Creative Emotional Reasoning Computational Tools Fostering Co-Creativity in Learning Processes

www.c2learn.eu

C²LEARN USER PILOTS
C²LEARN PROJECT DELIVERABLE NO. D5.3.1

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Dissemination level: Public

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<td>EA</td>
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<td>Consortium partners contributing</td>
<td>OU, BMUKK (with contributions from NCSR-D and UEDIN)</td>
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<td>Full Draft circulated for review</td>
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<td>EA</td>
<td>Final Version incorporating all comments from contributing partners and the Consortium</td>
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<td>22/11/2013</td>
<td>EA</td>
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<th>Explanation</th>
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<tbody>
<tr>
<td>EA</td>
<td>Ellinogermaniki Agogi, Greece (coordinator)</td>
</tr>
<tr>
<td>UEDIN</td>
<td>The University Of Edinburgh, UK</td>
</tr>
<tr>
<td>OU</td>
<td>The Open University, UK</td>
</tr>
<tr>
<td>NCSR-D</td>
<td>National Center For Scientific Research &quot;Demokritos&quot;, Greece</td>
</tr>
<tr>
<td>UoM</td>
<td>Universita ta Malta, Malta</td>
</tr>
<tr>
<td>SGI</td>
<td>Serious Games Interactive, Denmark</td>
</tr>
<tr>
<td>BMUKK</td>
<td>Bundesministerium Für Unterricht, Kunst Und Kultur, Austria</td>
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### B) Other abbreviations in alphabetical order

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Explanation</th>
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<tr>
<td>C²Learn</td>
<td>Acronym of the project (full title: Creative Emotional Reasoning Computational Tools Fostering Co-Creativity in Learning Processes)</td>
</tr>
<tr>
<td>CER</td>
<td>Creative Emotional Reasoning</td>
</tr>
<tr>
<td>CTP</td>
<td>Computational Tools Palette</td>
</tr>
<tr>
<td>DLT</td>
<td>Diagrammatic Lateral Thinking</td>
</tr>
<tr>
<td>DoW</td>
<td>Description of Work (Annex I of the Grant agreement no. 318480)</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
</tr>
<tr>
<td>ELT</td>
<td>Emotive Lateral Thinking</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Explanation</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>FP7</td>
<td>The Seventh Framework Programme for Research and Technological Development (2007-2013)</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technologies</td>
</tr>
<tr>
<td>LTC²</td>
<td>C²Learn’s Lateral Thinking</td>
</tr>
<tr>
<td>M#</td>
<td>#th month of the project (M1=November 2012)</td>
</tr>
<tr>
<td>RWG</td>
<td>Random Word Generator</td>
</tr>
<tr>
<td>SLT</td>
<td>Semantic Lateral Thinking</td>
</tr>
<tr>
<td>TEL</td>
<td>Technology-Enhanced Learning</td>
</tr>
<tr>
<td>WHC</td>
<td>Wise Humanizing Creativity</td>
</tr>
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</table>
Executive summary

C²Learn at a glance

C²Learn (www.c2learn.eu) is a three-year research project supported by the European Commission through the Seventh Framework Programme (FP7), in the theme of Information and Communications Technologies (ICT) and particularly in the area of Technology-Enhanced Learning (TEL) (FP7 grant agreement no 318480). The project started on 1st November 2012 with the aim to shed new light on, and propose and test concrete ways in which our current understanding of creativity in education and creative thinking, on the one hand, and technology-enhanced learning tools and digital games, on the other hand, can be fruitfully combined to provide young learners and their teachers with innovative opportunities for creative learning. The project designs an innovative digital gaming and social networking environment incorporating diverse computational tools, the use of which can foster co-creativity in learning processes in the context of both formal and informal educational settings. The C²Learn environment is envisioned as an open-world ‘sandbox’ (non-linear) virtual space enabling learners to freely explore ideas, concepts, and the shared knowledge available on the semantic web and the communities that they are part of. This innovation is co-designed, implemented and tested in systematic interaction and exchange with stakeholders following participatory design and participative evaluation principles. This happens in and around school communities covering a learner age spectrum from 10 to 18+ years.

About this document

In this document we report the activities and outcomes of a first introductory pilot cycle in the 1st year of the project, specifically from July through October 2013. These piloting activities were intentionally diverse, aiming to provide useable albeit exploratory input about various aspects of the project at an early stage.

The main focus of the first pilot, as planned in the DoW, was on the Learning Design (D2.2.1) and the Educational Scenarios (D5.1.1). In addition, there were targeted piloting activities pertaining to the Creative Emotional Reasoning techniques, which derive from the work in D2.1.1, with the intention of exploring how to better incorporate them into the Learning Design. There were also piloting activities of research methodology tools to be incorporated into the Co-Creativity Assessment Methodology (D2.3.1).

Further, while the development and piloting of the project technologies has been planned for subsequent piloting cycles in the Dow, we seized opportunities to gather and provide user feedback to the design and technical teams by including piloting activities of the first version of the Computational Tools Palette (D 3.1.1) and the first version of the Game Design (D4.1.1).

Consequently, while, as it can be expected, the conclusions of the introductory pilot cycle can only be tentative, they give strong indications about the adequacy of the proposed approach, pin-point specific areas for elaboration and revision and provide specific useable, though preliminary, input to all research teams in the project.
1 Introduction

The C²Learn project aims to shed new light on, and propose and test concrete ways in which our current understanding of creativity in education and creative thinking, on the one hand, and technology-enhanced learning tools and digital games, on the other hand, can be fruitfully combined to provide young learners and their teachers with innovative opportunities for creative learning. The sheer novelty of C²Learn, makes particularly crucial to its success the ongoing evaluation of the pedagogical and technological approach that is being developed. Therefore, a total of four piloting cycles are planned in the DOW in frequent intervals throughout the project to ensure that the theoretical elaborations, design choices and technological solutions developed by the project are meaningful and appealing to its intended users and amenable to fostering creativity and creative thinking in education.

The first introductory pilot cycle, which occurs very early in the project, is integral to this iterative philosophy. At the same time it presented a particular set of challenges. Most importantly, it was timed in M10-12, prior to the development of the research questions and methodological approach that will inform the subsequent piloting cycles and are described in the Co-Creativity Evaluation Methodology (D2.3.1). In addition, both the pedagogical and the technical components of the project were in early stages of development. An added practical challenge that in months M10 (August 2013) and 11 (September 2013), the C²Learn researchers had very limited access to the main user groups (teachers and students). To overcome this difficulty we started the pilot one month earlier (in July 2013) and extended it throughout October.

Given these constraints, we adopted an ad hoc exploratory approach to the first pilot. We conducted a variety of piloting activities that were intentionally diverse, extending them beyond the minimum requirements of the DOW, aiming to provide useable input to all the research and development teams of the project.

The main focus of the first pilot, as planned in the DOW, was on the Learning Design (D2.2.1) and the Educational Scenarios (D5.1.1). In addition, there were targeted piloting activities pertaining to the Creative Emotional Reasoning techniques, which derive from the work in D2.1.1, with the intention of exploring how to better incorporate them into the Learning Design. There were also piloting activities of research methodology tools to be incorporated into the Co-Creativity Evaluation Methodology (D2.3.1).

Further, while the development and piloting of the project technologies has been planned for subsequent piloting cycles in the DOW, we seized opportunities to gather provide user feedback to the design and technical teams by including piloting activities of the first version of the Computational Tools Palette (D 3.1.1) and the first version of the Game Design (D4.1.1).

Consequently, while as it can be expected, the conclusions of the introductory pilot cycle can only be tentative, they give strong indications about the adequacy of the proposed approach, pin-point specific areas for elaboration and revision and provide specific useable, though preliminary, input to all research teams in the project.
2 PILOTING ACTIVITIES

2.1 OVERVIEW

All three educational teams in C²Learn involved in the piloting activities the same core communities of teachers and students that were engaged in the project during the first six months, as reported in Deliverable 5.1.1.

Thus, the OU team worked in two locations, one in the South East and the other in the South West of England, with a primary and a secondary school in each. They conducted two 1.5 hour workshops in each school, involving students in piloting activities related to educational scenarios, learning design, diagrammatic reasoning techniques, the semantic tools and the evaluation methodology.

The BMUKK team worked with their core group of teachers to elaborate their scenarios, conduct a low-fi pilot of game-based learning with their students in a workshop setting and discuss the experience. In addition, the BMUKK team gathered input on scenarios from a group of e-learning experts, in the context of a conference roundtable.

The EA team worked with the core group of teachers in the school to gather some input on the preliminary game design sketch proposed in D 4.1.1.

An additional context for piloting activities was an in-service teacher summer school on “Games, Learning and Creativity”, organized by EA in Crete. Three piloting activities were organized there: an evaluation of the D 5.1.1 scenario seeds by participating teachers, conducted by the EA team; a piloting of the semantic reasoning tools conducted by NCSR-D; a piloting of Creative Emotional Reasoning (CER) Techniques, conducted by UEDIN.

An overview of the piloting activities is given in the following table.

Table 1: Summary of Pilot Activities

<table>
<thead>
<tr>
<th>What</th>
<th>How</th>
<th>Where &amp; When</th>
<th>Participants</th>
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<tbody>
<tr>
<td>Educational Scenarios</td>
<td>Evaluation with primary and secondary school teachers</td>
<td>Session at in-Service Summer School, July 2013 (EA)</td>
<td>16 teachers</td>
</tr>
<tr>
<td></td>
<td>Evaluation with primary (10-12 years) and secondary (13-15 &amp; 16-18 years) students</td>
<td>Workshops, July 2013 (OU)</td>
<td>35 students 3 teachers</td>
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<tr>
<td>Pilot trial with students</td>
<td>Workshop, September 2013 (BMUKK)</td>
<td>15 students</td>
<td></td>
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<td>Input from teachers</td>
<td>Workshop, September 2013 (BMUKK)</td>
<td>10 teachers</td>
<td></td>
</tr>
<tr>
<td>What</td>
<td>How</td>
<td>Where &amp; When</td>
<td>Participants</td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Learning Design</td>
<td>Piloting with primary (10-12 years) and secondary (13-15 &amp; 16-18 years) students</td>
<td>Workshops, July 2013 (OU)</td>
<td>35 students</td>
</tr>
<tr>
<td></td>
<td>Piloting with primary (10-12 years) and secondary (13-15 &amp; 16-18 years) students</td>
<td>Workshops, July 2013 (OU)</td>
<td>35 students</td>
</tr>
<tr>
<td>CER techniques</td>
<td>Trial with primary and secondary school teachers</td>
<td>Session at in-Service Summer School, July 2013 (UEDIN)</td>
<td>14 teachers and experts</td>
</tr>
<tr>
<td></td>
<td>Piloting with primary (10-12 years) and secondary (13-15 &amp; 16-18 years) students</td>
<td>Workshops, July 2013 (OU)</td>
<td>35 students</td>
</tr>
<tr>
<td>Game Design</td>
<td>Evaluation with primary and secondary school teachers</td>
<td>In-school sessions, October 2013 (EA)</td>
<td>11 teachers</td>
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<td>Semantic Tools</td>
<td>Trial with primary and secondary school teachers</td>
<td>Session at in-Service Summer School, July 2013 (NSCR-D)</td>
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<tr>
<td></td>
<td>Trial with primary (10-12 years) and secondary (13-15 &amp; 16-18 years) students</td>
<td>Workshops, July 2013 (OU)</td>
<td>35 students</td>
</tr>
<tr>
<td>Evaluation Methods</td>
<td>Evaluation with primary (10-12 years) and secondary (13-15 &amp; 16-18 years) students</td>
<td>Workshops, July 2013 (OU)</td>
<td>35 students</td>
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### 2.2 USER PILOTS ON EDUCATIONAL SCENARIOS

#### 2.2.1 EVALUATION WITH TEACHERS AT THE C²LEARN SUMMER SCHOOL

From June 30th through July 5th 2013, EA conducted the in-service summer school “Be Creative, Play Digital: Creativity in Learning through Gamification”, which involved participants from 12 countries. In the context of their work in the summer school participants were asked to refer to and reflect upon the main scenario seeds from deliverable 5.1.1 (see Appendix A.1.), while they were attending lectures and participating in workshops on creativity, game design and educational scenarios, from members of all key C²Learn scientific teams, who were among the lecturers and facilitators of the summer school. At the end of the fifth day, after being thoroughly inducted to the C²Learn approach they were asked to complete and hand in their replies to the questions posed in the activity sheet (see Appendix A.1.). The three basic questions asked them to select their four top scenario seeds in terms of creativity potential, gaming potential and potential for classroom use. A total of 16 participants completed this activity.
The following three graphs summarize the results, while more details can be found in Appendix A.2.

In the first graph we have ordered the scenario seeds according to the participants’ choices in response to the question: **choose four scenario seeds that you think have the best potential to foster creativity in learning.**

![Graph showing participants' replies sorted by question: creativity potential](image)

**Figure 1: Summer school participants’ replies sorted by question: creativity potential**

As this figure indicates, two scenarios that came up clearly at the top in this question ‘Surviving Global Warming’ and ‘What if (1)’, followed by two more ‘What if (2)’ and ‘What life? What Europe? What World’, which also came up high in participants choice for creativity potential. The ‘Eradicating Poverty’ and ‘Rescue Mission’ scenario seeds also gathered considerable preferences.

Taking into consideration the participants’ open ended comments (Appendix A.2) and our own analysis of the scenario seeds (see Deliverable 5.1.2), we could say that what these scenarios have in common is that they pose clear problems with strong societal impact, which however are complex and have no easy answer and thus require students to be creative in their solutions. Some also position students to take unfamiliar perspectives to familiar realities or they raise ethical dilemmas around choices and solutions.

In the second graph we have ordered the scenario seeds according to the participants’ choices in response to the question: **choose four scenario seeds that you think can be turned into an engaging game that your students would enjoy playing.**
Figure 2: Summer school participants’ replies sorted by question: gaming potential

Here we see in order the ‘Teleporter’, ‘The Amusement Park’ and the ‘Rescue Mission’ scenarios, as the top three which are perceived as having the most gaming potential, followed by ‘Space Mission’ and ‘ARG on School Grounds’, while the ‘Eradicating Poverty’ scenario also gathered some preference.

The most clear game-based element present in these scenarios is that they are all structured around a mission, comprising either a clear and compelling goal or a set of quests, or both. Most also assign students to roles and sometimes teams. Some wrap the mission in adventurous or playful storyline often with fantasy elements. Most also have strong elements of collaboration in order to accomplish the mission.

Finally in the third graph we have ordered the scenario seeds according to the participants’ choices in response to the question: Choose four scenario seeds that you think it is more likely that you would actually use in your classroom.
Here the participants’ preferences are spread across several scenarios: ‘The Amusement Park’ ‘ARG on School Grounds’, ‘What if (1)’ and ‘What if (2)’ are chosen equally, followed closely by ‘Rescue Mission’ and ‘Surviving Global Warming’. It is important to note that many of the scenarios that were chosen for their potential to foster creativity and for their gaming potential, were also perceived as suitable for classroom use.

Overall, across the three graphs there is considerable consistency in the scenario seeds that can be considered promising for further elaboration educational scenarios. Through the small size of the participant group means that we need to interpret their input with some caution, at the same time the fact that they came from a wide distribution of European countries and they were well immersed in the C²Learn framework of creativity and game-based learning when completing this activity makes their input particularly informative.

2.2.2 EVALUATION WITH STUDENTS AT THE OU SUMMER WORKSHOPS

In the context of the Summer Workshops they conducted, the OU team selected a subset of the scenario seeds developed with teachers in Greece and Austria (Evolution; What if? - 2, Alternative Reality Game played on school grounds; Teleporter; Civic Education; Being a Genetic Engineer; Space mission; Geography of Civilisation) to evaluate with participating students. All participating students started their workshops with a review and elaboration of the C²Learn Co-Creativity framework, focusing on the five key elements: Engaging in Dialogue; Intervention and Reframing; Engaged Action; Being in Control; Ethics and Impact. (see appendix B.1.).

With respect to scenarios, students worked in pairs or threes. They were handed a separate card for each scenario (see appendix B.4.). And asked to pick scenarios that appealed to them out of the eight offered, and to evaluate scenarios using the co-creativity dimensions and the co-creativity wheel.
The primary school students (10 – 11 year olds), choose to work with the following scenarios:

- Evolution (2 groups)
- Alternative Reality Game played on school grounds (3 groups)
- The Teleporter (1 group)
- Geography Mission (1 group)
- What if-2 (3 groups)
- Astronomy/Space mission (2 groups)

Included is one pair of students who were randomly given “What if” to evaluate as they were not particularly inspired by any of the scenarios.

The data from the two geographic sites are quite different in terms of students’ evaluation of the scenarios on the co-creativity dimensions. The 10-11 year olds in the SW seemed relatively uninspired by the scenarios. This could have been because it was the last task in quite a complex sequence. It could also be because they were only given a short briefing text adapted from C²Learn colleagues’ write up of the scenarios from teachers own descriptions of them with an image added by OU C²Learn member to attempt to make the scenario appealing. The presentation may not therefore have been
very interesting for a 10 year old, including that some of the language could have been too complicated. The SW primary school students did not see many of the co-creativity features evident within the scenarios. They felt the ‘Evolution’ scenario would allow them to be in control and ‘What if’ might make an impact. One group felt ARG contained all features apart from Ethics and Impact, but the other felt it only included the capacity for Engaging in Dialogue. Their comments are presented in the following table.

Table 2: SW primary students’ evaluation of scenarios using co-creativity criteria

<table>
<thead>
<tr>
<th>Scenario</th>
<th>In control?</th>
<th>Ethics and impact?</th>
<th>Immersed Action?</th>
<th>Dialogue?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution</td>
<td>√</td>
<td>X</td>
<td>√/x</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>“Yes because you get choose where you land. You can choose your planet”</td>
<td>“no” “no” “no”</td>
<td>“Keep playing because it sounds fun” but also “would not really play it”</td>
<td>“no because it’s a single player game”</td>
</tr>
<tr>
<td>What if? (NB these students were allocated this scenario)</td>
<td>X</td>
<td>x/√</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>“no” “no”</td>
<td>“nope it’s just a game” yes because of the changes</td>
<td>“no” “no”</td>
<td>“no” “no”</td>
</tr>
<tr>
<td>ARG on school grounds</td>
<td>√</td>
<td>X</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>“in the middle”</td>
<td>“not really”</td>
<td>“keep playing it”</td>
<td>“yes it does”</td>
</tr>
<tr>
<td>ARG on school grounds</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>“no you don’t control different parts in the story”</td>
<td>“no not at all. Depends on storyline!”</td>
<td>“no there’s not much to so I would put it down”</td>
<td>“a bit because you have to talk to people”</td>
</tr>
</tbody>
</table>

However with the same text and images the 10-11 year olds in the SE primary school gave comparatively positive feedback on why they felt these scenarios would make a ‘good’ game. The ‘What if’ scenario was the most appealing to this group of students. All of the scenarios indicated as chosen for evaluation above received positive feedback including that they were ‘creative’ (Evolution), ‘engaging’ (‘What If’ and Astronomy) and ‘it could help you become more responsible’ (‘What If’). It should be noted however that they were in Yr6 (11 year olds) and so a year older than the SW group (10 year olds). Students provided a rationale for their choice, which they wrote directly on the scenario card.
### Table 3: SE primary students’ evaluation of scenarios as a ‘good’ game

<table>
<thead>
<tr>
<th>Game scenario</th>
<th>Why would it make a good game?</th>
</tr>
</thead>
</table>
| **Evolution**              | • Creative  
  • Make your own decisions  
  • Evolution is a good topic as you can decide what to evolve into |
| **The Teleporter?**        | • Unique-unusual  
  • Educational-disguised  
  • Wider your knowledge  
  • Used real life skills and traits |
| **Geography of civilisation** | • Wide range of activities  
  • Multiplayer  
  • No-end-not over quickly  
  • Its fun as well as educational |
| **What if? (x 3)**         | • Good title, makes you wonder  
  • Sounds interesting  
  • Helps you learn about how life would be like in a different environment  
  • Engaging  
  • Challenges your brain  
  • Would interest both genders  
  • It could help you become more responsible  
  • It’s a bit like Minecraft, however better  
  • There are a range of things  
  • It is very realistic  
  • Could go wrong if take away water completely because it is impossible to survive without water after 2-3 days |
| **Astronomy: Space Mission (x 2)** | • Engaging  
  • Sounds interesting  
  • Teaches you about astronomy  
  • You get experience different roles in space  
  • *Lots of different missions so you learn more than one thing*  
  • The creativity is closed  
  • The idea is confusing  
  • I like it because it has a lot of ideas |

It is worth noting that although the SE primary students evaluated the scenarios more positively the following words were identified as being difficult for them: “social dimension’, ‘ruthless’, ‘parameter’, ‘scenario’, ‘saboteur’.

The secondary school students (10 – 14 year olds), choose to work with the following scenarios:

- Alternative Reality Game played on school grounds (1 group)
- The Teleporter (3 groups)
- Being a Genetic Engineer (1 group)
- Geography of Civilisation (3 groups)
- Astronomy/Space mission (2 groups)
- Evolution (1 group)
- Civic Education (1 group)
It is difficult to draw concrete conclusions from such a small data set, but it might be said that the data indicates that the Teleporter and Geography of Civilisation scenarios were the most popular as these were the ones most commonly chosen.

In the SW secondary school the Teleporter, ARG and Genetic Engineers might be said to hold the most potential in terms of the five co-creativity criteria as their creativity wheels were the most completely filled in to the highest level. In the SE secondary school Astronomy and Civic Education were most completely filled in to the highest level. However this can only be said very tentatively.

In the SE secondary during Workshop 2, students spent a good amount of time on the scenarios. Students filled out a co-creativity wheel for their scenario of choice and also provided a rationale for their choice, which they wrote directly on the scenario card.

Table 4: SE secondary students’ evaluation of scenarios as a ‘good’ game

<table>
<thead>
<tr>
<th>Game scenario</th>
<th>Why would it make a good game?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution</td>
<td>This sounds good as it is engaging as you get your bacterium, to survive and evolve. You need to decide about your future and planet you go and land on it and evolve. I would play this game if it was made right.</td>
</tr>
<tr>
<td>The Teleporter? (x2)</td>
<td>The idea sounds interesting and it would make you want to keep playing it if there were more levels to unlock. The game is not too simple to think it is boring, but with the right instructions, then it would be easy enough to understand.</td>
</tr>
<tr>
<td></td>
<td>I like this because there is a strategic side to it (what skills to improve) whilst making your way through many puzzles and layers and try to get to the end. This is a good idea because you can keep moving in so the challenge is keeps going on.</td>
</tr>
<tr>
<td>Geography of civilization (x2)</td>
<td>I feel like if this were to be made, that an RPG storyline would be suitable.</td>
</tr>
<tr>
<td></td>
<td>The idea of real life knowledge and facts being learnt.</td>
</tr>
<tr>
<td></td>
<td>Exploration of different countries, that have never heard of.</td>
</tr>
<tr>
<td></td>
<td>The idea of helping others/sharing to progress.</td>
</tr>
<tr>
<td></td>
<td>(Not so sure of the need for a “villain” perhaps a “situation” historical event which can impact the players progression if not dealt with) (TEACHER RESPONSE)</td>
</tr>
<tr>
<td>Astronomy: Space Mission (x2)</td>
<td>There is a lot to do and it shows the different points of views of many characters. There are many different scenarios that could keep you entertained.</td>
</tr>
</tbody>
</table>
|                                        | I think this game has such potential, however, it must be executed the right way. I think the should have lots of choice in it, what supplies to use, who to give the supplies to, where to travel. This is quite hard to do if this is a regular space mission as they are well planned out removes choice. My suggestion is that the game has a story: a deep space mission gone wrong. This then gives the gamer more freedom because it then becomes a fight for survival rather
### Game scenario

<table>
<thead>
<tr>
<th>Why would it make a good game?</th>
</tr>
</thead>
<tbody>
<tr>
<td>than a planned mission. This opens up new elements to the game because supplies are limited and only supposed to last for a certain amount of time but if the mission went wrong then the player would have to decide who to distribute supplies to. This could all be a sub-game whilst you are trying to get back to earth by navigating the spacecraft. How the crew react could be down to how well fed they are, etc. For example, they psychologist is not well fed and dies, the crews; mental health may deteriorate, some more than others.</td>
</tr>
</tbody>
</table>

### Civic education:

<table>
<thead>
<tr>
<th>What life? What Europe? What world? (x2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think it suits a digital/video game because you get to see how hard decision leaders have to make now and it is fun because you get to see how if you changed the would what impact it would make.</td>
</tr>
<tr>
<td>It’s good because you get to see how different the world is and how actions can have damaging re-actions to certain people or just everyone. It could improve by adding small mini-games such as helping a small village to collect money or food to make it more interactive.</td>
</tr>
</tbody>
</table>

Overall, the scenarios well well-received by the students, but their relation to the C²Learn co-creativity co-creativity concepts, did not come out clearly in these data.

### 2.2.3 PILOT TRIAL WITH STUDENTS AND EVALUATION WITH TEACHERS AND EXPERTS IN AUSTRIA

#### 2.2.3.1 DEVELOPMENT AND IMPLEMENTATION OF A PILOT USE CASE

To meet the goals of the first introductory pilot cycle in Austria the core team of BMUKK decided to pilot and further develop those scenario seeds, that have been designed by Austrian teachers in the framework of the C²Learn Visionary Workshops (spring 2013, see D5.1.1.) and the C²Learn summer school in Crete (July 2013). The scenario seed “Amusement Park” was chosen to be implemented in a real-life educational situation and therefore elaborated as a first use case “training on job interviews”. The use case was designed to be implemented in a class with 15-16 year old students (corresponding to Austrian secondary II level) of a higher school for tourism and economy (HTLW Bergheidengasse, [http://www.hltw13.at/](http://www.hltw13.at/)).

The scenario seed “Amusement Park” was designed by Austrian teachers in the first visionary workshops (see Del. 5.1.1., chapter 3.3.3.2) and further developed in the frame of the C²Learn summer school 2013. The core team of BMUKK decided to transform the Amusement Park to be used as first implementation scenario (use case) in class. The topic “training on job interviews” was chosen by the team as this topic can be regarded as commonly treated by teachers corresponding to the curricula of different school types, in the upper secondary I level or in secondary II level.

A teacher in a higher school for tourism and economy (secondary II level) in Vienna – she is member of the C²Learn team of BMUKK and participant of the summer school 2013 – designed and elaborated the use case “training on job interviews” by using the basic parts of the scenario seed Amusement Park which is designed for playful learning. Inspired by the ‘Prater’ in Vienna the scenario consists of various stations symbolizing ‘game attractions’ in the amusement park (House of Mirrors, Octopus,
Ferris Wheel, Labyrinth, Merry-Go-Round, Tunnel of Horror etc.). The teacher prepared the “game attractions” of the Amusement Park as educational activities at stations, each hosting a specific tool and challenge.

This implementation scenario was elaborated to be used by 15-16 year old students (secondary II level) in an educational session of two hours. Learning goals were specified according to the curriculum, the planned activities of the students aimed to foster mainly their communication competence, the social competence, the competence of initiative and entrepreneurship as well as cultural expression. Students had to prepare themselves beforehand by reading specific information material provided by the teacher and to work on other material (e.g. job advertisements in newspapers). The educational environment was prepared by the teacher in the evening before the implementation activity.

The implementation of this scenario was realised in the envisaged timeframe of two hours. The details of the implementation are given in C.1. Students worked in a very concentrated way; the teacher was very pleased about the outcomes. She will use this implementation scenario in the future and probably equip it with additional tools (creativity tools).

Afterwards students were asked to fill in a questionnaire to document their feedback to this teaching unit. The implementation activity was supported by a facilitator (a member of the BMUKK team) who acted as “observer”. She took photos, undertook short interviews with students and took charge of the survey with questionnaires.

### 2.2.3.2 STUDENTS FEEDBACK ON THE C²LEARN CO-CREATIVITY GOALS

A post implementation survey was conducted with the students, using a questionnaire. The questionnaire for students consisted of 15 questions on the basis of the C²Learn Co-Creativity goals that are outlined in the “assessment-wheel” designed by the OU team. The questions were slightly adapted and translated to be used by secondary II level students and transformed into a questionnaire with a 5-level Likert scale. Items were specified according to the rating system of school grades (“1” corresponds to “very good” = “this applies fully”; “5” corresponds to “failed” = “does not apply at all”) that Austrian students are used to. Students were asked to fill in the questionnaires after a general instruction by the facilitator. The questionnaire was explained by the facilitator and students needed on average 5 minutes to fill them in.

Some students were asked to do a short interview based on the five co-creativity goals. The interviews were done in the second hour of the 2 hours unit and students were asked to spend about 5 minutes for the discussion. The main aim was to gain deeper insight in the minds of students concerning these learning activities.

Finally, students were asked by their teacher to express their feelings by thumbs up or down.

The following table presents all 15 students’ responses to the questionnaire.
Table 5: Austrian students’ responses to the post-implementation questionnaire

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>This applies fully</th>
<th>Rather applies</th>
<th>Neutral</th>
<th>Rather not applies</th>
<th>Does not apply at all</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethics and Impact</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I try out new ideas &amp; different</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ways to do things!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can come up with new ideas!</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>I can decide between ideas that</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>are valuable or not.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intervention and Reframing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was thinking differently to</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>normal when I used the techniques</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I asked questions like “what if”</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>and how can we do this “as if”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I came up with new ways of</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>questioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Engaging in Dialogue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I ask questions with and of others</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>I question others different ideas</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>and compare them with mine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I try to find ways to work with</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>others – or work differently</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Engaged Action</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to do things which take me</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>out of my comfort zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I come up with ideas that</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>surprise me and others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can’t stop doing parts of the</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>activity again and again</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Being in Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I lead others in parts of the</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>creative process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can see how rules work and</td>
<td>10</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>that they have consequences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident to decide what</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>to do and to do it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To draw a clearer picture of the students’ impressions and the impact of this educational activity the student responses were quantified as follows and averaged:

- “This fully applies” = 1
- “Rather applies” = 2
- “Neutral = 3”
- “Rather not applies” = 4
- “Does not apply at all” = 5

The average values of students’ feedback are given in the table below.
Table 6: Averages of Austrian students’ responses to the post-implementation questionnaire

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Average (N=15)</th>
<th>Corresponding to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethics and Impact</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I try out new ideas &amp; different ways to do things!</td>
<td>1.86</td>
<td>Rather applies</td>
</tr>
<tr>
<td>I can come up with new ideas!</td>
<td>2.8</td>
<td>neutral</td>
</tr>
<tr>
<td>I can decide between ideas that are valuable or not.</td>
<td>2.2</td>
<td>Rather applies</td>
</tr>
<tr>
<td><strong>Intervention and Reframing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I was thinking differently to normal when I used the</td>
<td>3.33</td>
<td>Neutral</td>
</tr>
<tr>
<td>techniques</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I asked questions like “what if” and how can we do this</td>
<td>3.53</td>
<td>Rather not applies</td>
</tr>
<tr>
<td>“as if”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I came up with new ways of questioning</td>
<td>2.86</td>
<td>neutral</td>
</tr>
<tr>
<td><strong>Engaging in Dialogue</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I ask questions with and of others</td>
<td>2.2</td>
<td>Rather applies</td>
</tr>
<tr>
<td>I question others different ideas and compare them with</td>
<td>2.73</td>
<td>Neutral</td>
</tr>
<tr>
<td>mine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I try to find ways to work with others – or work</td>
<td>1.53</td>
<td>Rather applies</td>
</tr>
<tr>
<td>differently</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Engaged Action</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like to do things which take me out of my comfort zone</td>
<td>3.6</td>
<td>Rather not applies</td>
</tr>
<tr>
<td>I come up with ideas that surprise me and others.</td>
<td>3</td>
<td>Neutral</td>
</tr>
<tr>
<td>I can’t stop doing parts of the activity again and again</td>
<td>3.8</td>
<td>Rather not applies</td>
</tr>
<tr>
<td><strong>Being in Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I lead others in parts of the creative process</td>
<td>2.8</td>
<td>Neutral</td>
</tr>
<tr>
<td>I can see how rules work and that they have</td>
<td>1.33</td>
<td>This applies fully</td>
</tr>
<tr>
<td>consequences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident to decide what to do and to do it.</td>
<td>2</td>
<td>Rather applies</td>
</tr>
</tbody>
</table>

Although the indications in the questionnaires seem broadly scattered, the outcomes of this survey correspond with the feedback given in interviews that have been undertaken with seven of the students towards the end of their “training on job interviews” activities.

All of them highlighted that they liked to “play” with new ideas and to try out different kinds of activities as they are usually asked to do. An interesting aspect might be that they all had the impression that these ideas came up within the group – which corresponds with the rather “neutral value” for the questions “I can come up with new ideas!” and “I lead others in parts of the creative process.”

The same accordance between statements of students and indications in the questionnaires can be found for ‘engaged in dialogue’: Most of the interviewed students highly appreciated the team or group activities and mentioned that in their opinion the learning outcomes of these activities are more sustainable.

By observing them walking through the “game attractions” and solving all the tasks the impression was, that students were used to work in this way and they seemed very self-confident. This impression was confirmed by the indications to the questions “I can see how rules work and that they have consequences” and “I am confident to decide what to do and to do it”. In the interviews most of
them stated that the explanations have been very clear to them and within the team or group it was easy to fulfill the tasks.

According to the indications in the students’ questionnaires the co-creativity goals “intervention and reframing” and “engaged in action” have not so much been addressed in this educational scenario (indications “neutral” to “rather not apply”).

In summary it can be stated that the major part of this group of students enjoyed this educational unit very much, although the indications in the questionnaires prove that their individual views are vary. Maybe it can be said that they enjoyed different aspects of this playful learning. Group and teamwork activities were highly appreciated and addressed especially social and communication competences. Further students enjoyed to “play with” new ideas within the group and were happy about doing things they are usually not asked to do (although one student remarked that he would have the same learning outcome by listening to teachers’ instructions). Especially the role-play at the end of the unit was perceived differently: some students enjoyed it and would like to do activities like that more often, others stated the contrary (see indications at “I like to do things which take me out of my comfort zone”).

### 2.2.3.3 FEEDBACK AND INPUT BY TEACHERS AND EDUCATIONAL EXPERTS

Feedback of teachers and educational experts on the process and outcomes of this first in-class implementation was collected by guided discussions in the framework of two C²Learn workshops with teachers:

- One workshop with teachers was carried out on 18.09.2013 (University of Vienna), focusing on the C²Learn scenarios and creativity tools.
- One roundtable was organised in the framework of the annual Austrian eLearning Conference in Eisenstadt, focusing on the C²Learn methodology and selected scenarios.

In the framework of two C²Learn workshops a time span of about half an hour was spent on a guided discussion with teachers about the presented scenario seed Amusement Park and the specifications and outcomes of the implementation of the use case “training on job interviews”. The scenario seed Amusement Park was presented in general and the use case “training on job interviews” was outlined as an example of a concrete implementation scenario. Participants were asked to give their input and feedback in a guided discussion on the following questions:

- What do you think about the “Amusement Park” and the implementation scenario “training on job interviews”?
- Do you think about using this scenario seed or scenario in your own class?
- Do you think the impact on your students would be similar?
- Do you have suggestions to adapt or further develop the “Amusement Park” or the “training on job interviews” scenario?

In the framework of the above mentioned workshops with teachers not only the “Amusement Park” but also the scenario seed “Teleporter” was presented, which was also designed by Austrian teachers in the visionary workshops in the spring and further developed in the C²Learn summer school 2013. Besides, one teacher of these workshops came up with a new scenario – the Food chain – which was enthusiastically taken up by the other participants.

The main input was noticed by a member of the BMUKK team in order to be summarized for this report.
The responses of the participants in both workshops were very positive. They stated that this rather open scenario seed could be used for nearly all subjects and be adapted for all age groups. Some teachers working in schools with corresponding curricula mentioned that they thought about adapting this use case for (upper) secondary level. Further most of them stated that their own students would like this kind of activities as well, although 2 of them mentioned that in their schools activities like these are not commonly used and they would maybe be regarded as “freaks” by their colleagues.

Some suggestions for further developing the use case have been mentioned e.g. to run the buddy-system with older students who have some job experiences or with specific job experts. One interesting suggestion was that student should also be involved in the creative process of designing and preparing the “game attractions”.

As in these workshops also some theoretical background and the prototypes of the creativity tools have been presented to participants, they suggested, that e.g. the random word generator could be integrated as new “game attraction”. Generally they argued that the integration of a disruptive element would foster creativity additionally.

Overall, we gained the impression that the 25 participants of these workshops are very interested in playful learning activities although some of them stated, that they are absolutely not used to teach in this way and besides that, activities like that are not usually realized in their schools.

### 2.3 USER PILOTS ON LEARNING DESIGN

In the Second OU workshop, the researchers piloted the overall Learning Design, using the ‘Removing Racism’ scenario that was used as a case to illustrate the Learning Design in the respective deliverable (D 2.2.1), with additional elements of the CER techniques included (see Appendix B.2). The students evaluated their experience using the axes tool (with the exception of SE primary school due to time limitations). They did their Axes evaluation on a giant quadrant on the floor before marking their position on the A4 paper axes. They also responded to the co-creativity questions for the different tasks within the ‘Removing Racism’ learning design.
With the primary school students (10-11 years old), there was evidence from the axes task that the participation and possibility elements of the 4Ps of co-creativity were enacted and recognized to varying degrees. The children’s responses using the axes showed that they all marked themselves in the top right hand corner of the possibility/participation axes showing that at least for those two aspects of the 4Ps the children felt they were achieving well within the Removing Racism task. Those further into the quadrant gave justifications such as: “I had a lot of ideas. Lots of chances to think”, those further back towards the middle of the axes reasoned that “I am in the middle as I didn’t give that many [ideas]”.

In terms of the other four elements of co-creativity related to WHC, it is difficult to comment on how we know co-creativity is occurring as we are not clear that the ‘Removing Racism’ task does actually foster the WHC elements of co-creativity. At the time of the workshop, the task had not been fully worked up, and it was felt that it would need to be part of a larger teaching and learning set in order for it to foster creativity and/or a journeys of becoming. However from considering the children’s participation and recorded responses on paper and post-it notes from across the tasks within the Removing Racism learning design the following comments in relation to the four main conceptual parts can be made:

- **Engaging in Dialogue** *(Posing questions, debating between ideas, finding ways to negotiate conflict or to go in a different direction to others if conflict not resolved).* There was evidence of the children debating between ideas and a small number of children demonstrated a clear difference of opinion to the majority which they found ways to bring into the debate in a valid way, and go in different directions to others.

- **Being in Control** *(Taking charge of different parts of the creative process. Understanding the rules of the system and how decisions have consequences, making decisions and taking action).* It was more difficult to know whether the children were in control of the creative process in this task as it is not necessarily clear where the avenue for full-blown creativity is for the children within it. There was perhaps most potential for the children to be in control of a number of creative ideas towards the end of the task when they were debating ‘what if you were there?’ There was a mixture of levels of originality to these responses across the two primary schools with some very standard responses and some more interesting. It is notable that when the students in the SE primary school where asked how they would react to racism in if it were a digital game (“what if you were playing a digital game, how would you have reacted and why?”) rather than a real life incident (“what if you were a passer-by and saw a racist incident, how would you have reacted and why?”), their responses where more imaginative (see fig. 6) The latter might indicate that the children were more in control and therefore able to come up with more interesting ideas of their own.

- **Engaged action – being immersed in the experience** *(Being addicted to play, not able to stop. Such immersion sometimes leads to taking risks and putting forth surprising individual or collaborative ideas. Players might try parts repeatedly).* On one level the task proved very immersive and engaging for the children who took it seriously. However, there was no evidence of the children taking risks although a small number of them did put forward interesting, perhaps even surprising new ideas.

- **Attending to ethics and impact of ideas** *(Generating, exploring and enacting new ideas with a valuable impact on the community [discarding other ideas that do not]).* The children’s debates certainly contained many references to the ethics of the scenarios that they were considering. As above this led to the generation of novel or surprising ideas for a small number of children. However, it would be hard to argue that this had any impact on their community.
With the secondary students as well, there was evidence from the axes task that the participation and possibility elements of the 4Ps of co-creativity were enacted and recognized to varying degrees, although the older children were much more self-critical than the younger children and overall judged themselves as less far into the top right hand quadrant. Students who marked themselves in the top right hand quadrant provided comments such as: “I did a lot, I debated and contributed and I thought about things that normally I wouldn’t consider”; “I don’t feel as if I did as much participation because I’m not as controlling [as the student she was working with] and the possibilities I thought about things I normally wouldn’t”. Others marked themselves in the top left quadrant: “I think I participated quite well”; “I participated as much as possible but I’m quite narrow minded”. Two positioned themselves in the bottom right quadrant: “I did my best at joining worried at getting stuff wrong”; “I didn’t do much”.

In terms of the other four elements of co-creativity related to WHC, the same comment applies as for the primary data as we are not clear that the ‘Removing Racism’ task does actually foster the WHC elements of co-creativity. However, the secondary students showed evidence of some elements of co-creativity occurring as follows:

- **Engaging in Dialogue** *(Posing questions, debating between ideas, finding ways to negotiate conflict or to go in a different direction to others if conflict not resolved).* There was certainly evidence of the young people debating between ideas, and negotiating conflict in so doing. There was not explicit evidence of them taking a different direction however.
- **Being in Control** *(Taking charge of different parts of the creative process. Understanding the rules of the system and how decisions have consequences, making decisions and taking action.)* Again, it was more difficult to know whether the young people were in control of the
creative process in this task as it is not necessarily clear where the avenue for full-blown creativity is for them within it. They were able to be in control of a number of creative ideas towards the end of the task though and the students self-feedback indicated that they felt they had come up with new ideas for them. There was less opportunity for evidence which demonstrated that they understood the rules or were taking actions as a result of their decision making. Although in one school students were able to discuss different ‘as if’ actions had they been playing digital/video games.

- **Engaged action** – being immersed in the experience *(Being addicted to play, not able to stop. Such immersion sometimes leads to taking risks and putting forth surprising individual or collaborative ideas. Players might try parts repeatedly)*. The secondary students did not find the debate as emotionally intense as the 10 – 11 year olds, although they were engaged and took it seriously. There was no evidence of them taking risks or putting forward surprising new ideas, although as above two students indicated that they felt they had come up with new ideas for them.

- **Attending to ethics and impact of ideas** *(Generating, exploring and enacting new ideas with a valuable impact on the community [discarding other ideas that do not]*). The young people’s debates again contained references to the ethics of the racist scenarios. But this did not seem to overtly lead to the generation of novel or surprising ideas.

One key question remains across both the primary and secondary data in terms of knowing that co-creativity is occurring. It is going to take activity above and beyond the elements above, which in isolation do not lead to creativity, to make sure that they combine and generate “novelty which has emerged through shared ideas and actions and which involves participants taking into account the impact of that novelty”. The researchers therefore pose the question of: What needs to be done differently in the learning design that will enable this? It should be noted that two of the participants said they thought they had come up with ideas that they would not normally come up with. The researchers would not have been able to make this judgment themselves. This demonstrates the value of the self-assessment tool (although triangulation with teacher opinion would also help here).

Time is perhaps a key factor. In the piloting workshops in that there was not enough of it given all the activities being piloted, to concentrate on the core focused creative process. This would not be an issue in the ‘actual’ C²Learn environment, but it is important to bear in mind in all stages that this cannot be a ‘quick’ classroom activity and that it will need considerable embedding and time to allow space for new ideas to emerge. This is important both for its implications in designing the C²Learn scenarios and for providing accurate and adequate teacher guidance.

There may be an issue related to student numbers in that pilot workshop numbers were quite small – around 10 – this may have contributed to less new ideas emerging as there was less diversity of opinion. However this may also be to do with the groups coming from particular socio-economic groups within which there is not a great diversity of opinion in terms of racism due to a lack of experience of the issue. This raises the issue that there needs to be a good choice of scenario topic/focus in order that different groups in different areas/countries/socio-economic groups can work on ideas that are most productive creatively for them. We will need to engage teachers very closely in all three pilot countries in refining the learning design.
2.4 USER PILOTS OF CREATIVE EMOTIONAL REASONING (CER) TECHNIQUES

2.4.1 TRIAL WITH TEACHERS AT THE C²LEARN SUMMER SCHOOL

Within the context of the C²Learn Summer School 2013 Creativity and Games in Education, held in Crete (Greece) - between June 30th and July 5th - the UEDIN team conducted a Workshop on Creative Emotional Reasoning (CER) Techniques.

The participants of the Workshop were all adults with a background in education, predominantly teachers. As teachers are C²Learn’s most valued allies, their input on our techniques plays an essential role in their further development.

Going into the Workshop we had 4 interrelated aims:

- Test the use of different CER techniques in a real life context, with an actual creative challenge.
- Test whether CER techniques can be adequately explained in a short time, using simple instructions.
- Acquire feedback on the CER techniques.
- Acquire feedback on Brainstorming activities.

The participants consisted of 12 teachers (mostly from secondary education) and 2 educational content designers.

The Workshop was divided into two parts:

[A] Concise presentation of CER

- Creativity within CER’s framework
- Core principle of C²Learn’s Lateral Thinking (LTC²) techniques
- Brainstorming explained – Presentation/Explanation of the tools at the participants’ disposal [cartons, papers etc.]
- LTC² techniques explained:
  - Semantic Lateral Thinking (SLT)
  - Diagrammatic Lateral Thinking (DLT)
  - Emotive Lateral Thinking (ELT)

[B] Creative challenge

The participants were presented with a challenge: “A faraway country is being ruled by corrupt oligarchs. As a result its people are starving. Find a way to help the populace.”

The participants were divided into 3 groups. Each group would use one type of LTC² technique, drawn from the 3 types of LT respectively (i.e. one group would use only SLT, the other only DLT and the last
only ELT to tackle the same challenge). Apart from the restriction on the techniques used, the participants were free to tackle the challenge as they thought.

Each group was given pens (of different colour), sticky-notes, papers and 2 big pieces of carton to serve as their mind maps (they were advised to use the second piece to record the ideas they rejected during the process).

The only instructions for the Brainstorming activity were: [i] That it be divided into rounds and [ii] that at each round participants write down their idea(s) on a piece of paper and present it to the group. (The reason for minimalism in instructions was to see how the group spontaneously handled the rest of the decision making process.)

The creative process lasted for about 45 minutes (to simulate a typical classroom timeframe). After the conclusion of the creative process each group presented their results to everyone, with some discussion.

At the end of the Workshop the participants were given time to fill in the Workshop 5 – CER Questionnaire.

The questionnaire consisted of 3 multiple-choice questions, and 4 open-ended questions. Participants were asked to write down which of the three groups they participated in on the questionnaire sheet.

The multiple-choice questions were:

A. Was the task fun?
B. Was the task challenging?
C. Was the task clear?

Participants used a rating system from 1 (most) to 5 (least) in answering the questions.

The following diagrams provide an overview of the results:

![Diagram 1: Was the task fun?](image1)
![Diagram 2: Was the task challenging?](image2)
![Diagram 3: Was the task clear?](image3)

Figure 7: Participant Responses to the Questionnaire on the CER reasoning techniques

More specifically:

**SLT** scored intermediate/low in questions [A] and [C] (mostly 3 and 4), and high in [B] (mostly 2)

**DLT** scored high in all three questions (mostly 1 and 2)

**ELT** scored high in question [B] (mostly 2), with more mixed results in questions [A] and [C] (mostly 3 and 4 but also 1 and 2)

The 4 open-ended questions were:
D. Describe the decision making process during brainstorming. Do you feel your voice was heard?
E. What element of the task worked best?
F. What element of the task worked least?
G. Any additional comments?

The conclusions drawn from the open-ended questions are embedded in the general conclusions presented below.

Indeed, a number of interesting conclusions were drawn from this Workshop:

- A major concern reported by most of the participants was time. Many felt that the time was not enough to reach a satisfactory conclusion. This is a concern that we have taken to heart as we further develop our techniques and the game(s) associated with them.
- Taking into account certain language barriers (the Workshop was conducted in English, which was not the mother tongue for the majority of the participants), the groups responded quite well to the instructions provided. The SLT and DLT groups were able to work with their respective techniques productively. The ELT group faced more problems, but that was expected as ELT was still in its early phase of development.
- In all three groups the participants recorded that they were able to voice their opinion, and used mostly dialogue to negotiate through the different phases of the Brainstorming activity. The ELT group reported that they eventually had to resort to voting in order to reach consensus.
- Out of the three groups the DLT group seemed to have capitalized on the experience more. Of course group chemistry/dynamics played an important role in this, but there were also indications that the visual elements (drawings, manipulations of shapes etc.) played a major role in this group’s experience.
- It is interesting to note that despite the simple structure of the challenge, the majority of the participants rated the experience as challenging (giving it a 2). Time, group interaction and unfamiliarity with the techniques were amongst the prime reasons alluded to in the commentary.

2.4.2 TRIAL AT THE OU SUMMER WORKSHOPS

In the first OU workshop, the researchers evaluated a diagrammatic lateral reasoning task based on the process of remapping, which is described in D 2.1.1. [see appendix B.1.].

Students worked on the basis of the scenario ideas that they had developed in the fall on the theme of equality (see D. 5.1.1 ). As they were new to the project the 11 – 14 year olds at the SW secondary school did not try out the diagrammatic reasoning task.

Students were first presented with an image that shows the pyramid structure of an unequal society, and asked to reflect on their scenarios in relation to this graphic. Then they were asked to consider three additional diagrams representing a moebius strip, an atom and a honeycomb structure. Finally, they could use what they did to create different opportunities for change and greater equality within their scenarios. After completing the activity students were asked to evaluate it.

The diagrammatic lateral reasoning task was very well received by the primary school students. The students engaged well in the process and were able to work through the reasoning task. The children were also able, to a certain extent, to use what they learned from this task to develop their scenarios.
indicating that some of them at least perhaps understood that they had shifted their thinking in some small way. In the SE primary school one group of girls re-organised society, to make it more equal, as an atom. In relation to the atom they stated:

- Money is in the middle
- There are walls in way of the money
- Equal money is every part
- Kings and people have same amount of money

This same group also stated they did not like the honeycomb structure, because:

- Alone with problems
- Separate
- Gaps separating (the hexagons)

One group described a new from of society using all of the diagrams (but spent the most time on the moebius strip).

![Figure 8: Students and Teacher at the SE primary school during the Diagrammatic Reasoning Task](image)

The intervention and reframing activity was also very well received by the 11-14 year olds in the SE secondary school. They were highly engaged throughout the process and this activity accounted for about 70% of time in Workshop 1. With the secondary students each group was given one of the three diagrams. They were not able to choose which diagram to use, like the primary students. Their responses and discussion often reproduced the hierarchy in the original diagram, but often they struggled to engage in some ‘what if’ thinking. The two teachers present worked with different groups and roamed between the groups. There was robust discussion and agreement/disagreement.

![Figure 9: Students and Teacher at the SE secondary school during the Diagrammatic Reasoning Task](image)
The students seemed to make good use of the series of questions, which guide their interaction with the diagrams (see appendix B.1). The only question that was not fully exploited was: “Can you think of ways to transform it?” Kids took this as a conceptual question, i.e. they thought of ways to change the diagram in connection with its meaning, whereas the idea was for a more visual transformation. But this is understandable, as the diagram (the social pyramid) was highly charged with meaning in the first place.

Overall, there were very interesting discussions about the diagrammatic reasoning tasks and students and teachers all agreed that the activity did push them to think differently.

### 2.5 USER PILOTS ON EVALUATION METHODS

The OU team included in the workshops piloting activities to explore students’ understanding and reception of the Co-Creativity Wheel (see fig. 4) and the Axes (see fig. 4), two of the evaluation tools that are being developed for the Co-creativity Assessment Methodology. They were interested both in piloting the tools and in examining whether the co-creativity criteria were meaningful to the participants.

#### 2.5.1 EVALUATION OF THE CO-CREATIVITY WHEEL

The Co-Creativity Wheel was introduced and explained after the review and elaboration of the C²Learn Co-Creativity framework (see Appendix B.1.). Then students first worked in small groups who each focused on one segment of the Wheel, to make sure they had figured out what it meant to be able to explain it to the rest of the group in terms of examples from their scenarios. The students were asked to write around the wheel, if they thought that there were better ways of phrasing what was on the Wheel.

The students tested the Co-Creativity Wheel in the context of LIM, a very simple maze game with multi-coloured squares that explores themes of violence, conformity and exclusion (see [http://www.gamesforchange.org/play/lim/](http://www.gamesforchange.org/play/lim/)). The students had been asked to play the game in preparation for the workshop, and were also given ten minutes during the workshop to play the game. The 11-14 year olds at the SW secondary school played Stop Disasters, instead, a game about developing areas responsibly to minimize the toll of natural disasters (see [http://www.stopdisastersgame.org/en/home.html](http://www.stopdisastersgame.org/en/home.html)).

The students were asked to use the Wheel to decide which parts of co-creativity they could do in the game that they played, by putting a tick, a cross or a question mark on the wheel for the parts that they felt worked, didn’t work, or they were not sure about. The closer the check to the centre of the wheel indicated stronger agreement. They were also instructed to write down explanations next to their choice.
Students were also asked to use the Co-Creativity Wheel in the scenario evaluation (as described in section 2.2.2 above), again using the tick, cross, question mark system in the same way that they did with the game.

After completing these tasks, the students were asked to evaluate the Wheel itself: what they liked about it, what they found difficult and what they would change.

The ability of the primary school students to use the Wheel was generally sound. Most 10-11 year olds understood the principle of colouring in or writing onto the Wheel to indicate whether they felt LIM allowed them to achieve on a particular co-creativity feature a bit, a fair bit or a lot. Some students did not mark on the wheel but wrote an explanation of what they thought in relation to a particular feature. This indicates that although they understood the thinking principle behind it they did not follow through and mark on the wheel the representation of their thinking.
The feedback on using the Wheel from the primary school students (10-11 year olds) was mixed. On the positive side, students offered comments such as “good variety of questions”, “it made you think hard”, “colourful, good amount of questions, choice of answers, explanation”, “it was good because it gathered your thoughts”. However some students said they simply did not like it, with two saying that there was “nothing” good about the wheel and a third saying “I didn’t think the wheel was a good idea”. Others gave some useful criticism as follows: the three box structure was quite confusing; writing was too small; some of the writing was confusing and too hard – they wanted easier questions; some wanted more questions and choices; some wanted it online; the tick, question mark and X was a little confusing; hard to read.

The secondary school students’ ability to use the wheel to evaluate Stop Disasters, LIM and the scenarios was generally sound. Their filling in of the wheel shows that unlike the younger children they all understood the breakdown of features, and the gradation of amounts that might be demonstrated through colouring in or ticking.
Figure 13: Use of the Co-Creativity Wheel SE Secondary school students to evaluate LIM

The feedback on using the Wheel from the secondary school students (11-14 year olds) was also mixed. On the positive side, they commented that “It tells you what elements you need”; “enjoyed grading”; “it helps you understand a bit more”; “you can easily break down the game and look at different ideas”; “it splits up sections and makes them easier to understand”; “the wheel is helpful because you keep referring to the criteria of the game”; “it helps you when you get stuck”; “very colourful”; “easy to see how much you like the game”; “it is not really very difficult, it is just ticking boxes”; “easier to get practical information afterwards”.

Others gave some useful criticism as follows: “some of the titles are hard to understand”, “some sections are very wordy”; “the words could be bigger”; “it is sometimes confusing in different tasks”, “it is hard to actually know if you’re doing some of them”, “lots of the criteria are difficult to understand, you’re not always sure what they mean”; “make it clearer to relate to games more”; reframing part does not seem to be about a game; it seems like a checklist, “make it a table not a wheel”.

In summary, the Wheel seemed relatively positively received but the key areas for improvement are:

- Work on age specific wording
- Make the labeling of the 3 boxes clearer
- Simplify where possible
- Enlarge the wheel
- Make its purpose explicit and try not to overuse it for different aims
- Consider whether an online version would work alongside a hard copy
- Consider how it might be made more ‘game/environment’ appropriate but still be useable across sites/scenarios etc
The data set indicates the students understand how to use the Wheel, but may not have had time to fully understand the different categories to assess their gameplay. Further testing of the instrument is definitely needed. We need to better ascertain the extent to which the students really understand the different statement that fall under the 5 element of co-creativity.

It is also important to think about how the wheel is standardized or if this needs doing. What do very high amounts or low amounts of each feature look like per se in C²Learn? It is not clear that there was any consistency on this in the way that students used the wheel. This is completely varied across these workshops, although students did understand the basic meaning of each of the criteria.

### 2.5.2 EVALUATION OF THE AXES TOOL

The Axes tool was also piloted in the context of the ‘Removing Racism’ scenario, during the second OU workshop. They did this task on a giant quadrant on the floor before marking their position on the A4 paper axes. After completing the ‘Removing Racism’ scenario and using the Axes tool to evaluate it, the students were asked to comment on what they liked about it, what was difficult about it and what they would change.

In general the primary school students found the axes tool useful and fun and liked its simplicity. Some suggestions for improvements were made including: more explanation of what the terms mean, having an online version and having more options (although this goes against the simplicity point above).

The secondary school students also found the axes generally useful, with such comments as: “it’s good to be physical”; “I think they are good to reflect on what and how much effort you put in” “makes you think even more, if you didn’t contribute it makes you want to”; “it’s good to reflect on”. They also enjoyed doing the large scale physical version. Suggestions for improvements included: using a -10 to +10 scale, using different vocabulary to describe the axes, labeling what the points mean.

### 2.5.3 HOW WELL DO THE CO-CREATIVITY CRITERIA WORK?

Besides the tools themselves, another question was whether the students using them understood the co-creativity criteria that they represented.

From their use of the co-creativity questions (see appendix B.5.) and the Wheel, it is evident that all the 10 - 11 year olds were able to understand and use the co-creativity features derived from WHC in order to evaluate other games (LIM and Stop Disasters) and the C²Learn scenarios. Some were also presented with the CER criteria (intervention and reframing) and were able to understand and use these too within the Wheel.

All the 11 – 14 year olds were able to understand and use the co-creativity features derived from both WHC and CER in order to evaluate other games via the list of co-creativity questions and the wheel, and evaluate selected C²Learn scenarios via the wheel. The 11 – 14 year olds in the SW secondary school were also able to use the co-creativity criteria to generate the features of their own new scenarios. This task was carried out relatively quickly at the end of their first workshop but below are some examples of the features that they designed into their scenarios:
2.6 USER PILOT ON GAME DESIGN

In October 2013 we conducted piloting activities of the preliminary game design (D 4.1.1), in a series of sessions with our core group of teachers in EA.

For this piloting activity we used the preliminary game design sketch (D4.1.1, fig. 26 reproduced here in appendix D.1.) and developed a script for going through it with the participants. We selected this version of the game design to pilot, while being aware that the game design process is on-going and the sketch represents only a preliminary conception of the C2Learn gaming environment. However, it represented the more fleshed out game design proposal at this point in the project and it is was for us a good candidate for eliciting user input in that it contained concrete versions of several elements of the environment described in the abstract in the DOW (e.g. the tool suite, the shared space) as well as specific elaborations of game elements that the game design teams are considering the C2Learn framework (e.g. game patterns that can foster creativity, scaffolded game construction by the users, multiple games on a theme etc).

The sketch therefore served us well in that it grounded the discussion about several game elements and ideas that are important for C2Learn, enabling participating teachers to envision them more specifically in their educational context and provide answers that are useful input for moving ahead even if the design changes substantially. Indeed we prefaced the activity by emphasizing to the participants that this is not ‘the game’ but a preliminary proposal for the C2Learn gaming environment and that we expect to receive presently other designs as well to try out and evaluate.

2.6.1 PARTICIPANTS AND PROCESS

There was a total of 11 participants, three teachers together with the principal from the elementary school, and 6 teachers from the middle and high school together with the high school principal.

The duration of a piloting activity was approximately two hours, with additional time spent by the participants on their own. To accommodate schedules the activity was repeated three times with different groups: the elementary school group worked together, while the middle and high school group was divided in two.

The main activity took about 1.5 hour, in one or two sessions, depending on schedule. A script created in advance and used flexibly during the sessions consisted of the following:

- **Set the stage**: we gave a summary of the progress in the project so far, especially with respect to game design and how it ties in with the work of our core group and with the
present request for input; then we assigned to the participants the role of clients evaluating the proposal and asked them to specifically envision that this is something they would use in their work and think if it would be functional and useful.

- **Overview of the game design sketch**: we gave to each participant a color printout of the sketch presented briefly the four main areas of the proposed environment: the *Creative Suite*, the *Shared Space*, the *Game Template* and the *Games*.

- **Walk through the game design sketch**: we ran through the whole sketch in detail, starting from a theme (what is called a creative prompt in the sketch), that was relevant to the group we were working with, e.g. geography with the primary school teachers. In some cases a participant volunteered a theme and we used it. In going through the flow of the sketch we avoided assigning particular tools and activities to either teachers or students, speaking generally of users, as we didn’t want to constrain the scenarios of use that the teachers would consider. With respect to the *Creative Suite* we described the semantic tools that the teachers were familiar with from a prior workshop and a mixed initiative procedural content generation tool. With respect to the *Game Template* we gave brief descriptions of the game patterns that we considered more relevant and accessible, based on prior scenario work and consortium discussions, namely storytelling, cooperation, conflict, resource management and character-based role play. We only gave explanations of the remaining patterns if asked. We emphasized how the *Creative Suite*, the *Shared Space* and the *Game Template*, would function together to enable the generation of playable *Games*. Finally, with respect to *Games*, we explained the idea of enhanced board games played on tablets, and the idea of generating several games that elucidate a theme from different perspectives.

- **Q&A**: we encouraged participants to pose any questions they had, or to identify anything that they found unclear. We took notes on the questions posed, as they constitute important input and gave answer when it was possible at the present level of specificity.

- **Critique the proposal**: first we asked participants for their general critique and opinion; we reiterated the client assignment and asked again if this would be useful and useable in their work, noting down the main points; then we distributed the teacher input form and summaries of the scenario seeds and we used them to structure the remainder of the discussion, while flexibly following up on the points that arose and again noting down the main points raised.

The participants took with them their color copy of the sketch, summaries of scenario seeds and the input form to reflect and complete. We had additional half hour follow up sessions, per participant request to provide clarifications, while they completed their forms.

### 2.6.2 FINDINGS

The teacher inputs reported in this section were compiled from the participant forms and the researcher notes during the discussions. We present together the key points made by both in the elementary school teachers and the middle and high school teachers, while also focusing on some informative differences between the two groups.

The teachers unanimously said that this environment could in principle serve all the scenarios that they have worked on in the previous year. However they pointed out that it was so open-ended as to accommodate any scenario, therefore in practice a lot depended on the specific tools and functionalities for the implementation of a scenario.
The teachers appreciated the fact that the environment was open-ended and gave them many degrees of freedom to be creative. However, they saw two potential inhibitors to making use of this freedom.

First, what was aptly called the empty box problem: an environment may have a lot of potential, but that they will not know what to do with it, if it comes to them as an empty box to fill. The teachers felt that they would be best served if the environment started off with some ready-made games (from experts or peers) and game assets, that would serve to them as working models, but they wanted to be able to change these using the creative suite and the game templates. They used the analogy of LEGOs. A LEGO set comes with a specific blueprint about what you can build with it. But as you start to build it you may deviate from the plan. And as you buy many LEGO sets and you start mixing them you create new buildings without a blueprint. Similarly, starting from specific blueprints for games, would enable them to eventually build their own.

Second, a recurrent concern was the time and effort investment required, both in terms of teacher preparation and in terms of classroom activity. They pointed out that if the tools for making game assets and the game were too hard to learn and to use and if the whole process was too complicated most teachers would not consider it worthwhile to make their own games. Providing the freedom, while simplifying the process was viewed by many as the major challenge for such an environment to work. They also emphasized the constraints posed by the curriculum and the timetable, especially if the topic of the game-based activity is not such as to easily justify the additional time allotted in the classroom. These latter concerns get more pronounced in high school.

Time and effort considerations were discussed extensively in reference to the Creative Suite. They generally appreciated the creative potential of the tools, but they emphasized that a lot depended on how useable the tools were and the amount of time they needed to spend in the Creative Suite. Too much time spent there, either by teachers or by students, could be a problem, especially if it was about trying to figure out how to use the tools. “if it takes two months just to create the game pieces, we will not use it”. There was also some concern that children may get distracted by irrelevant material.

There were a lot of questions about what kinds of assets the Creative Suite would generate, what kinds of assets it would start with and what kinds of assets could be imported. For example, the teachers emphasized that tools that start from drawing lines and such would be probably problematic in terms of time investment. They would rather have tools that start from given elements that they can select, mix-and-match or alter, having the starting from scratch only as the last resort option. In addition, it was suggested that an important missing piece is the capacity to design game terrains for their games; for example they wanted to be able to set their game on the map of a geographic area.

There were fewer questions and discussion about the Game Template, besides asking again for explanations for some game patterns. Some teachers suggested that they probably didn’t have a clear conception of what they would be like, “this is a new thing and we will slowly get to understand it”. A recurring question was whether these patterns could be combined, e.g. role-play elements in a resource management game.

Another recurring suggestion that relates to the Game Template, is to be given tools for defining and changing game rules, not just the game assets. Indeed, some teachers suggested that this would be very important for the students to be able to do, in order to exercise their creativity: the challenge with respect to creativity is getting students to the position where they take initiative and make decisions rather than follow the rules. So changing a game and the tools to change a game might be a very useful pedagogical tool.
All teachers emphasized the importance of the Open World component. They stressed the importance of a persistent shared space component that would allow games and assets to accumulate. They suggested repeatedly that not only assets generated in the Creative Suite, but full games generated with the Game Palette should be shared in the Open World. They said that accumulation and re-use is a very important for the long term usefulness of the environment. They also valued the potential of such a space for sharing with colleagues and communicating with others about their work. They suggested that some sort of social annotation on games by previous teachers who have used them would be very helpful. These would capture the educational scenario of implementation as well. They also stressed that they would like to be able to modify games made by others and provide annotations to explain these changes. They also liked the idea of adding to the shared space and also going back to things that they have made before and advance them further.

They also wanted to know what assets would be available in the environment to start with, before the user-generated content begins to accumulate in the Open World. They pointed out again that this is related both with time considerations (being able to adjust the use of the environment even in relatively short units) and with the need for a framework to counter the ‘empty box’ problem.

Overall, participants puzzled a lot over which parts of this environment would actually be integrated in classroom activities and which parts would be used in preparation of classroom activities. At one end would be scenarios that rely on teachers using the environment to create games and only bringing the final product, i.e. the game, in the classroom; at the other end would be going together with the students through the whole process of conceiving, designing and playing a game. They pointed out again that very much depends on the time required for moving from conception to playing the game. Some teachers suggested that if too much time was allocated on making the games, they would not have time to play games, which would be disappointing form the students. Others pointed out that in the long run, if the environment allows for games to accumulate students would play the games made by their peers in the previous year and in turn create games for their peers next year. In effect, teachers wanted the flexibility to be able to build activity units both around playing games and around designing games, but they pointed out that time constraints would make it unlikely that both occur in the same context.

In any event, participants discussed many scenarios for using such an environment that deviated from the flow of activity presented in the sketch, both in terms of sequence and in terms of end-user roles. For example, they discussed different ideas about which areas would be used by the teachers and which they would be used by the students: e.g. teachers might use the Creative Suite, students may use the Game Template, and either or both could participate in the selection of assets to go into the Open World.

They also anticipated that educational scenarios might use different subsets of the environment. For example they suggested that Creative Suite might be more appropriate with certain game patterns than with others, e.g. in a storytelling game you would be more likely to want to design your own cards, but in other instances designing game pieces would be a distraction from focusing on understanding how the game works. Or, they suggested scenarios where they would start from an existing game and change the game pieces to adjust it to different subject matter, in which case the Creative Suite would be useful primarily because it would enable them to adjust existing games to new content or to their own ideas.

They repeatedly emphasized that they would want to be able to make changes in games at any point, in effect moving in different ways along the path illustrated in the game design sketch, between the Game Template, the Open World and the Creative Suite. Being able to invoke the Creative Suite, the
Game Template and the Open World in any order and have them all interconnected, was a suggestion that came from most teachers.

Beyond the above observations that were common in both the elementary school group and the middle and high school group, there were a few notable points of divergence.

The elementary school teachers saw the Game Template rather than the Creative Suite as their entry point. They felt that it would make more sense to start by saying “I’m thinking of making a storytelling game for such-and-such theme”, have some ready-made assets to setup the game with their students and then go back to the Creative Suite and design together the game pieces and other assets that they might want specifically for their game. They also thought that the activity of designing game assets for a specific game made more sense that the activity of designing game assets for a theme in general.

In contrast, several middle and high school teachers said that they would rather start from the Creative Suite than a Game Template. They felt that they didn’t want to start with a game template and have students design to the game they themselves have chosen, because that again would be regimented and limiting. They would rather have students start by selecting something for themselves, creating something that they choose to create, therefore starting from their own ideas. They said that given an open prompt and an opportunity the kids are very creative. They envisaged scenarios for which they saw the applicability of the Creative Suite, as they involved a stronger element of producing a collection of material using various sources, making links and connections among disparate concepts that can be relevant to the topic and culminating into a creative outcome. Indeed, several teachers stated that they could engage their students in games exclusively with the Creative Suite. They said that such a process has a lot more potential it is more attractive, though they do worry that it can become chaotic and may not be feasible — a more regimented process is feasible but not as creative. They also came back to the main constraint of time: time to allow for process; taking the time to be creative.

The elementary school teachers also raised more specific pedagogical concerns, about students’ collaborative work. They cited as possible challenges, collaborating in group projects, competition and conflict within and between groups, playing by the game rules and abiding by the team rules, dealing with dominating students and students that insist on their own creations, making sure that all voices are heard.

These differences may correspond to the different age groups that the teachers are working with in elementary school vs. middle and high school respectively, to their different pedagogical experiences and training, but also to how strong a need they perceive for making space for creativity in the school day.

Finally, there was some skepticism from some participants about the necessity of a digital gaming environment to support the playful learning activities illustrated in the sketch. They were concerned of pervasive use of technology, and the image of people glued to screens, not responding to people around them, not being aware of their surroundings. Especially, some of the middle and high school teachers who have experience with playful and creative activities pointed out that the ideas on the sketch were very good, but they could be implemented with physical material and face-to-face activity. For example, one teacher suggested that it would be possible to simulate mixed-initiative PCG through the social organization of activity in the classroom. They were concerned that the digital environment may introduce just another layer of structured activity on top of school routines, hindering spontaneity and in that sense getting in the way of playfulness and making them less responsive the genuine creative needs and processes of their students.
In summary, the overall reaction to the game design sketch was positive, but participants pointed out that, whether such an environment will be actually workable in a school context or not depends on how many of its specifics will be designed. Usability of the available tools is key, especially with respect to the open-ended construction functionalities proposed. It is also important to provide accessible entry points, such as model games that can serve as blueprints and the shared space for sharing and accumulation of their creations. There also need to be provisions of flexibility that would allow them to expand and contract the game-based activity supported by this environment.

2.7 USER PILOTS ON THE COMPUTATIONAL TOOLS PALETTE (CTP)

2.7.1 TRIAL WITH TEACHERS AT THE C²LEARN SUMMER SCHOOL

In the context of the “Games, Learning and Creativity”, Summer School organized by EA in Crete, the NCSR-D team conducted a piloting of the semantic tools. The Computational Tools Palette (CTP), a stand-alone application for invoking the developed services, was provided to participants. They were asked to form five groups of 4-5 people in order to perform collectively two distinct tasks, whose solution could be assisted by the usage of the computational tools. The first task was to make up a story on an arbitrary initial theme, using results from the Random Word Generator (5 words) and the Image Finder (3 images) services. The second task aimed at the building of a Mind Map with the support of the Information Summarization service (choosing 3 words from the cloud of terms returned). Participants were able to complete these two tasks meaningfully. More details on this piloting activity, from the technical perspective, are provided in Deliverable 3.1.1, Annex A.

From a theoretical perspective of fostering LTC², however, an analysis of the selected RWG task, not the RWG tool itself, presents certain problems. It appears that, though people successfully engaged with the tool and completed the challenge of creating a story, there was limited consideration of the lateral semantic possibilities of the words generated by the tool. This may have to do with the use of a large number of words (5 words) and with the challenge itself – finding a way to include the words into a story even superficially. Less words (even just one), in the context of a challenge that invites people to explore more of the conceptual possibilities each word has to offer, would probably lead them to engage with the word more deeply.

This raises the point that the strategic use and purpose of CTP tools is not implicit within them and we need better to understand how they can be integrated with CER techniques in activities that foster co-creativity.

2.7.2 TRIAL AT THE OU SUMMER WORKSHOPS

The Computational Tools Palette (CTP), specifically the Random Word Generator was tried out in the OU workshops, in the Context of the ‘Removing Racism’ scenario, in the second workshop (see Appendix B.2.). The students used mostly the Random Word Generator, as the images from the visually-based generators were blocked by the school’s firewall.

The participants were encouraged to use the tools as they were working through the creativity challenges of this scenario. Thus, students were asked to use the RWG either in developing their definitions of racism or in considering possible responses the racist attacks.

The experience of student groups with the RWG varied as they used the tool at different stages of the activity. For example, one of the younger groups (10 year olds) in the SW primary school, who had little direct experience of racism and struggled to think of more than one example of what it might
look like in reality, used the Random Word Generator. Each student was given a word to use in the
generator that the researcher had previously tested. Then students choose to work with one or more
generated words for their brainstorming activities. Their discussion was documented in post-its.
Analysis demonstrated that the tool was useful to open up their thinking.

On the other hand, one of the secondary groups was asked to use the RWG to explore possible
responses the racist attacks. The students found it very difficult to use the tool in the process to help
them think further. They were given words to use by the researcher (e.g. black, white, bridge etc).
For example one of the words that was generated for the student using ‘white’ was ‘tweed’ which
they chose to use to help them think about their racism scenario and which they found very little in to
help them develop their thinking on the task. They were literally unable to generate any
new/different responses to the two questions asked. When prompted to step back and help the
researcher to understand why the RWG had not been helpful here the students and their teacher
were incredibly insightful. In discussion they suggested that the tool might be better suited to help at
points in the task where you needed to open out rather than hone down your thinking.

Overall, it seems that students used the words generated by RWG as a device to think associatively,
but they were not always able to capitalize on that in order to create new ideas and solutions.

The students also offered feedback on the tool. Positive comments included: “random and good to
use”, “funny” and “learning new words”. Negative comments included: “too random”, “it has a lot of
bugs”, “it isn’t very accurate” and “confusion”.

An important concern to be noted is that the RWG generated some words which were highly
inappropriate for children and young people. Some kind of filter needs applying to it.

Another factor to be taken into consideration is that schools generally have firewalls installed to block
what may be unsafe content. During the OU workshops, this affected the two visually based
generators, as the students could not always access the images proposed by the tools. It is useful to
provide this information to schools though it is unlikely that they will want to change the typical
restrictions, as the firewalls are in place for safeguarding reasons.

Further collaborative work is needed between OU and UEDIN to think strategically about how the
random stimulus tool and indeed the full set of CER tools can be used most effectively to facilitate co-
creativity within the activities and the wider unit. This is not to do with the CPT itself, as the strategic
use and purpose of these tools is not implicit within them and information will need to be provided to
potential C2Learn users/facilitators on how to most effectively integrate the tools within pedagogy.

3 Conclusions and future directions

Overall, the variety of trials and evaluation activities in the introductory pilot cycle provided
informative, albeit tentative input about various aspects of the project that has important
implications about the way forward. Specific implications are already discussed in the respective
sections above. Here we highlight some key points and offer some more general implications.

The preliminary Educational Scenarios were generally well received by teachers and students. The EA
pilot, illustrated that some scenarios were consistently seen as having more creativity, game-based
learning and classroom use potential than others. The features that the most appealing scenarios
have in common should be taken in consideration for further scenario development. The BMUKK pilot
demonstrated that such a game-based scenario is feasible to implement within regular school
constraints and agreeable to teachers and students. However, as demonstrated most notably by the
OU pilot, it is still not clear how these foster co-creativity as defined within C²Learn: an active process of change nurturing transformation / self-transformation. The bigger picture of the scenario then must not be lost. The choice of scenarios will need to be carefully made and further alignment between Learning Design and Educational Scenarios development is imperative. We will need to engage teachers very closely in all three pilot countries in this process. These issues are further addressed in D5.1.2.

With respect to Learning Design, the key challenge is to make sure that we design activities that catalyse co-creativity, defined as “novelty which has emerged through shared ideas and actions and which involves participants taking into account the impact of that novelty”. To address this challenge the Learning Design pilot experience should be taken together with the findings from piloting CER techniques, both within the learning design and independently. CER techniques, particularly the diagrammatic reasoning task, were not only appealing to participants, and generative in terms of new ideas, but also revealed their potential as co-creative activities for engaging in dialogue. It appears that within the cultural and ethical frame of WHC, CER techniques can serve as the catalyst of generativity and novelty advancing the C²Learn goal for co-creativity. A better integration of CER techniques into the Learning Design would also guide a more effective integration of the Computational Tools the tools within pedagogy, so that they can be used to facilitate co-creativity.

With respect to the Evaluation Methodology, the need to aim for simplicity in data collection tools addressed to students, standardize and clarify concepts for users and fit data collection tools to purpose, were the main implications of the piloting activities.

With respect to Game design, the overall reaction to an open gameworld that offers many degrees of freedom to its users was surprisingly positive on behalf of teachers. However, participants pointed out that, whether such an environment will be actually workable in a school context or not depends on how many of its specifics will be designed, to make it easy to use, flexible to adapt and to provide accessible entry points for novice users. They also emphasized the importance of a persistent shared space that would allow accumulation and re-use, which is very important for the long term usefulness of the environment. They also valued the potential of such a space for sharing and communicating with colleagues. Another recurring theme is the pedagogical potential of modifying games, changing game rules not just the game assets, as an exercise in creativity.

A final note is that time, as a limited resource in education, was a recurrent theme through several piloting activities. Time is perhaps a key factor: in the piloting workshops, in that there was not enough of it given all the activities being piloted, to concentrate on the core focused creative process; in the development of the ‘actual’ C²Learn environment, in that it is important to bear in mind in all stages that this cannot be a ‘quick’ classroom activity and that it will need considerable embedding and time to allow space for new ideas to emerge. This is important both for its implications in designing the C²Learn scenarios and for providing accurate and adequate teacher guidance. It is also going to be important for subsequent piloting cycles, that need to provide for more extensive exposure to the C²Learn environment. Indeed, this may be one of the major challenges not only of the C²Learn project, but of the quest to foster creativity in education more generally.

The subsequent cycles of piloting will of course be more unified and more fully integrated as they will be informed by a robust Co-Creativity Assessment Methodology, making possible stronger conclusions about the adequacy of the C²Learn approach for fostering creativity in education. A better integration of learning design, game, tools and evaluation methods within educational scenarios, en route to the development of the integrated C²Learn environment is also an important priority in preparation for the upcoming piloting cycles.
Appendices

A. DETAILS AND MATERIALS FROM THE EA SUMMER SCHOOL PILOT

A.1. THE ACTIVITY SHEET DISTRIBUTED TO THE PARTICIPANTS

Recently, we have started working with teachers and students on fostering creativity through game-based learning. They came up with some initial game ideas that could be developed into full-fledged educational scenarios.

We call these ideas scenario seeds. We would like to invite you to use them as material for reflection during this summer school.

So, please, read the short summaries below and answer the following reflective questions.

Basic Questions

1. Choose four scenario seeds that you think have the best potential to foster creativity in learning. List their titles and, if you’d like, give a short explanation for your choice.

2. Choose four scenario seeds that you think can be turned into an engaging game that your students would enjoy playing. List their titles and, if you’d like, give a short explanation for your choice.

3. Choose four scenario seeds that you think it is more likely that you would actually use in your classroom. List their titles and, if you’d like, give a short explanation for your choice.

Additional Questions

4. Choose up to four scenario seeds that you think can be combined in an interesting way in a new educational scenario. List their titles and, if you’d like, give your ideas of how they would be combined.

5. Choose four scenario seeds that you think can better serve a variety of subject areas. List their titles and the relevant subject areas.

6. Any other thoughts, comments or observations on these scenario seeds, or on educational scenarios in general?
Scenario Seeds

1. RESCUE MISSION

There are two teams: the ‘lost’ team and the ‘rescuer’ team. The lost team needs to (a) find ways to survive and (b) orient themselves, figure out where they are and convey this information to the rescuer team. The rescuer team needs to (a) assist the lost team in figuring out where they are and (b) assist them in their efforts of survival (c) devise plans for their rescue. To achieve their missions the teams need to play with knowledge from geography, but also of history, maths, etc. in order to find solutions, devise strategies and decide on moral dilemmas.

2. ‘SURVIVING GLOBAL WARMING’

Players take on multiple roles (citizen, mayor, engineer, builder, etc.) who are trying to survive global warming by changing things to emit less carbon dioxide. The goal is to create a village to survive together. The following are some of the important dimensions: territory (properties of particular land for building on, e.g. by sea’s edge), building resources (different materials and designs, e.g. solar panels), lifestyle choices (e.g. how to keep warm, what to eat, what the local economy is based on), crops and land use options.

3. THE TELEPORTER

The game is designed as a space environment with different planets. Starting point is the space mission. The player can choose via the teleport gate on which planet they want to travel. There they are presented with a set of specific challenges. As they progress, players gain more energy for the Teleporter to travel to planets in a greater distance. There is a collaborative element in the game. The following is an example of how this might work: several groups of space troopers travel to a planet. The aim is to find a hidden area of the planet to gain special energy for the teleporter. Challenges would include: to make the planet human-friendly, so that exploring can start; to talk to inhabitants in order to find the hidden place; to extract the special energy etc.

4. WHAT LIFE? WHAT EUROPE? WHAT WORLD?

Players make decisions on changes to make in the world that they live in and that has consequences (1) to the state of their world (2) to their own quality of life. There are different regions in the game with different characteristics and the players’ choices affect their well-being differently. Choices include: environment, research, everyday life etc., and give rise to moral dilemmas. An important element of such a scenario is engaging students in puzzling over the complicated and often incalculable consequences of decisions, and going beyond the obvious good or bad.

5. ‘GIRLS’ RIGHTS MARCH!’

The players assume the role of campaign organizers trying to achieve better rights for girls by organizing a campaign march. They have a budget to cover advertising, safety concerns and they can raise resources. They may do such things as running ad campaigns. They may interact with someone who does not agree with them and have to persuade them to see their point of view. The game might also be framed as happening in different countries which would mean different kinds of campaigns were needed in different countries.

6. THE AMUSEMENT PARK

The “Amusement Park” consists of various stations. These stations are game attractions in the amusement park for example House of Mirrors, Ferris Wheel, Merry-Go-Round, Labyrinth, Roller
Coaster, Tunnel of Horror. In each game attraction different tools and challenges are available for the players, who walk through the Amusement Park and set their own pace. They choose topics and play in order to advance Teamwork is an integral part of most activities, therefore players have the possibility to choose their partners in the House of Mirrors. This game can be used to elaborate a specific topic or as an educational instrument to consolidate knowledge. For example it can be used by teachers to instruct students to solve several tasks in a certain timeframe.

7. BEING A GENETIC ENGINEER

Genetic engineers want to create a genetically modified fruit. The game includes the processes of genetic engineering. However, opposition to the genetic engineering project introduces risks and dilemmas. For example farmers may accept or refuse to introduce the genetically modified variety, may raise concerns about the “contamination” of other orchards, etc. Different players with different roles may introduce different solutions. Roles may include researchers, food industry representatives, consumers, farmers, politicians, priests, philosophers, eco-farming proponents and environmental activists.

8. ‘DANCE GAME!’

Players assume the role of dancers who are trying to dance and experience what it is like for other people who are different from them (e.g. in shape, size and ability) by competing in a dance competition. In addition, gameplay will enter a dance competition and dance as different sizes or avatars (‘fat’, ‘disabled’, ‘thin’, ‘very tall’, ‘very short’) so they can learn to change the way they think about others.

9. SPACE MISSION

Players assume various roles and collaborate for successful space missions: some players are astronauts; others work in the control room and guide them through their mission. There are various missions that include research challenges concerning various celestial bodies and necessitate the use of astronomy concepts. Such a game could encompass several sub-games, beyond science: these could touch on social, psychological, moral and religious themes, management of resources in a closed system etc.

10. REMOVING RACISM

The player assumes the role of a ruler in a fictional country that is highly racist and has to try to stop racism. The game starts in 1968 (death of Martin Luther King. Jr.) and ends in the present day. The player runs campaigns to persuade people to eradicate racism and tries to make different areas more diverse. There are challenges from the public, due to the risk of being thrown out of office. There are also limited resources, therefore the player needs to choose which initiatives to implement and that gives rise to dilemmas. Constant news feed allow the player to monitor progress. The player may also zoom in on a specific area to see citizens going about their daily lives and eavesdrop on conversations.

11. EVOLUTION

Every new player starts the game in a newly formed planetary system as a bacterium traveling on a meteorite. The player chooses a planet to install himself and if the right conditions are present it evolves into a multicellular organism and so on… Various choices made determine the evolutionary course of each player. For example, an important element in evolution is the creation of cell colonies, which implies collaboration.
12. STOP CRIME!

The player must take on the role of crime stopper in a cityscape in which a range of crimes take place. Walkie talkie tell players where the crimes are happening. There are challenges, with ethical dimensions, such as which crime is more important and how you should deal with the crime at hand.

13. AN ALTERNATE REALITY GAME PLAYED ON SCHOOL GROUNDS

Players secure various areas of the school for their teams by accepting and solving challenges associated with various locations on the school grounds: the library, the garden, the canteen, some laboratory etc. An alternative to “conquering” various locations for competing teams would be: in each location when solving a challenge or a puzzle, they get to leave a piece of a story, so that the whole school can follow their story as it evolves.

14. ERADICATING POVERTY

The players assume the role of head (leader) of a village who is trying to stop poverty in the context of Zambia, by creating jobs, homes, and providing medical care and attention as well as clean water and farming resources. The aim is to successfully eradicate poverty. Players start with a certain amount of money. Each of their initiatives costs a certain amount of money, but the changes that they effect get them more money. Players need to make quick decisions within limited time, prioritizing their actions and taking into considerations all kinds of challenges such as the outbreak of disease, crops failing, weather cycles affecting livelihoods and understanding the culture. A constant newsfeed tell them how well they are progressing.

15. GEOGRAPHY OF CIVILIZATION

A game that situates geographically important ideas, discoveries and cultural accomplishments: visiting different countries players have to solve challenges associated with ideas, discoveries and cultural accomplishments that originated in that country. Through their travels the players may also get to embody character traits, abilities or knowledge of specific historical personalities.

16. FROM MYTH TO GAME

Using known myths as an inspiration, the game would incorporate specific challenges or missions taking the structure of the myth (the hero, his object, his obstacles etc) and/or using spatial ideas, such as the labyrinth. The myth may be the stage where challenges are set about present-day problems. Alternatively the labyrinth could be seen as a metaphor of a complex life situation to be navigated, e.g. the labyrinth of adolescence, or the labyrinth of school life. An interesting emotive dimension, is seeing the myth through the eyes of the antagonists, i.e. the ‘villains’ and the secondary characters.

17. WHAT IF (1)

Starting from an event that has occurred in reality (e.g. a historical event or a natural disaster) build the scenario around how it could have played out differently. Each change that they introduce in the actual events, leads to new events, questions and unexpected consequences that trigger new rounds of “what if” decisions.

18. WHAT IF (2)

A world where a very familiar parameter is removed or changed and life has to be organized in this new natural and social reality: “What would living on the earth be like, if it weren’t 70% water?”
A.2. PARTICIPANTS’ CHOICES IN TABULAR FORM

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| # of teachers who replied | 16 | 16 | 16 | 3 |

Questions

**Creativity:** Choose four scenario seeds that you think have the best potential to foster creativity in learning.

**Game:** Choose four scenario seeds that you think can be turned into an engaging game that your students would enjoy playing.

**Classroom:** Choose four scenario seeds that you think it is more likely that you would actually use in your classroom.

**Cross-Curricular:** Choose four scenario seeds that you think can better serve a variety of subject areas.
### A.3 PARTICIPANTS’ COMMENTS AND JUSTIFICATIONS FOR CHOICES

NOTE: not all participants offered such open-ended replies

#### Basic Questions

1. Choose four scenario seeds that you think have the best potential to foster creativity in learning.

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<th>Justification/Comment</th>
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<tr>
<td>Rescue Mission</td>
<td>I think this dilemma lends itself to lots of creative outcome. The students also have to draw on various (previous) knowledge of various subjects and come up with creative solutions. Very little ideas are given beforehand, students have to work as a team. They need to use knowledge from different areas and subjects. It also, as default, is like a game, you know when you have completed the task. Many different age groups can do this.</td>
</tr>
<tr>
<td>Surviving Global Warming</td>
<td>In a way a very clear task for the students, however this one really needs creative students and creative skills. Very wide options for students to react to different situations.</td>
</tr>
<tr>
<td>The Teleporter</td>
<td>Very wide options for students to react to different situations</td>
</tr>
<tr>
<td>‘Girls’ Rights March!’</td>
<td>Students can come up with various creative ways of advertising and raising resources</td>
</tr>
<tr>
<td>Being a Genetic Engineer</td>
<td>Students can experiment with different ways of creating new types of fruit. They can modify different characteristics and make different nutritious combinations.</td>
</tr>
<tr>
<td>Dance Game!</td>
<td>Foster creativity could be[wanted?], with synchronized dance prepared by themselves</td>
</tr>
<tr>
<td>Evolution</td>
<td>Completely new ways of thinking possible</td>
</tr>
<tr>
<td>Eradicating Poverty</td>
<td>Just not with a concrete country</td>
</tr>
<tr>
<td>Geography of Civilization</td>
<td>Very wide options for students to react to different situations</td>
</tr>
<tr>
<td>From Myth to Game</td>
<td>This is a good seed for creative writing. Students can use their imagination to come up with very creative stories. Make it from fairytale to game</td>
</tr>
<tr>
<td>What if (1)</td>
<td>It is a good seed for looking into social events that are close to students’ realities and enable them look into different perspectives.</td>
</tr>
<tr>
<td>What if (1) + What if (2)</td>
<td>Combined: opens many creative possibilities</td>
</tr>
</tbody>
</table>
2. Choose four scenario seeds that you think can be turned into an engaging game that your students would enjoy playing.

<table>
<thead>
<tr>
<th>Choice</th>
<th>Justification/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rescue Mission</td>
<td>The fact that this seed supports collaboration makes it interesting to students. It is a fun activity for them, as they would probably enjoy taking up roles and working with each other. Always fun to play</td>
</tr>
<tr>
<td>Surviving Global Warming</td>
<td>Engaging, a lot of activities</td>
</tr>
<tr>
<td>The Teleporter</td>
<td>Space topics are usually interesting to students. The challenges and the offering of rewards is likely to facilitate students' engagement. Seems to have a clear structure and a goal</td>
</tr>
<tr>
<td>The Amusement Park</td>
<td>Every student associates the Amusement Park with fun and games and I think therefore the motivation of visiting and playing in the Amusement Park is very high. Looks like games they play in free-time Easy to expand many different options possible</td>
</tr>
<tr>
<td>Space mission</td>
<td>Like above, the interesting topic, combined with the different aspects (social, psychological, etc) would engage students.</td>
</tr>
<tr>
<td>Removing Racism</td>
<td>Seems to have a clear structure and a goal</td>
</tr>
<tr>
<td>ARG on school grounds</td>
<td>To engage the students not always necessary to go outside the school</td>
</tr>
<tr>
<td>Eradicating Poverty</td>
<td>I think this is a very engaging game that involves a lot of strategy. The fact that you get to invest money and you immediately see the effect of your decisions in financial terms, also turns this into an economic strategy game. Seems to have a clear structure and a goal Topic of my students/subject</td>
</tr>
<tr>
<td>Geography of Civilization</td>
<td>Combination of fun and learning is again a property of this seed.</td>
</tr>
<tr>
<td>From Myth to Game</td>
<td>Students like mythological, fantastic games Seems to have a clear structure and a goal</td>
</tr>
</tbody>
</table>

3. Choose four scenario seeds that you think it is more likely that you would actually use in your classroom.

<table>
<thead>
<tr>
<th>Choice</th>
<th>Justification/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surviving Global Warming</td>
<td>Very educational Close to my students/topic</td>
</tr>
<tr>
<td>The Amusement Park</td>
<td>It seems challenging in terms of learning and situated understanding.</td>
</tr>
<tr>
<td>Evolution</td>
<td>Actual observation of what happens when students make different combinations. Fun experimentation. Easy to be applied for all ages</td>
</tr>
<tr>
<td>An Alternate Reality Game played on School Grounds</td>
<td>The sense of embodiment (embodied understanding) within the game – students are situated as actors within the learning experience</td>
</tr>
<tr>
<td>What if (2)</td>
<td>Very educational</td>
</tr>
<tr>
<td>What if (1) &amp; (2) combined</td>
<td>Alternative thinking --&gt; especially for older kids and students</td>
</tr>
</tbody>
</table>

Additional Questions

4. Choose up to four scenario seeds that you think can be combined in an interesting way in a new educational scenario. List their titles and, if you’d like, give your ideas of how they would be combined.
- An alternate reality game played on school grounds could be combined with healthful feeding (in the canteen) with biology (in the garden)
- The Teleporter + Rescue Mission + Space Mission
- Rescue Mission + The Teleporter + The Amusement Park + ‘Dance Game!’ + From Myth to Game + What if (1) + What if (2)
B. DETAILS AND MATERIALS FROM THE OU SUMMER WORKSHOPS

B.1. WORKSHOP 1 PLAN FOR THE UK PILOTS

Previously involved group

Prior to workshop 1 – play LIM

Workshop 1

9.30 – 9.40 Warm up activity

Make connections: move around the space sharing TWO WORDS to describe what you remember about C²Learn; pair with someone who has similar word to yours and explain to each other....

Find the gaps: Do it again and this time pair with someone who has a different word.... Discuss these and introduce each other explaining other’s word and a QUESTION that occurs to you in relation to it

Taking your gaming temperature – what did you make of Lim? Spread yourself between one wall and the next hot to cold.

TODAY – OU team remind you about co-creativity in C²Learn, teach you about a new element of the project in preparation for testing the tools next week, look at a way to document creativity, and get you to critique some of the scenarios developed by European teachers

9.40 – 9.50 What’s C²Learn creativity again?

In groups of 3 - give them previous equality scenario designs with 4 x features egs as reminder. If someone in your group is new take opportunity to explain to them.

Introduce wheel – explain how the 4 features are represented there.

9.50 – 10.10 C²Learn creativity’s newest feature (Intervention and reframing) 3 x 4 images printed out

Working on idea that all of the equality scenarios are premised on readdressing some kind of inequality, try the diagrammatic reasoning task

Level [i]

The Group is presented with the following diagram. It is a representation of society from a particular socio/economic viewpoint.
The Eduactor/Group Leader begins discussing with the Group the particular characteristics of the diagram.

Questions may include:

[1] Can you describe what you see?

[2] What is the main purpose of the image? How does it achieve this purpose?

[3] Can you describe the structure of the diagram? Is this structure significant? In what way?

[4] What are the elements of the diagram? Are colours used? What do you think is their function?


[6] Can you think of ways to transform it?  

Finally, ask the groups relate the scenario they have worked on to this structure

Level [iia]

The Group is presented with the following diagrams. The task they are given is to describe a new form of society (or basic political/social structures) based on the diagrams. (The Group may of course be divided into sub-groups and each one assigned one of the diagrams.)

Possible solutions/ideas given by the players may include:

[1] The moebius strip seems like an ordinary strip with two sides but actually if we follow one of them we end up on its opposite; meaning that in reality it only has one side. This may lead us to question the notion of difference and hierarchy, by questioning whether seemingly oppositional or antithetical relationships actually are so.

[2] The image of the atom may lead us to question the classification into social groups and instead focus on one element of society, be that the individual or the family, as the nucleus around which everything does or should revolve.

[3] The picture of a hive may prompt us to review the notion of comprehensive and rigidly defined levels and instead view modern man as a unit occupying a cell within a vast network of relationships.

This proto-exercise/task is based on the process of re-mapping elaborated above. The analogical solutions/ideas here presented all stem from a remapping of the particular diagrams’ elements onto the task presented at the beginning.

Finally, ask the group how they can use what they did to create different opportunities for change and greater equality within their scenarios. Document these by adding post-its to your scenario map.
Post-its

Feedback on CER technique

On post-its:

• *Intervention and reframing in your own words* – what does it mean; brainstorming on what you were doing when you used the two diagrams, so what names would you give to the process
• Did the task make you think differently to normal?
• Did you ask different questions?
• Did you draw any more images on your map?
• Any other thoughts?

10.10 – 10.20 Co-creativity wheel *5 x wheel on large paper*

Introduce the wheel and explain what it’s for. Get into 5 small groups who each focus on 1 segment of the wheel and make sure they have figured out what it means to be able to explain it to the rest of the group in terms of eg’s from your scenarios. Are there better ways of putting it – please write around the wheel on a larger piece of paper.

10.20 – 10.35 Testing out the wheel - playing Lim *coloured pens*

Play Lim again for 10 minutes

In your 5 small groups, use the wheel to decide which parts of co-creativity you could do in Lim. One person act as interviewer for 2 segments of the wheel, another act as interviewer for the other 3 segments of the wheel. Put a tick, a cross or a question mark on the wheel for the parts you felt worked, didn’t work, not sure about. And write down why next to it.

10.35 – 10.50 Scenarios work *15 x wheels*

In groups of 3 using the wheel to evaluate 3 scenarios from the scenario cards. Use the tick, cross, question mark system as with Lim – how would you improve them so that they include everything that’s on the wheel?

10.50 – 11 Wrap up

The wheel – on post-its

What do you like about it?

What’s difficult about it?

What would you change about it?

Interim activity: play Lim and evaluate play via the wheel using most appropriate parts of the wheel identified in the session. Find a way to tell us about your progress over time.
New group (UK SW Secondary)

Prior to workshop 1 – play LIM

Workshop 1: Wednesday 3 July, 9.10 – 10.40

9.10 – 9.20 Warm up activity – intro to C^2Learn

Create a circle: Letter of alphabet starting first name then each person go round circle and introduce the person next to them and one thing they know about them; then go round again and offer 2 words to describe how you’re feeling about this workshop

Taking your gaming temperature - move near the centre of the room if you think you game a lot, stay near the edge if you game a little bit, spend 30 seconds (take it in turns, one then the other) talking to the person nearest to you about the game you played most recently and one thing you learned in the game last time you played it

What did you make of LIM Centre hot, edges cold.

TODAY – OU team hear your thoughts on LIM from a co-creativity point of view, teach you about co-creativity in C^2Learn, look at a way to document creativity, and get you to critique some of the scenarios developed by European teachers; as well as come up with some of your own ideas

9.20 – 9.50 Co-Creativity Access to internet/computer + 5/6 x question sheets, big pens/paper, post-Its....

Play LIM for 10 minutes.

With a focus on LIM, look at the five key aspects of co-creativity.

TASK: Work through the questions in relation to LIM with one of the group as a facilitator. If you can’t answer positively to the questions, how would you change the game to include that element?

Use 5 different post-it notes to note down 5 different responses

You may want to put these into your own words. What does each term mean to your group? Do you want to rename it? Can you think of a better way of putting it?

9.50 – 10.00 Co-creativity wheel 5 x wheel on large paper

Introduce the wheel and explain it’s a way of building up responses to the questions they used previously. Get into 5 small groups who each focus on 1 segment of the wheel and make sure they have figured out what it means to be able to explain it to the rest of the group.

10 – 10.20 Scenarios work 15 x wheels

In groups of 3 using the wheel to evaluate 3 scenarios from the scenario cards. Use ticks, crosses and question marks system – how would you improve them so that they include everything that’s on the wheel?

10.20 – 10.40 5 x question sheets + large sheets of paper + coloured pens

Using the scenarios that you’ve just evaluated as a starting point, can you generate your own scenario
for the game – either use their best features as a basis for the scenario or come up with a completely new idea. Draw your main challenge or idea in the middle and divide the rest of the sheet into 5 sections and show how the scenario will meet the 5 co-creativity criteria.

10.30 – 10.40 Wrap up

The wheel – on post-its

What do you like about it?

What’s difficult about it?

What would you change about it?

Interim activity: play Lim and evaluate play via the wheel using most appropriate parts of the wheel identified in the session. Find a way to tell us about your progress over time.
B.2. WORKSHOP 2 PLAN FOR THE UK PILOTS

Prior to workshop 2 – play Lim and critique with wheel (collect wheels at beginning of workshop)

9.10 – 9.20/1.30 – 1.40 Warm up activity

Create a circle: Go round circle and introduce the person next to you and one new thing they know about them; then go round again and offer 2 words to describe how you’re feeling about this workshop

Lim on the wheel – what did you make of Lim? Imagine the circle is the wheel spread yourself between centre and edge for each segment.

TODAY – OU team work through a possible activity in C²Learn gaming environment, pilot a digital tool for the game, look at another way to document creativity

9.20 – 10.20/1.40 – 2.40 ‘Removing Racism Scenario’

| Activity 1 | • Presentation and Brainstorm  
| • Introduction of the problem at hand (UEDIN 2.1.1) |
| Activity goal(s) or intended outcome (“X”) | • Encourage dialogue, collaboration and discussion between students & teachers  
| • Posing questions about racism  
| • Encourage anticipation and immersion in the next activity (viewing BBC film)  
| • Understand what students & teachers believe about racism |
| Activity title & description | Title: Understanding racism and racist behaviours

Brainstorm questions:

• What do we understand by the term ‘racism’?
• What kinds of ‘everyday’ incidents and behaviour can we identify as being racist?

This is a quick activity that provides the students and teachers in the workshop with something tangible to do, think about and list (write) in regards to what they understand about the term racism and those actions or incidents that can be identified as racist. Students and teachers are required to share what they know or believe by attending to ethics and impact or generating and exploring ideas/beliefs. **This activity should take 15 minutes.**

The activity is a warm up or icebreaker that paves the way for the 2nd and 3rd activities.

| Activity materials | ➢ Whiteboard/Blackboard & markers/chalk  
| ➢ Digital camera (for documentation)  
| ➢ Whiteboard/blackboard to write questions |
The “how” (steps A, B, C, that lead to Y or the activity outcomes)

A. The workshop facilitator draws a line down the middle of the blackboard and writes down the 2 brainstorm questions on each side of the line.

- The workshop facilitator instructs the students to read the questions and asks if they understand the questions and/or need more explanation.
- As soon as the students are ready she asks them to ‘think-pair-share’ the both questions with a partner and tells them they have 2 minutes.
- She then told each pair they would need to quickly come up with a definition for racism they can share with the group as well as 4-5 incidents that could be classified as racist.
- She then informed each pair that one member would need to come to the front of the room and write down the definition and incidents and share them with the class.

B. Students quickly form pairs with the student closest to them; some pairs comprise a mix of teacher with student, working as equals. 1 student from each group comes to the front and writes the definition on the board. (10 minutes)

C. The facilitator then thanks students for their work and briefly comments on the definitions on the board, noting similarities and differences. She highlights the incidents and asks, “What is another word for all of these incidents?” (particularly if the word ‘attack’ is not written down) and highlights that these behaviours are actually attacks. If the word ‘attack’ is written down, she emphasises this and uses this as a segue to the next activity. She then informs the students that they are going to watch a short clip from the BBC about real racist attacks in Northern Ireland, noting the class will critically view the film to see if what they have generated as pairs and a class does/does not resonate with the content of the video. (2 minutes)

Activity 2

- Critical viewing of the BBC’s ‘Racists Attacks’ (5:40)
- introduction of the random stimulus (UEDIN, D2.1.1)

Activity goal(s) or intended outcome (“X”)

- Encourage critical viewing in relation to the ideas generated by the students and teachers in activity 1;
- Encourage dialogue, collaboration and discussion between students & teachers post viewing;
- Posing questions about the events in the film;
- Encourage anticipation and immersion in the next group activity;
- Compare what happens in the film to the definitions and behaviours listed in Activity 1

Activity title & description

Title: Racists Attacks

This activity is simple and further sets the scene for the next group activity. The students and teacher(s) have already generated a number of definitions for racism
and some examples of racist behaviours. **This activity should take 15 minutes.**

The activity was conceptualised to bring the reality of racism in Northern Ireland to life in English classrooms by showing authentic reports from the media about events that actually transpired. This idea is to generate a discussion, among primarily white students, that provides examples of racism and racist attacks, to encourage them to share similar stories or experiences they may have experienced, heard of, or witnessed.

<table>
<thead>
<tr>
<th>Activity materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ BBC film ‘Racist Attacks’ available from <a href="http://www.bbc.co.uk/northernireland/schools/11_16/citizenship/racism/video.shtml">http://www.bbc.co.uk/northernireland/schools/11_16/citizenship/racism/video.shtml</a></td>
</tr>
<tr>
<td>➢ Large white paper with 5 questions written down (beforehand) to encourage dialogue and discussion among students and teacher(s) (related to film)</td>
</tr>
<tr>
<td>➢ Video camera for documentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The “how” (steps A, B, C, that lead to Y or the activity outcomes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. The workshop facilitator explains to the students and teacher(s) that they are about to watch a movie that explores 3 separate racist attacks in Northern Ireland where individuals/families experienced a racist attack.</td>
</tr>
<tr>
<td>➢ The workshop facilitator instructs the students to view the short movie on racist attacks. She also informs them that there are 3 parts to the movie: an attack on a Chinese man in Belfast at Christmas; an attack on a Portuguese family in Portadown; and an attack on a man from Bangladesh in Belfast.</td>
</tr>
<tr>
<td>➢ The students and teacher(s) watch the short BBC trio of clips. (6 minutes)</td>
</tr>
<tr>
<td>➢ The facilitator got the whitepaper ready with the following questions to post on the whiteboard/blackboard after the trio of BBC news clips:</td>
</tr>
<tr>
<td>i. What kinds of attacks happened?</td>
</tr>
<tr>
<td>ii. Why do you think they faced this treatment?</td>
</tr>
<tr>
<td>iii. How were the locals who were interviewed reacting to these attacks?</td>
</tr>
<tr>
<td>iv. Who did this to them and why?</td>
</tr>
<tr>
<td>v. What impact did these experiences have on the families involved?</td>
</tr>
<tr>
<td>➢ She then instructs the students to get into groups of 4 and discuss the five questions. She lets them know this is a quick activity of no more than 5 minutes. (5 minutes)</td>
</tr>
<tr>
<td>➢ She circulates among the groups and checks to make sure they are on task.</td>
</tr>
</tbody>
</table>
| Activity 3 | • Possibility thinking (OU)
• Brainstorming (discussion/debate/critique) (UEDIN) |
|---|---|
| Activity goal(s) or intended outcome ("X") | • Encourage critical dialogue and reflection on the questions answered by students and teacher(s) in Activity 2
• Encourage dialogue, collaboration, discussion between students & teachers post viewing in relation to a hypothetical activity involving risk;
• Immersion in the activity;
• Taking charge and considering how certain actions have consequences;
• Putting forth surprising individual or collaborative ideas; &
• Facilitating changes in participants’ dispositions in regards to, or understandings of racism and what to do if they witness a racist attack in their school (and community if there is time) |
| Activity title & description | Title: “What if”

This activity poses two important questions to students and teacher(s):

1. What if you were a passer-by in the video, how would you have reacted and why?

2. How do you think we should react to such attacks?

3. What are the potential risks involved in taking such actions? Are they worth it?

4. What should the policy be at this school if you see a racist attack?

The activity is designed so as to not only encourage dialogue, but also the other aspects of WHC. Students and teachers need to take control of making decisions and consider the risks of certain actions. Giving the students and teachers these questions focuses on the ethics and impacts of thinking about actions to take in regards to addressing/confronting racism that they are witness to. The questions are ordered so that they can make suggestions about how they would have reacted and how they think we should react to the racist attacks they viewed in the BBC trio of clips. **Approximately 20 minutes.**

Although this activity may not lead to ‘new’ ideas per se, students and teacher(s) are also being asked to put forth a framework for what to do if they see a racist attack in their school. This is likely different from Antiracist Policies in schools which tend to be a set of rules and consequences or policy that state:

• Pupils are encouraged to report all incidents involving racism, racial discrimination and racial harassment

• All staff deal with incidents involving racism (including prejudice and stereotyping), racial harassment, and racist name-calling whenever they occur

The activity therefore lays the foundation, alongside other WHC-based tasks for

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<table>
<thead>
<tr>
<th>Activity materials</th>
<th>The “how” (steps A, B, C, that lead to Y or the activity outcomes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Large white paper with the 4 questions written down ahead of time</td>
<td>A. The workshop facilitator explains to the students and teachers needed to work in groups of 3. She asks them to try to work with someone who they don’t usually work with. She explained they would need to work together to answer the 4 questions and then present their findings to the class</td>
</tr>
<tr>
<td>✓ Large white paper for students to collaboratively answer the questions</td>
<td>✓ The workshop facilitator instructed the students to get into groups of three and find a place to sit where they could all see the large white paper. She also asked for 1 student to come to her to collect the paper and some markers as soon as they were in their groups.</td>
</tr>
<tr>
<td>✓ Markers</td>
<td>✓ As the students were getting in to groups and finding a place to sit on the floor the teacher described the task: “ please read each question and discuss it. Then collectively compose a response on the large paper.”</td>
</tr>
<tr>
<td>✓ Digital camera for documentation</td>
<td>✓ She then informed them that each group will be required to share their responses, specifically the last question.</td>
</tr>
</tbody>
</table>

**10.20 – 10.30 / 2.40 – 2.50**

Use axes to evaluate the above process; as a whole group come into a space with string laid out on an axis with the four words (possibility +, possibility -, participation +, participation -) on A4 sheets at the relevant points on the axes.

Talk through how the axes work with the students

Ask them to position themselves on the axes + talk to someone nearby about why they are where they are

Handout small versions of the axes, ask them to mark where they are on the axes and to write next to it 2 reasons why – one for participation, one for possibility

**10.30 – 10.40 / 2.50 – 3 Wrap up**

The axes – on post-its

What do you like about it?

What’s difficult about it?
What would you change about it?

**The random word generator – Harvard Compass Points**

What excites you about it?

What worries you about it?

What more do you need to know about it?

What should happen with it next?
B.3. NOTES ON THE IMPLEMENTATION OF THE WORKSHOPS

South West Location

GCSE and A level students were not available in this phase as they were either in exams or not in school the first 2 weeks in July so SW data goes from 10 – 14 year olds;

The primary school teacher had run out of cover budget by this point in the year so could not take part in the workshops this time; and

The secondary teacher did not indicate which were her responses despite being asked so these are integrated below within the student responses.

South East Location

Secondary Students: The SE data collection took place during the first 2 weeks of July. As a result there were a smaller number of students present at the secondary workshops: Day 1 had 9 students and Day 2 had 8 students;

As it was a busy time of the end of the year, three teachers participated in the 2 workshops to provide cover. Each teacher worked with a different group of students on various workshop activities. It is noted in the data where work on activities was collaborative between a teacher and a smaller group of students;

Day 2 of the workshop got off to a slow start because not all of the students arrived on time. This made it difficult to complete all of the activities in the C²Learn learning design using the ‘Removing Racism’ Game Scenario. To provide an engaging environment, as students entered the classroom they were instructed to play the serious game, Darfur is Dying. We started 25 minutes late. This gave us only 1 hour to complete the C²Learn Learning Design workshop activities.

The Random Word Generator did not work on the Secondary school computers.

Primary students: There were 10 students present for both workshops on days 1 and 2, this was less than anticipated;

During workshop 1, we only had time to work on the intervention and reframing task. Near the end of the session, for approximately 10 minutes, I did give them their game scenarios (on large sheets) from the first set of workshops and we reviewed the 4 components of co-creativity: Engaged in dialogue, being in control, engaged action and ethics an impact using the Co-creativity colour wheel;

During workshop 2, we primarily worked on using the co-creativity wheel to evaluate the European scenarios;

The primary school teacher was not present all of the time in the SE workshops, but provided some reflective notes on students’ playing LIM (which they did the week before the workshop). At the times when she was in the classroom, she did collaborate with each of the 3 primary groups by circulating during a number of the activities.

Workshops in the primary school happened at lunchtime. Thus, the time spent with the primary students was shortened considerably, to about 50 minutes per workshop, not allowing us to complete all of the workshop activities across the 2 days. As a result, here was no time to available to attempt to complete the Removing Racism activities, try out the Random Word Generator or use the Axes to assess the participation and possibilities in the Removing Racism Game Scenario Activities.
B.4. SCENARIOS SUBSET USED


Players make decisions on changes to make in the world that they live in and that have consequences (1) to the state of their world (2) to their own quality of life. There are different regions in the game with different characteristics and the players choices affect their happiness. Choices include: environment, everyday life etc. There are time periods (e.g. 6 months of game-life) and players can choose either to start their next game from the position they have achieved or to replay the previous cycle to start at a better position. Players could puzzle over the complicated consequences of decisions, and try to go beyond the obvious good or bad: for example a potentially deadly uprising vs. keeping a bad leader.

Biology: Being a Genetic Engineer

Players take the role of a genetic engineer who wants to create a genetically modified fruit (e.g. cinnamon tasting apples or something of the sort). The game includes experiments that take the player through the processes of genetic engineering. However, opposition to the genetic engineering project introduces risks and dilemmas or problems. For example farmers may accept or refuse to introduce the genetically modified variety, may raise concerns about the “contamination” of other orchards, etc. Different players with different roles may introduce different solutions. Roles may include researchers, science or food industry representatives, consumers, farmers, politicians, priests, philosophers, eco-farming proponents and environmental activists. The players who have the genetic engineer role will try to work on an engineering solution to control genetically modified variety (e.g. introducing a modification that makes them visibly different). Other players will vote to give or refuse permission for the project.

The game could include a voting mechanism for determining if a particular genetic engineering project will be permitted. Players take (or are assigned) a position for or against the project, do the pertinent research and organize campaigns to influence the voting.
Astronomy: Space mission

Players assume various roles and collaborate for successful space missions: some players are astronauts, others work in the control room and guide them through their mission. There are various missions that include challenges concerning various stars and need players to use astronomy. Such a game could encompass several sub-games, depending on the player interests. This could include different themes (e.g. life in a small space with a small team of people, what goes through an astronaut’s mind?, how do you manage your resources on a mission?). Possible perspectives include the doctor, the engineer, the pilot, the psychologist, the commander, the saboteur, the priest, the scientist (biologist, chemist, physicist) etc.

Evolution

Every new player starts the game in a newly formed planetary system as a bacterium traveling on a meteorite. There he chooses a planet to install himself and if the right conditions are present it evolves into a multicellular organism and so on... Various choices made determine the evolutionary course of each player. For example, an important element in evolution is the creation of cell colonies, which implies collaboration. There may be some “bonus-challenges” that speed up the evolutionary process. After arriving at the human species the game clearly gets a lot more difficult and complicated. The game could even extend to the future conditions that may support them. If the “traveling on a meteorite” part was extended, Astronomy concepts could also be introduced in this context. The player may be given the tools to alter the environmental conditions (or define them from scratch) and thus influence the pace and the complexity of evolution, and resulting alternate course of evolution, e.g. where life evolves solely within water.
An Alternate Reality Game played on School Grounds

Players secure various areas of the school for their teams by accepting and solving challenges in various locations on the school grounds: the library, the garden, the canteen, the hall, the art displays. “Treasure hunt” items can be added to the game with hidden clues. Collecting these could have value in the game. An alternative to “conquering” various locations for competing teams would be: in each location when solving a challenge or a puzzle, they get to leave a piece of a story, so that the whole school can follow their story as it evolves. The game can also include the staging of short play-acting episodes by students in key places.

Geography of Civilization

A game that situates geographically important ideas and discoveries. Players visit different countries and have to solve challenges about those ideas and discoveries that came from that country. There are levels of challenges, with increasing difficulty. In solving the challenges in one country the players accumulate the points that will eventually allow them to travel somewhere else. Players can use some of their points to take with them fellow players, if they have become stuck in one place. There may be a ‘villain’ that tries to trap players in a single country and prevent their cultural adventure. Through their travels the players may also get to have the character traits, abilities or knowledge of specific historical personalities.
What if?

A world where a very familiar parameter is removed or changed and life has to be organized in this new reality: “What would living on the earth be like if it weren't 70% water?” Adding a social dimension to such a scenario might make players engage in ruthless struggles for survival.

The Teleporter?

The game is designed as a space environment with different planets. Starting point is the space mission on earth. At the beginning of the game every player can choose a personal avatar. This avatar will be equipped with basic skills that correspond with that player’s real life skills. The existing knowledge or skills of the player can be assessed in the mission control e.g. by a supercomputer or a special character such as “Obi Wan Kenobi” or a special “Oracel” that grants the avatar a specific set of skills after completing a certain challenge.

Now, the player can start with their avatar via the teleport gate in the mission control centre and choose which planet they want to travel to. On this planet they find a certain tool (e.g. puzzle) that is filled with different layers. Players can choose their level layer and work on certain levels to navigate towards a rewards and new skills. The player might win e.g. more energy for the Teleporter to travel to planets further away with a new puzzle. The last planet would be the end game where players would be challenged to show all their skills. The player then has the energy to travel to a new galaxy and find her/himself in the mission control centre of a totally new species.
B.5. CO-CREATIVITY QUESTIONS

Ethics and impact (orange)

Were you able to come up with new ideas? When?
Did you try out different ways to do things? How?
Did you try out new ideas? How?
Did you have to decide between different ideas for particular reasons?

Being in control (pink)

Did you lead others in part of the activity? How?
Could you see how the rules work and what happens because of them? How was that?
Were you confident to decide what to do? Eg?

Engaged action (yellow)

Did you get addicted to the activity? How long for?
Did it take you out of your comfort zone? How?
Did you come up with any surprising new ideas? What were they?

Engaging in dialogue (green)

Did you ask new questions?
Did you question others’ different ideas and compare them with your own? How?
Did you try to find ways to work with others or did you work differently? Eg?

Intervention and re-framing (white)

Did you think differently to normal? How?
Did you ask what if...?
## B.6. STUDENT RESPONSES TO THE DIAGRAMATIC REASONING TASK

**SW Primary students responses to the diagrammatic reasoning questions**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Group 1 (mobius strip)</th>
<th>Group 2 (hive)</th>
<th>Group 3 (atom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 What is the main purpose of the image?</td>
<td>Scale of people from royalty, holly people, army troops, feasters, deceaseds</td>
<td>Different people in different stages. Not important to important.</td>
<td>The higher the pyramid goes up the more important they are, military, bar, mortar, life, rich, showing people part of life,</td>
</tr>
<tr>
<td>3 Can you describe the structure of the diagram?Is this structure significant? In what way?</td>
<td>Scale of who matters or what matters the most to people who don't matter as much (everybody matters)</td>
<td>Pyramid, Triangle, Christmas tree. Pyramid of life, getting further through life</td>
<td>Everything matters, different lives, colour, lines hold the people and split them up, pyramid,</td>
</tr>
<tr>
<td>4 What are the elements of the diagram? Are colours used? What do you think is their function?</td>
<td>Dark colours. Rich to poor. Poor to rich. Holding people splitting them up!</td>
<td>Partying, army, church, lines, platforms. It tells you what has happened in life. White, black and red, Platform, what happens in their life. Bigger to smaller.</td>
<td>-</td>
</tr>
<tr>
<td>5 What else does it remind you of?</td>
<td>Options of life, Different life styles,</td>
<td>Corranation great granddad, grand</td>
<td>Life</td>
</tr>
<tr>
<td>Choices of life</td>
<td>Kate Middleton. My nan. WW1 WW2 coronation, remembrance day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Can you think of ways to transform it?</td>
<td>Housing the poor, helping poor, sharing money donated to the poor</td>
<td>No because it’s what happens in life I wouldn’t change it! I wouldn’t change it because I agree with the picture. There’s more people partying and less people in the army</td>
<td>Less fighting</td>
</tr>
<tr>
<td>Thinking in relation to new diagram: What new form of society does this make you think of?</td>
<td>Not an easy life, symbol of life, wonky, going wrong in life, challenging, not fair, more equal</td>
<td>People would know more people Beehive? If we live like bees we might communicate in a different way If we live like the we might know more people</td>
<td>Shapes No top or bottom Circle Overlaps The core of the world The atom No fighting Equality Futuristic</td>
</tr>
</tbody>
</table>
### SE Primary students responses to the diagrammatic reasoning questions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Group 1 (hive) 3 boys</th>
<th>Group 2 (hive and atom) 3 girls</th>
<th>Group 3 (moebius strip) 3 girls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Can you describe what you see?</strong></td>
<td>How respected things are</td>
<td>At the top king, queens and prime ministers, then priests and leaders, army people, fat people that are drinking, some are dead some are unwell</td>
<td>“At the top we see money $; then rulers; religion; armed forces; welfare and celebrations; and suffering, death, depression and crime.”</td>
</tr>
<tr>
<td><strong>2 What is the main purpose of the image? How does it achieve its purpose?</strong></td>
<td>Show power</td>
<td>It shows that a lot of people are bad and fewer are good. This maybe because it is easy to be bad, but harder to be good</td>
<td>The ones at the top need the ones at the bottom to survive.</td>
</tr>
<tr>
<td><strong>3 Can you describe the structure of the diagram? Is this structure significant? In what way?</strong></td>
<td>Pyramid, strong at top</td>
<td>At the bottom they are dead and unwell because they are criminals</td>
<td>It’s a pyramid where the stuff on the bottom is needed for the stuff on the top. Going up you have workers, partyers, the respected, the looked up to, the depended on and the wanted.</td>
</tr>
<tr>
<td><strong>4 What are the elements of the diagram? Are colours used? What do you think is their function?</strong></td>
<td>Weak at bottom strong at top</td>
<td>Pyramid</td>
<td>Not many people are lucky as only a few get to the top.</td>
</tr>
<tr>
<td><strong>5 What else does it remind you of?</strong></td>
<td>-</td>
<td></td>
<td>Tree of importance</td>
</tr>
<tr>
<td>6 Can you think of ways to transform it?</td>
<td>-</td>
<td>-</td>
<td>Make all the same</td>
</tr>
<tr>
<td>Thinking in relation to new diagram: What new form of society does this make you think of?</td>
<td>Everyone is everywhere</td>
<td>We think this one is the more fair because they are all the same size and shape none of them are more important.</td>
<td>• There is only one level so there is only one importance</td>
</tr>
<tr>
<td></td>
<td>All is equal and doing the same thing</td>
<td>They are all the same size, they have not been categorized</td>
<td>• The ideal pic would be paper chain as they are all the same, but different, They are linked together an if they are separate, then they would not be a paper chain</td>
</tr>
<tr>
<td></td>
<td>Same importance</td>
<td>All hexagrams are equal</td>
<td>• Everyone together</td>
</tr>
<tr>
<td></td>
<td>Everyone has the same amount of power</td>
<td>All spaces are equal</td>
<td>• Tie the world together</td>
</tr>
<tr>
<td></td>
<td>Save money</td>
<td>All the same colour</td>
<td>• Everyone linked together</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Reach your goals all can</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• They are all equal same importance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• There is never a join, top or bottom</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Everything is equal on the same planet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• There are the same number of purples as reds (chain image drawn on paper)</td>
</tr>
<tr>
<td>Questions</td>
<td>Group 1 (hive) 3 Males</td>
<td>Group 2 (moebius strip) 2 Males + 1 M teacher</td>
<td>Group 3 (Atom) 2 girls + 1 F teacher</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>1 Can you describe what you see?</td>
<td>Hierarchy</td>
<td>Pyramid- poor at bottom and rich at top</td>
<td>Levels of importance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class of people goes down the pyramid</td>
<td>Popularity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Authority</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S.I.L runs like this. E.g. Top-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Headmistress, then SLT, Sixth</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>From, Students, then the less</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>important staff</td>
</tr>
<tr>
<td>2 What is the main purpose of the image? How does it achieve its purpose?</td>
<td>Criticise money</td>
<td>To show unfairness and noncommunism</td>
<td></td>
</tr>
<tr>
<td>3 Can you describe the structure of the diagram? Is this structure</td>
<td>Triangle, uneven</td>
<td>It is a pyramid, this suggest the power is</td>
<td>The structure is a pyramid that</td>
</tr>
<tr>
<td>significant? In what way?</td>
<td>hierarchy</td>
<td>owned by the few at the top</td>
<td>shows levels of importance.</td>
</tr>
<tr>
<td>4 What are the elements of the diagram? Are colours used? What do you</td>
<td>Inequality, different</td>
<td>Religion being on layer 3 shows that the</td>
<td>The bottom are doing the work,</td>
</tr>
<tr>
<td>think is their function?</td>
<td>social classes</td>
<td>high religious figures have lots of</td>
<td>whereas the rest of the pyramid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>power over the people</td>
<td>are having fun</td>
</tr>
<tr>
<td>5 What else does it remind you of?</td>
<td>Inequality, communism</td>
<td>Classes of people, money people have</td>
<td>You can base this on other</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>things like racism because it is</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>not equal like the pyramid</td>
</tr>
<tr>
<td>6 Can you think of ways to transform it?</td>
<td></td>
<td></td>
<td>Maybe it could not be a pyramid</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and everyone could be the same</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>level of importance.</td>
</tr>
<tr>
<td>Thinking in relation to new diagram: What new form of society does this make you think of?</td>
<td>Students used different colour markers to make the sides of each hexagon represent the lower class (purple), the monarch (green) and the military (orange)</td>
<td>Equal society apart form the king. King/Queens in the middle All equal All of the people are equal, so the army and religion except for the king and queens who are basically icons for people to look up to and follow. It stops everything from breaking down and unifies the population behind them and gives the people to trust and believe in. The people are equal with the army and religion because in society there should be no one above them. The army should be fighting for the country, not be above the people but should be there to protect the country; Religion should be equal, but there to be something to believe and be here to trust and follow but removable</td>
<td>Things like love and money would go in the middle and everything else would be on the outside Everyone has their own specialty Everyone is equal distance from the center and from each other Everyone has their own specialty and has a part in society If you take one away, it has a big effect on everything else.</td>
</tr>
</tbody>
</table>

NOTE: As they were new to the project the 11 – 14 year olds in the SW secondary school did not try out the diagrammatic reasoning task
C. DETAILS AND MATERIALS FROM THE BMUKK PILOT

C.1. IMPLEMENTATION OF THE USE CASE ‘TRAINING ON JOB INTERVIEWS’ WITHIN THE ‘AMUSEMENT PARK’ SCENARIO

After the arrival of students the teacher explained the work that had to be done within the next 2 hours. It was a general introduction, explaining the workflow and the time frame. Corresponding to the scenario seed “Amusement Park” students were invited to engage and learn in different “game attractions”. Students were asked to search for partners of free choice for the respective activities.

**The House of Mirrors:**

This game attraction can be seen as „get together“, were students can talk with each other about specific topics. In this use case students had to deal with the question about their adequate appearance (“no go” and “perfect”) for a job interview.

**The Octopus:**

This tool (in this case a whiteboard) served students to brainstorm about the question “How to prepare for my job interview?”
The Ferris Wheel:
The Viennese Ferris Wheel corresponds to a buddy-system. In each cabin the learner finds a special topic, one teacher and 3 buddies. Players become buddies themselves after they have reached a certain number of points. In this use case students had to concentrate themselves on their own strength and weakness. They had to find out how they are perceived by others.

The Puzzle:
In this station students had to design a puzzle on the question “How is the common process of a job interview?” Other students had to piece the puzzle together afterwards.
The Labyrinth:

In the labyrinth students find several job advertisements. They have to analyse them in regard of the wording. After this they have to create an own job advertisement and a riddle for other students by using the computer.

Quiz

Students have to reflect on questions they may reckon and those questions that will rather not be posed in the context of a job interview. Students had to write down the questions and to sign them with ✓ or ✗.
The Merry-Go-Round

In this use case the merry go round was an exercise to find synonyms for specific phrases. One student had to take up a specific posture and the other student had to interpret and describe the body language in the context of job interviews.

The Tunnel of Horror

This game attraction symbolises the final examination. Based on their experiences and the learning outcomes of the previous activities students should have a clear idea about the specifications and procedures of a job interview. They have to search for a partner to perform a role-play on a job interview in the plenum. The audience is asked to give constructive feedback.
C.2. USE CASE “TRAINING FOR JOB INTERVIEWS” (GERMAN LANGUAGE)

Unterrichtsszenario – Amusement Park

Titel: Bewerbungstraining; Bewerben – aber richtig!
Unterrichtsfach: Informations- und Officemanagement
Zielgruppe: 15 – 16 Jährige

Lehr- und Lernziele:
Die Schülerinnen und Schüler sollen
- wissen worauf es bei einem Vorstellungsgespräch ankommt
- wissen welche Fragen gestellt werden können
- wissen wie man auf die Fragen richtig antwortet
- ihre Stärken und Schwächen kennen lernen
- wissen wie sie von anderen gesehen werden (Selbst- und Fremdbild)

© Sabrina Schnabel, IBD.
Spiegelkabinett – House of Mirrors

Das Spiegelkabinett soll einen Austausch für Schüler/innen und Lehrer/innen darstellen, ein sogenanntes „get together“. Dort sieht man, wie fit andere Schüler/innen mit dem Thema sind und es besteht dort die Möglichkeit Spielpartner/innen zu finden. Weiterhin gibt es die Möglichkeit einen Avatar auszusuchen, zu gestalten und sich damit zu identifizieren.

Einführung in das Thema.

In unserem Fall sollen sich 5 überlegen und sich im Spiegel genau betrachten, wie sie bei einem Bewerbungsgespräch gekleidet bzw. auftreten sollten. Was macht ein Bewerbungsgespräch perfekt? Welches ist das richtige Erscheinungsbild? S und I sitzen im Sesselkreis. Am Flipchart (≈Spiegel) sind zwei Moderationskarten befestigt – No-Go! und Perfekt!

Utensilien: Flip, Moderationskarten, Stifte, Spiegel

Danach Gruppeneinteilung: Moderationskarten auf den Sesseln haben unterschiedliche Farben – Einteilung nach den Farben.

Lösung:

No-Go!: zu viel Make up, you are too sexy for this job, zerfetzte Jeans oder Minirock, mit high heels bewaffnet

Perfekt!: dezentes Styling, Hosenanzug, Bewerbungsmappe, flach treten – hoch gewinnen 😊, Farben usw.

Krake

Mindmap: Wenn ihr eine Anleitung benötigt um eure Gedanken und Ideen zu strukturieren bzw. besser ordnen zu können besucht die Krake und benötigt das dort vorfindige Mindmapsystem.

5 benutzen das Whiteboard um zu Brandstormen ...

Thema: wie bereite ich mich auf das Vorstellungsgespräch vor?

Lösung: Unternehmensform, Standorte, Tochtergesellschaft, Unternehmensgröße, U-Philosophie, Marktposition, Mitbewerber, Produkte, Firmengeschichte, Weiterbildung, Aufstiegschancen, ... Unterlagen, Kleidung, Schreibzeug, Terminkalender, wo und wann findet der Termin statt, Gehaltsvorstellungen

Wiener Riesenrad – Ferris Wheel


© Sabrina Schnabel, Bed.
Die 5 haben sich schon zuhause mit ihren Stärken und Schwächen auseinandergesetzt. Nun sollen die 5 mit Hilfe der Buddys herausfinden, wie sie andere 5 wahrnehmen und wie sie auf andere Personen wirken.

Selbst- und Fremdbild; Arbeitsblatt: Wie mich andere sehen?

Unterlagen: Tischinseln und Arbeitsblätter

**Puzzle**

5 kreieren verschiedene Bausteine – „Nach welchen Muster läuft ein Vorstellungsgespräch ab?“ Andere 5 versuchen das Puzzle zu lösen ...

**Labyrinth**

5 finden verschiedene Stellenanzeigen im Labyrinth vor ... diese werden nun von den 5 analysiert. Welche Wörter, Formulierungen sind in diesen Stellenanzeigen enthalten ... filtert sie heraus. Nun könnt ihr selbst eine eigene Stellenanzeige gestalten und später einen Lückentext für die anderen 5 gestalten.

**Quiz**


**Ringelspiel – Merry-Go-Round**

Synonymübungen → Synonyme finden für bestimmte Redewendungen, wie kann man es noch ausdrücken ...

5 sollen die Körpersprache bei einem Vorstellungsgespräch deuten ...

Gerade Sitzhaltung, Beine rechtwinklig ... steht für →

Oberkörper zurückgelehnt, Beine übereinander geschlagen →

Oberkörper leicht nach vorne gebeugt, Augenkontakt mit dem Gesprächspartner →

 Stirnrunzeln →

Schultern hochgezogen →

Augenbrauen hochgezogen →

Oberkörper weit zurückgelehnt, Kopf nach hinten →

Oberkörper weit nach vorn gebeugt, Füße unter dem Stuhl, kein Blickkontakt

**Geisterschloss - Tunnel of Horror**

© Sabrina Schnabel, Red.

Dies soll eine sogenannte Abschlussprüfung (=Exit Level) darstellen. Alle Aufgaben werden unter Zeitdruck mit einem Timeout versehen. Es müssen alle Themen beherrscht werden, jedoch gibt es immer wieder die Möglichkeit in andere Welten zurückzukehren.

Aus den Gedankengängen der 5 ergibt sich nun logischerweise eine Struktur, wie ein Vorstellungsgespräch ablaufen könnte! Die 5 finden einen Partner im Geisterschloss vor mit denen sie ein Vorstellungsgespräch üben können.

Im Anschluss können sich die 5 gegenseitig Feedback geben und nun die beste Variante bzw. optimale Version eines Vorstellungsgespräches nachstellen.

Unterlagen: 3 Tische – 6 Sessel
C.3 STUDENTS QUESTIONNAIRE (GERMAN LANGUAGE)

Kreativität und spielbasiertes Lernen

Fragebogen für Schülerinnen und Schüler:

Das EU-Projekt C2learn will digitale Spiele für den Unterricht entwickeln, um kreatives Lernen in vielfältigen Lernsituationen zu fördern. Dazu brauchen wir auch deine Unterstützung!!!

Gib bitte an, wie sehr für dich die folgenden Aussagen bezüglich deiner Erfahrungen in der Unterrichtseinheit zum spielbasierten Lernen zutreffen:

<table>
<thead>
<tr>
<th>Wirkung</th>
<th>trifft völlig zu</th>
<th>trifft eher zu</th>
<th>neutral</th>
<th>trifft eher nicht zu</th>
<th>trifft gar nicht zu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ich habe neue Ideen und verschiedene Umsetzungen ausprobiert!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ich habe neue Ideen eingebracht!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ich habe zwischen brauchbaren und weniger guten Ideen ausgewählt.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Intervention

<table>
<thead>
<tr>
<th>Intervention</th>
<th>trifft völlig zu</th>
<th>trifft eher zu</th>
<th>neutral</th>
<th>trifft eher nicht zu</th>
<th>trifft gar nicht zu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ich habe auf eine andere Art gedacht als sonst (während ich diese Tools verwendet habe).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ich habe Fragen gestellt wie „was wäre wenn!” und wie könnten wir „tun als ob”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Während des Arbeiten habe ich neue Möglichkeiten zu Fragen gefunden.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Dialogbereitschaft

<table>
<thead>
<tr>
<th>Dialogbereitschaft</th>
<th>trifft völlig zu</th>
<th>trifft eher zu</th>
<th>neutral</th>
<th>trifft eher nicht zu</th>
<th>trifft gar nicht zu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ich habe Fragen mit anderen und über andere gestellt.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ich habe verschiedene Ideen meiner Kolleg/innen hinterfragt und mit meinen verglichen.</td>
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<tr>
<td>ich habe versucht Möglichkeiten zu finden, mit den anderen zu zusammen zu arbeiten – oder andere Wege gewählt, wenn dies nicht möglich war.</td>
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</tr>
</tbody>
</table>
## Kreativität und spielbasiertes Lernen

<table>
<thead>
<tr>
<th>Fordernde Aktivität</th>
<th>trifft völlig zu</th>
<th>trifft eher zu</th>
<th>neutral</th>
<th>trifft eher nicht zu</th>
<th>trifft gar nicht zu</th>
</tr>
</thead>
<tbody>
<tr>
<td>ich habe Dinge gemacht, bei denen ich mich normalerweise nicht wohl fühle.</td>
<td></td>
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</tr>
<tr>
<td>ich habe Ideen hervorgebracht, die mich selbst und andere überrascht haben.</td>
<td></td>
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</tr>
<tr>
<td>ich wollte bestimmte Aktivitäten immer wieder durchführen (konnte nicht aufhören, bestimmte Dinge zu tun).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kontrolle</td>
<td>trifft völlig zu</td>
<td>trifft eher zu</td>
<td>neutral</td>
<td>trifft eher nicht zu</td>
<td>trifft gar nicht zu</td>
</tr>
<tr>
<td>ich habe die anderen beim kreativen Arbeiten teilweise geführt (angeleitet)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ich habe die Regeln und deren Konsequenzen verstanden.</td>
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</tr>
<tr>
<td>ich war mir sicher, entscheiden zu können, was zu tun ist – und ich habe es getan.</td>
<td></td>
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</tr>
</tbody>
</table>

Vielen Dank für Deine Unterstützung!
D. DETAILS AND MATERIALS FROM THE EA GAME PILOT

D.1. GAME DESIGN SKETCH

Note: this sketch is taken from D.4.1.1. fig.26.
### D.2 TEACHER INPUT FORM FOR THE GAME DESIGN SKETCH (GREEK LANGUAGE)

**Ημερομηνία:**
**Συμμετέχοντες:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Θα μπορούσατε να αξιοποιήσετε ένα τέτοιο περιβάλλον παιγνιδιού…</td>
</tr>
<tr>
<td>...σε μάθημα (ποια μαθήματα);</td>
<td></td>
</tr>
<tr>
<td>... σε project (ποιες θεματικές);</td>
<td></td>
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<tr>
<td>... σε άλλο πλαίσιο;</td>
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<tbody>
<tr>
<td>2.</td>
<td>Με βάση την παραπάνω απάντηση, μπορείτε να φανταστείτε και να περιγράψετε ένα ή περισσότερα σενάρια για το πώς θα μπορούσατε να αξιοποιήσετε ένα τέτοιο περιβάλλον παιγνιδιού;</td>
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<tbody>
<tr>
<td>3.</td>
<td>Τα σενάρια που έχουμε συζήτησε, θα μπορούσαν να εξελιχθούν ώστε να υλοποιηθούν σε ένα τέτοιο περιβάλλον παιγνιδιού;</td>
</tr>
<tr>
<td>Η ποια από τα σενάρια που έχουμε συζήτησε θα μπορούσαν να εξελιχθούν ώστε να υλοποιηθούν σε ένα τέτοιο περιβάλλον παιγνιδιού;</td>
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<tbody>
<tr>
<td>4.</td>
<td>Ποιες πιθανές δυσκολίες πιστεύετε ότι μπορεί να συναντήσετε αν θελήσετε να δοκιμάσετε να χρησιμοποιήσετε ένα τέτοιο περιβάλλον παιγνιδιού;</td>
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<tbody>
<tr>
<td>5.</td>
<td>Θα θέλατε να προτείνετε κάποιες αλλαγές, βελτιώσεις ή προσθήκες που θα έκαναν πιο πιθανό να μπορέσετε να αξιοποιήσετε ένα τέτοιο περιβάλλον παιγνιδιού;</td>
</tr>
</tbody>
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</thead>
<tbody>
<tr>
<td>6.</td>
<td>Σκέψεις, ερωτήσεις, σχόλια...</td>
</tr>
</tbody>
</table>