outlined and argued for. One of the key issues for homework to be meaningful in the learning process and worth doing is the students’ awareness of how useful and important it can be. This could be one way of increasing their intrinsic motivation, which is purported to be one of the most critical factors for successful learning (Ryan & Deci, 2000; Good & Brophy, 2003). More recent thinking on motivation suggests that the notion of self-motivation is more suited to explain school motivation. Rather than placing emphasis on the prompt for the action, that is, a deadline reward, praise or threat, self-motivation stresses how deliberate/determined an individual person is and feels about what s/he is doing. Is s/he acting with a sense of purpose?

As already shown in previous chapters, it is argued that the use of web comics can have a motivating effect on the learner because it is open-ended (i.e., the student is free to decide how to use the tool and how to build up a story in which to embed the learning objects), interactive (i.e., both production and perception skills can be developed by being creators and readers at the same time), multimodal (i.e., both visual and auditory senses can be fully used), digital (in which new generations are immersed and are at ease), collaborative (i.e., it promotes group rather than individual work, thus enhancing affective and social abilities), and social (since the end product can be shared either in the classroom setting or online).

Considering all the possible benefits of web comics as a learning tool, we formulated the following exploratory question:

**Do web comics actually enhance motivation for learning and develop positive attitudes towards homework?**

We set out to investigate whether it would enhance students’ motivation for learning and, at the same time, develop positive attitudes towards homework in general. These goals were pursued by delving into the students’ own perceptions and feelings as expressed in concepts (such as pleasure or creativity) and moods (such as motivated or bored) that could be related to both homework and web comics.

2.2 Research design
Teachers in both institutions were contacted and asked to assign the creation of a web comic book as a homework task, after which a questionnaire about their perception of homework in general and the use of web comics as homework assignment was to be passed to the students. One teacher from the primary school and two from the secondary school responded positively to the request. The details of the experience are presented in more detail in two separate sections below. Here we will focus only on the questionnaire design.

Regarding the questionnaire, the aim was to create an instrument that would allow us to gather information about the students’ perception of the usefulness of and disposition towards the web comic book creator as a homework tool. It was divided into two sections, which in turn contained two parts each.

Section 1 - Part 1 was devoted to the students’ perceptions about traditional homework, as encapsulated in seven concepts: pleasure, interest, freedom, creativity, challenge, usefulness and learning, and which they had to grade from 1 (not at all) to 5 (totally) depending on whether they perceived the terms to be applicable to homework. The same procedure was followed in Section 1 - Part 2, which contained the same set of questions but this time referring to web comics as a homework tool. For the purposes of data analysis, 1 and 2 were collapsed and the same was done with 4 and 5, in order to divide the results into “negative”, “neutral” and “positive” perceptions.

Section 2 comprised two sub-sections. The first part was a yes/no questionnaire about students’ perceptions of the value of web comics as homework, summarised in sentences like “The homework I did helped me to revise what I learnt in class”, “The homework I did helped me to develop my imagination and creativity”, etc. The second part consisted of a set of six adjectives (three positively oriented, such as motivated, and three negatively oriented, like bored) about how students felt while working on their web comics (see Appendix A).

Finally, in the case of the primary school students, their own open-ended impressions about the use of web comics were gathered in order to provide further support to the questionnaire findings.

2.3 Exploratory study # 1
Background information

- School: Private bilingual school
- Level: Primary school, 6th form
- Subject: Science (taught in English)
- Period of time: Last term (Spring)
- ICT tools: ComicLab 1.2.

Procedure

We approached the school and teacher at the end of January 2010 to ask whether he would be willing to cooperate with EduComics. We explained to him the possibilities we saw in using web comics in modern language education. We also expressed our interest in exploring web comics in Content and Language Integrated Learning (CLIL). The teacher showed interest in web comics, since he taught science in English, but was concerned about time limitations, subject overload and the overall organisation of the syllabus. For this reason, we suggested the possibility of exploring the value of web comics as homework. This idea was attractive to the teacher and finally accepted to cooperate with the EduComics project. We organised a tutorial to show him how to use ComicLab. He then told students about EduComics and showed learners how to use ComicLab. Students in 6th form were expected to develop a comic on any topic related to the syllabus they were studying. Students worked on their own or in pairs for about five weeks.

Results of the questionnaire and discussion

All the fifteen students who participated in the experience responded to the questionnaire and yielded valid answers. Results show that students are well aware of the benefits of homework with respect to the learning process (see Figure 1). This was shown by the high scores given to usefulness, which 93.3% of the respondents found a positive relationship with homework, and learning, with a 100% of students responding positively. Freedom and challenge, on the other hand, received a relatively high score (60% and 53.3%, respectively found a positive relationship), although the impression was far less unanimous than the first two. Interest and creativity obtained rather low scores (40% each), and above all pleasure, which received no positive evaluation at all (0%). This means that although students know that homework can be
useful and beneficial for the acquisition of knowledge, in general they do not find it interesting or pleasurable, which might have a negative effect on their motivation and, consequently, hinder their learning process after all. In other words, to “know” that something is good is one thing and to “feel” satisfaction and pleasure doing it is something quite different. Especially at this age (11-12 years old), when they are rather impulsive and their performance is so dependent upon their “mood”, the fact that affective factors obtain so low scores is of high relevance, and something to be taken into consideration.

In this case, web comics seem to come to the rescue, since learners’ perception of web comics as a homework tool showed quite a different picture. The most outstanding contrast was found in the three elements that were related to affective factors – pleasure, interest and creativity –, which obtained 80%, 93,3% and 93,3% of positive scores respectively. Freedom also scored high with 93,3% of positive answers. This means that web comic creators (and in particular ComicLab) are seen as interesting tools and students feel good when they use them, which might be highly motivational for them.

This conclusion is further supported by the results of the yes/no questionnaire, where 14 out of the 15 students (93,3%) answered that they felt motivated when using the web comic book creator to do the homework (see Figure 2). This is also confirmed by the negative response given to the adjective bored, with only 13,3% of cases being
positive. In fact, positive answers to positive attitudes and feelings such as self-confidence and challenge to learn outnumbered by far the negative answers (93.3% and 66.7% for ‘YES’ vs. 6.7% and 33.3% for ‘NO’, respectively), whereas something similar happened to ‘NO’ answers to negative features such as overwhelmed or lost.

The students’ comments on the experience are all in the same line and provide further evidence for the motivational potential of this digital tool at this educational stage. Common qualifiers used to describe the experience with web comics were divertido (“entertaining”) – e.g., Me ha parecido una experiencia bastante divertida/“For me it has been quite an entertaining experience” or EduComics me ha parecido muy divertido y sobre todo me he divertido con el inglés/“I think EduComics is very entertaining and especially I’ve had fun learning English” –, chulo (“cool”) – e.g., He aprendido inglés y está chulo/“I’ve learnt English and it’s cool” –, and interesante (“interesting”) (e.g., Ha sido una cosa bastante interesante y peculiar – “It’s been quite an interesting and peculiar thing”).

There are, however, certain reservations to the positive picture above. Although it has been demonstrated that web comic creators have full potential as motivating tools, the results regarding its usefulness for learning are not so robust. We might even say that they are rather negative. As shown in Figure 1 above, usefulness and learning obtained lower scores for web comics (80% and 73.3%, respectively) than for homework (93.3% and 100%, respectively). This might mean that students perceive
that they are not doing proper homework or that they do not see a clear relationship between web comics and the goals of homework. Still, albeit lower, the results do not represent a radical shift towards the negative side, and therefore we could venture to say that the high benefits in terms of motivational gains make it worth the risk.

7.2.4 Exploratory study #2

**Background information**

- School: State secondary school
- Level: Secondary school, 4th form (Ages: 15-16)
- Subject: English as a Foreign Language
- Period of time: Three months in Spring.
- ICT tool: ComicLab 1.2.

**Procedure**

Four teachers of the English Department in a state secondary school in Chauchina (Granada) were contacted and asked whether they would be willing to participate in an experiment using web comics as a learning tool. All of them volunteered to cooperate but due to problems with the computer operating systems we were forced to put the project on hold. Alternatively, the possibility of using the tool as a homework assignment was suggested and two out of the four teachers agreed to participate. Since it was not possible to change the class schedule or the homework activities already assigned to the students, the task was presented as a non-compulsory activity which would be awarded with an additional mark in the final grade. In total, 12 students from one group and eight students from another group (20 in total) of 4th-form secondary school students accepted the invitation to participate.

After an initial introductory phase including information to the students about the project and a tutorial about the digital tool to be used (ComicLab 1.2.), a hands-on experience was programmed to allow students to get familiar with the tool. After that, the following steps were followed:
a) Reflection about comic books and their potential as a learning tool.
b) Use of “ComicLab 1.2. User’s Manual” as learning material to make students get familiar with the basic terminology in Informatics, as well as the functioning of the digital tool.
c) Distribution of a Progress Sheet to keep a record of the work done.
d) Periodical revisions (a maximum of three) of the job done by the students, both of the comic book and the progress sheet.
e) Submission of the final comic book.

The students in the first group decided to work in pairs, thus yielding six web comic stories, whereas the other group formed two groups of four students. Immediately after the experience, the homework/web comic questionnaire was administered to the 20 students individually, with a 100% response rate.

After analysing the data, three invalid answers were found – distributed as follows: one for the item labelled freedom in Section 1 – Part 1; one for the same item in Section 1 – Part 2, and one last one for the item challenged to learn in Section 2 – Part 2. In these three cases, they were computed as missed data when making the frequency counts, and comprised 5% of the final results in each item. No further problematic elements were found.

Results of the questionnaire and discussion

The results obtained among secondary school students (aged 15-16) were not as conclusive as those found in the primary school data (see Figure 3). In fact, web comics obtained a lower score for all items in Section 1 (Homework in general vs. web comics for homework) except for challenge, which actually is in line with the rest since it is the only negatively-oriented value in the list.
One thing that clearly stands out is the extremely low score obtained for *pleasure* in the web comics section, with only 20% of the respondents having a positive opinion in that respect. This is in sharp contrast with the primary-school students’ position (see Section 7.2.1 above), who found web comics highly pleasurable.

In general, all scores for web comics are systematically lower than those found in the primary school data. Except for *pleasure* just mentioned, all scores range from 40% minimum to 65% maximum of positive answers. This said, there are two factors that need to be taken into account in the interpretation of these results. One aspect that requires consideration is the fact that except for *pleasure* again, with 50%, and *interest* with 25%, almost all items obtained 10% of negative responses or less (*freedom* = 10%; *creativity* = 5%; *challenge* = 10%; *usefulness* = 5%, and *learning* = 5%). This means that a considerable amount of responses gathered around slightly positive answers. So, we could say that their opinion of web comics is still positive although not as highly valued as among primary school students.

Nevertheless, we cannot deny that the results are not as convincing as in the first study. One possible reason for this could be that at this age students are much more immersed in the ICT world and are already familiarised with all kinds of devices such as video- or computer-games, complex mobile phones, mp3 and mp4 playback and recording devices, online chats, forums, weblogs and wikis, and above all online social
networks. One effect of this could be that web comics are not so “new” for them as a digital tool and they are not so impressed by it.

Secondly, we need to consider the relatively high scores given to homework in general as compared to those given by primary school learners. If we take pleasure out again, the percentage is 50% or above in all items, which means that students in secondary school have a rather high concern for homework as part of their learning process. Again, age could be a key factor here. Fourth-form students are in the final secondary school year and they are already thinking about their future career. Their goals and objectives in life are starting to be more important for them and learning outcomes and results are rationally taken into account. In other words, their motivation could stem from more cognitive factors, rather than merely “enjoying” an activity.

This interpretation may be reinforced by the findings in Section 2, where, as expected, high scores were obtained for motivated (80%) and the opposite tendency was found for bored (20%) (see Figure 4 above). This means that 16 out of 20 students felt motivated while using ComicLab in their assignment and only 4 out of 20 were bored. So, it is not the case that web comic creators are not motivating anymore at this age but rather that intrinsic motivation of this kind is not as necessary at this stage as it is earlier in their learning process.
In general, the tendencies in this section almost replicate the results found among primary school students, with the salient exception of *overwhelmed*, which seems to run against the overall picture with as high as 80% of positive answers. This contradictory result might be explained in terms of timing. By the time of the final stage of the web comics development, when students had to finish their comic stories and had to fill out a progress sheet with all the information regarding the things they had learnt and practiced with the digital tool, they had to cram for the final exams at the same time and some of the students reported via email that they were rather anxious about it and about the little time they had for doing both things at the same time.

In sum, although the figures in this second case are not as impressive as in the first one, we still can say that web comic creators have positive effects on the learners in terms of motivation. Maybe one question that remains to be answered is whether they are still useful when motivation is not an issue. However, this is outside the scope of the present research.

3 Concluding remarks

While time of the day may be an unchangeable variable, out-of-class assignments, projects and research opportunities may allow for students flexibility in the selection of optimum performance hours. Homework might therefore be viewed not as workbook chores, but as activity that is comparable or superior in learner engagement to classroom work and valued beyond its mere completion. All the above tasks can be carried out via web comic book creators and we hope to have shown that they can be useful tools for gradually changing the long-standing view that homework is tiresome and boring.

The caveat is, however, that we need to keep in mind that web comic book creators are mere tools, and as such, they are good for some things and maybe not so good for other things. They definitely enhance motivation, but homework activities should be designed with care and detail so that the final aim, which is enhancing learning, can be achieved.
RESEARCHING MOTIVATION IN FOREIGN LANGUAGE LEARNING: A CASE STUDY INTRODUCING WEBCOMICS IN A RURAL DEPRIVED SCHOOL

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DEFINING MOTIVATION

Motivation is one of the key aspects in students’ academic success and finding out what motivates our students plays a crucial role in education. Teachers, due to their years of experience in the classroom, may have come up with some checklist of characteristics to define what a motivated student is and how a motivated student behaves.

Acknowledging that, in order to facilitate and promote learning, teachers need to understand what motivates their students, we need first of all to clarify what motivation actually is. A commonly accepted definition of motivation towards learning a second or foreign language (L2) is that of Gardner (1985) who defines it as “the extent to which the individual works or strives to learn the language because of a desire to do so and the satisfaction experienced in this activity” (p.10), but in a given context or situation students may not perceive any need or have any desire to learn an L2.

Motivation in itself is a multifaceted phenomenon that needs careful attention since there are many factors such as individual and social differences that have an impact on students’ level of motivation and academic performance. Therefore, teachers need to be aware of what shapes their students behaviours and what makes them willing, or not, to engage in the learning process. Oxford and Shearin (1994) express it in the following way: “Motivation determines the extent of active, personal involvement in L2 learning. Conversely, unmotivated students are insufficiently involved and therefore unable to develop their potential L2 skills.” (Oxford & Shearin, 1994: 12).

When we try to clarify what motivation is and the aspects that influence it, we come to realise that “researchers disagree strongly on virtually everything concerning the concept” (Dörnyei, 2001: 7). Oxford and Shearin (1994: 13) suggest that:

four conditions impede our understanding of students’ motivation for L2 learning: 1) absence of consensus on a definition of L2 learning motivation; 2) confusion
surrounding motivation in second vs. foreign language situations; 3) L2 research omission of some key motivational and developmental theories taken from many areas of psychology; and 4) teachers’ lack of knowledge about their students’ real reasons for learning a language.

How would you define motivation?

How can teachers find out what motivates their students?

EXPLORING THE USE OF WEB COMICS AS A MOTIVATIONAL TOOL IN PRIMARY EDUCATION

Nowadays technology plays a crucial role in many educational settings, methodological approaches and learning processes, and it is an often unrecognized source of learner emotions.

As has been noted by different authors, Information and Communication Technology (ICT) “are a tool, not a panacea for intellectual development” (Bandura, 2001: 6). With the advent of new and more sophisticated resources, teachers need to learn and students need to develop new strategies to “motivate themselves to take advantage of what these systems have to offer. Students must develop skills in regulating the motivational, emotional, and social determinants of their intellectual functioning” (Bandura, 2001: 6).

The advent of ICT, web technology and the widespread concept of the knowledge society have generated new demands on educational systems and on schooling. Anderson (2009) highlights that for the last decade educationists and researchers have advocated using ICT extensively and have gathered powerful evidence that ICT use in classrooms is associated with greater opportunities for academic success (cf. Cogburn,
and although technology is not the only answer to all educational problems and societal demands, to ignore what it can offer is to miss out on many potential benefits.

Passey et al. (2004: 3) present a detailed study of the potential benefits of introducing ICT with pedagogical aims in the classroom. These potential benefits can be roughly summarised under the following broad headings:

- ICT use by pupils and teachers can lead to positive motivational outcomes.
- Technology can raise student’s motivation, and lead to changes in classroom roles and organisation.
- Teachers can assume a role of facilitator thus freeing time to support individual learning processes.
- Technology can enhance student engagement, research, writing and editing, and presentation of work.
- Using ICT students develop some of the necessary skills to live and work successfully in the 21st Century.
- Technology can help students develop positive cooperative learning relationships, enabling them to work together creating presentations, and developing social skills such as debating, compromising, negotiating, etc.

Can you think of any other potential benefits of ICT in the classroom?

New technologies: developing digital competence and motivation in education.

Based on the ‘potential’ of ICT to increase the effectiveness of teaching and improve students’ learning, new technologies are regarded as essential for a high-quality education and for social and economic development. However, by simply having computers in the classroom or reducing the computer-student ratio there is no guarantee of any changes in educational outcomes. What makes a difference is the pedagogical use of ICT by teachers and students. Although there is evidence from research that ICT can have a positive impact on teaching and learning, that it plays an enhancing role in motivation and that it can strengthen teachers’ design of effective learning environments (cf. Smith & Doyle, 2002), there are a number of issues, such as educational context, infrastructure, teachers’ skills, beliefs and practices that need to be considered (cf. Higgins & Moseley, 2001; Attewell & Seel,
Among the general objectives of the Primary Education English Curriculum we can highlight the following:

- To learn how to use with progressive autonomy all the means available, including new technologies, to obtain information and to communicate in the foreign language.

- To use information and communication technologies to develop and strengthen learning.

The progress in media and information technologies has created an ever more international, multicultural and multilingual world. As we can see from the above objectives, teaching our pupils to communicate efficiently in foreign languages and to use new technologies with autonomy is essential for equipping our pupils to manage in society.

Regarding foreign language, Primary Education starts from a very elementary competence. That is why in the process of L2 learning previous experiences, attitudes and emotions are of great importance to understand pupils’ motivation and build meanings and strategies. Alongside with the need of learning an L2 schools also encounter the growing need for digital competence. Answering these needs require from schools new approaches that include lifelong learning strategies.

The digital competence involves the development of different digital skills such as the ability to access digital media and ICT, to understand and critically evaluate different aspects of digital media and to communicate effectively in a variety of contexts. It involves the confident and critical use of ICT for employment, learning, self-development and participation in society. However, in order to support this process teachers need to be equipped with digital competence themselves.

Learning digital skills not only needs to be addressed as a separate subject but also embedded within teaching in all subjects and as early as possible (i.e. in primary education).

What is your personal view about introducing ICT in education?
Do you think computers can be useful for learning a foreign language?

Webcomics: embedding ICT within teaching.

An interesting and innovative methodology for that embedding can be done in the English class by introducing webcomics within a Task-Based language Learning (TBL) approach. Within this approach to language teaching pupils can use ICT in practical and effective ways that promote English use, enhance motivation while developing the digital competence, which includes learning to use digital tools critically, confidently and creatively, paying to security, safety, and privacy.

The introduction of the web comic book creator ComicLab in the classroom as a teaching resource with children can be done in a way that engages students in using technology meaningfully and effectively in the English class as a means of producing comprehensible output, both written and spoken, therefore its use as a pedagogical tool fits with Ellis’ (2003) definition of tasks.

The use of webcomics using the authoring tool ComicLab in English classes can provide an opportunity for ICT to be integrated into a TBL approach, where learners, with the appropriate training in ICT skills, should be able to increase communicative language exchanges in the L2 with other students, find something of mutual interest and be able to function linguistically as well as technologically. ComicLab gives children the opportunity to use elements from their own lives beyond the classroom to conceive, write, and illustrate stories using the target language and new technologies communicatively and meaningfully.

Research and pedagogical objectives

The research touches on three main areas: Education, ICT and L2 and acknowledging the complexity of motivation and believing that:

a) motivation is a process,

b) pupils can be encouraged to take ownership and responsibility of their learning
c) pupils can learn to self-regulate themselves and develop a high sense of self-worth

d) motivation and personal attitudes can be influenced by external factors such as pedagogy and new technologies.

e) ICT combined with a TBL approach can contribute to make language learning attractive and enjoyable, thus enhancing motivation,

f) that using webcomics students would be more motivated and actively engaged in their learning,

a case study was conducted to explore the ways in which the introduction of new technologies in the classroom can enhance learning, motivate students and benefit teachers.

We have already pointed out the potential benefits of introducing ICT with pedagogical content and that ICT use in classrooms is associated with greater opportunities for academic success, and we have also highlighted that there are a number of issues, such as educational context, infrastructure, teachers’ skills, beliefs and practices that need to be considered. Thus, this research aims to explore not only the possibilities of webcomics as a way of developing digital competence but also to illustrate the enhancing role that new technologies can play in the motivation towards learning English of children of a deprived rural community.

The pedagogical objectives of the research can be summarised as follows:

1. Identify pupils’ motivational stage and attitudes towards English.
2. Identify the factors which promote positive and motivating learning experiences.
3. Enhance autonomy by allowing students to select the topic and content of their tasks.
4. Discover viable ways for students to become creative and active learners.
5. Foster the development of appropriate educational materials for language learning that are effective, interactive, enjoyable and inclusive.
6. Develop ICT skills.
7. Encourage the production of meaningful output in English (written and oral).

Research questions

The research question derived from the above can be phrased as follows: Can the pedagogical use of webcomics increase the motivation and improve the attitudes towards English of a group of multi-ethnic and disadvantaged pupils of a rural primary school?

This broad question was broken down into a number of sub-questions that evolved over the time span of the research:
- Is it possible and viable to integrate webcomics in the class? And if so, what pedagogical uses can they have?
- Does the use of web comics have any effect on students’ motivation?
- How could web comics be used as a pedagogical resource to keep students interested and motivated?

On the basis of the above, the specific objective of this study is to identify the changes in motivation towards learning English that students experienced as a result of using ComicLab as part of a TBL approach.

**Characteristics of the research site and subjects**

The research was carried out in a Primary School in the area of Guadix, Granada. The students that took part in the project were from 3 different classes: 3rd, 5th and 6th of Primary Education. Altogether, 38 children took part in the research.

The introduction of ComicLab in the classroom as a teaching resource with primary school children aged from 9 to 12 sought to engage them in using technology meaningfully and effectively in the English class as a means of producing comprehensible output, both written and spoken.

Some of the characteristics of the research context and the pupils are the presence of two distinct cultures (gypsy and paya), that many pupils are not encouraged by their families to study or engage in cultural activities, the language standards are very different in the home and in the school, significant difficulties in learning tasks such as reading comprehension and writing and a general lack of interest in written communication. These particular characteristics determined the school’s educational offer: Educación Compensatoria, which has been translated as Compensatory Education.

💬 Do you think new technologies (ICT) can encourage students to learn and use English?
Research design

In keeping with qualitative data collection methods, this research project employed interviews and classroom observations, but it also gathered data from Likert-type scale questionnaires, which are not only used to collect data but also to verify information gathered from the observations and interviews between February and May 2010.

The questionnaires were written in Spanish and adapted from questionnaires designed by Jimenez Raya and Lopez Sako, which were devised for the EduComics Project. They follow a 5 point rating scale in which they could rate each item on a 1-to-5 response scale: 1, indicates Strongly Disagree/ Not true at all; 2, Disagree/Not very true ; 3, Somewhat Agree/ More or less true; 4, Agree/ Quite true; 5, Strongly Agree/ Very true. A sixth option (0) was included to express “I don’t know/ Undecided”. The aim was to gather information about students’ attitudes towards learning English, the value they attach to it and their interest in the language as such, as well as other aspects that could be influential in their level of motivation.

Taking into account the students’ developmental age, semi-structured interviews were set up and carried out in a way that allowed the respondents to talk about their opinions about English and describe what is meaningful, interesting or important for them using their own words. The interviewer has an outline of topics or core questions determined in advance. Within limits, the interviewer may vary the wording and order of the questions to some extent, maintaining the original interview schedule (cf. Seliger & Shohamy, 1989).

The English teacher was asked to keep a journal in which she would write her observations and experiences derived from the implementation and use of web comics.

PROCEDURE AND STAGES OF THE RESEARCH

Access to the School

First of all, I contacted the principal and obtained access to the school. Secondly, I arranged a visit to the school to meet her personally and explain about the research. She then organised a meeting with the class teachers of classes 5 and 6. However, since the research was going to be centred in the English class, the English teacher was

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1 See Appendix 1
2 See Appendix 2 and 3
the only one who continued the experience and with whom I arranged the following meetings and training sessions.

Once I had obtained access to the school I started to work with the English teacher in order to show her how to use ComicLab. The teacher needed to understand the benefits and possibilities of using comics, the different visual and conceptual aspects used in comics, as well as the possibilities that a TBL approach has to offer. Therefore, during the working and training sessions with the teacher, I explained the programme and some TBL main principles (cf. Willis, 1996; Ellis, 2003; Jimenez Raya, 2010). She was also given some handouts about comics that she could use later on with the students, a portfolio with the ComicLab User’s Guide and a timeframe proposal.

Before introducing ComicLab in the classroom, the teacher was asked to give a questionnaire of motivation and attitude towards English learning, and a similar questionnaire was also given to the students at the end of the research.

Technical Support and data gathering

Two training sessions were arranged so that the English teacher would be in a position to introduce ComicLab in her English classes. The aim of these training sessions was two-fold: Firstly, to train the teacher in the basics of the software to be used and, secondly, to gradually present the teacher with an alternative methodology to the traditional “task-supported language teaching” (i.e. teaching that uses tasks to practise pre-selected and presented linguistic forms)” (Ellis, 2005: 6), or as Nunan (2004) puts it, a “transmission approach” which contrasts with the “active, experiential nature of learning by doing”, a key conceptual basis of TBL (cf. Nunan 2004: 10-13).

When the arranged training sessions were over, we brought the computers to the classroom and, after an initial introductory phase that included information about the project and a tutorial about ComicLab, children were given the first questionnaire.

Using web-comics in the Classroom with 5th from and 6th form:

After the first questionnaire, the teacher presented various models and samples of comics, some of them facilitated by the researcher, and explained some of the characteristics of comics, how the story is planned and designed, etc., the students were asked to read comics and critically observe the different elements found in comics to communicate feelings, sounds, time sequence, how the characters “speak”, where and how the narrator appears, etc. This exploration of the language of comics took place in the lessons of Spanish and Arts.

5 See Appendix 4.
The objective of this Pre-Task stage was to promote what Nunan (2004) calls *experiential learning*. According to Nunan (2004: 12),

intellectual growth occurs when learners engage in and reflect on the sequences of tasks. The active involvement of the learner is therefore central to the [TBL] approach.

This first observation phase also gave the teacher the opportunity to promote a cross-curricular approach and to help the students develop skills in the production of narratives in various semiotic codes (multi-literacy).

This previous work gave the teacher opportunities to talk to the children about topics that they find interesting, TV programmes they watch, etc. Many students reported that it was interesting and fun to talk about their favourite characters to the teacher and that this was “school work”.

After that, the teacher, in dialogue with the students, arranged the deadline for the work to be completed, making it clear that in order to finish the comic it had to be done in digital format and with a voice recording. They were also told to use English as much as possible.

From the work carried out with these groups it is important highlight some elements: a) children did activities with comics and there was a cross-curricular approach; b) children were free to choose their topic; and c) the approach was partly student-centred.

Children from 3rd form also completed the questionnaire, however the information gathered from this group was obtained from direct classroom observation and informal interviews throughout the time span of the research. However, because of the rushed way in which the research was carried out in this group of pupils and data was not systematically recorded, the findings presented here will only refer to 5th and 6th form.

As far as possible, the following steps and phases were followed:

**SESSION 1:**

- Promote a positive and motivating climate in the class.
- Encourage students to read comics over the next couple of days and come up with ideas for their own comic for the next class.
- Make clear to them from the beginning that they will be “designers and artists” and that they will be free to choose the topic and content of their comic but that this has to be in English.
• **Introduction to ComicLab:** Show various examples and the interface of the software.

**SESSION 2:**
- Share ideas and comment the comics they have read.
  - Since the comic has to be in English, the teacher has to help them set realistic goals.
  - The main goal is that they are engaged in the learning process and use English.
  - The teacher has to provide feedback and guide pupils work in order to make sure that all students are able to experience success.

- After sharing their ideas, the pupils, divided in small groups (4 pupils maximum), have to select the topic for their comic.
  - Working in group demands negotiation and debate. The teacher has to help them in this process, negotiate with them and arrive to a consensus in the group. It is important to remind them that they have to plan all the different aspects of the comic: characters, theme, narrator, number of frames, etc.

• **First tutorial with the students:** First introduction to the software.

**SESSION 3:**
- Once each group has already decided on their comic, they have to show their final idea to the teacher.
- If it is acceptable and realistic, the teacher will give them the laptop.
  - Students can look for information about their topic on the Internet. They can also look for vocabulary. After exploring the different cliparts and backgrounds, they can start creating their comic.
  - It is important that the teacher encourages them to use English. It is also important that all pupils use the computer and that they share the work helping each other as much as possible.

**SESSIONS 4 - 6:**
- Students will be working on their comic. The teacher will be a facilitator of the experience. The students will be encouraged to look up for new words in dictionaries, books and the internet.

- The teacher has to provide feedback on their students work and suggest necessary changes, give ideas, etc.

- It is important that the children are reminded to use English.
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SESSIONS 7 - 8:

- Putting everything together.
  - At this stage, most of the design and written work of the webcomic should be already finished.

- Pupils have now the opportunity to read and practice the dialogues.
  - It is interesting to promote a realistic approach; this is using the correct intonation, imitating sounds, using different voices in order to present orally what is happening in the frame.

- They will have the opportunity to record their voices and attach the audio file to the comic.
  - It is important that children feel comfortable and capable of doing the task, so the main role of the teacher at this stage is to support them, help them and reward their performance giving them friendly feedback.