Portuguese Postgraduate Teachers' Opinion about Designing a WebQuest: a descriptive study
Ana Carvalho, University of Minho, Portugal

This paper reports Portuguese postgraduate teachers' opinion about their experience on designing a WebQuest, during their Master course classes. The instrument developed to collect their opinions is a Questionnaire with open and closed questions. Data was collected when they finished their WebQuest. All subjects except one had no previous knowledge on WebQuests. Findings indicate that they all enjoyed the webquest design, although they had some difficulties in finding the appropriate resources to solve the intended tasks, particularly because the information found on the web was too simple or extremely complex, and the interface sometimes was too poor. They considered the process the most difficult component of the WebQuest followed by the evaluation. They addressed positively the integration of WebQuests in their classes due to group work activities, students' motivation to learn, and its potential to develop students' autonomy in learning.

Corporate E-learning: a Flexible Training Solution for Italian Enterprises
Nunzio Casalino, CeRSI - LUISS University - Rome, Italy

In the age of just-in-time production, just-in-time training becomes a critical element to organizational success. Especially for global organizations, live classroom-based training is becoming too costly and cumbersome. Modern training methods need to reflect these changes in lifestyle. Training managers feel the urgency to deliver knowledge and skills more rapidly and efficiently whenever and wherever needed. Corporate e-learning is one of the fastest growing and most promising market in the Italian education industry. While the market is currently relatively small and early-stage, it is poised to explode.

Web Based Teacher Support System: FEDS Approach
Bulent Cavas, Teoman Kesercioğlu, Dokuz Eylül University, Turkey

Fast improvements in new technologies and web based education systems have gained more importance especially for teaching university classes. Distance education has become inevitable in today’s education programs. Letting people join the education process wherever and whenever they choose can be considered as an advantage for both students and teachers. FEDS is a national project which was supported by Dokuz Eylül University. The main aim of the project was to create web based teacher support system and improve the teachers' knowledge and skills to use information and communication technologies as effective teaching and learning tools. The project included improving the teaching and learning processes and environments so that teachers acquire flexible knowledge and skills, and can pose and solve problems collaboratively using information and communication technologies.

Multimedia on English Pronunciation for K-12 Students in China
Hao Cen, University of Texas at Austin, USA

Smart Pronounce is a multimedia instructional CD-ROM developed for Chinese K-12 students' learning English pronunciation. It is a joint development by the students in English department and physics department in East China Normal University and was the first courseware using multimedia for English pronunciation learning in China. This paper elaborates its development background, followed by design process. Then it discusses its instructional and country specific features. Finally it points out the future of English pronunciation courseware.

Assistant Agents for Improving Learning of Visual Impaired Child
Luca Cernuzzi, DEI - Universidad Católica, Paraguay; Ilse Girau, DEI Universidad Católica, Paraguay; Jaime Sánchez, DCC - Universidad de Chile, Chile

This study presents the Lucia System, a system of agents that supports visual impaired children playing with a hyperstory. The goal of the Lucia System is to help visual impaired children by enhancing sensory-motor skills and to provide professors with suggestions about the children's performance during the play. Such system was designed using the AAIL methodologies (Kiny, 1996). Finally, the study presents an analysis of some results obtained during the evaluation of the Lucia System in the school Santa Lucia, in Asunción, Paraguay.

ULISSE - In the Net of Science: ulisse.sissa.it: An innovative Italian Project for the Popularisation of Science on the Internet
Simona Cerrato, Danièle Gouthier, Laura Tonon, International School for Advanced Studies (SISSA), Italy

There is an increasing demand for scientific information dedicated to the non specialists, both from professional categories and the general public. Simultaneously, in the scientific community there is an increasing consciousness that diffusion of the scientific information is an asset the scientific community cannot afford to overlook. The Internet is a perfect tool to meet this demand. It reaches a large and ever-increasing number of people and permits an interactive and detailed exchange of information. We present Ulisse - In the net of science (http://ulisse.sissa.it), an innovative Italian project for the popularisation of science via the Internet. Its main purpose is to establish a connection between scientists and the general public, and it is based on three major characteristics: a) strong interaction with the public, b) a network of scientists, who guarantee the quality of the materials, c) technology to create an efficient and friendly system.

Representations and Translations embedded within Interactive Diagrams
Ozlem Cetikturk, University at Albany, SUNY; Bogazici University, Turkey, USA

This study attempts to understand the nature of representations within an Interactive Diagram (mathtet). The representations of an ID will be analyzed with respect to the translations required. The possible effects of different types of translations versus, how these translations work will be targeted. An example applet from the NCTM Illuminations i-math investigations will be the focus of the study, however, the results are supposed to give some general insight into both the characteristics of translations, and to the role of insight and intuition plays in identifying this.
Assistant Agents for Improving Learning of Visual Impaired Children

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Abstract: This study presents the Lucia System, a system of agents that supports visual impaired children playing with a hyperstory. The goal of the Lucia System is to help visual impaired children by enhancing sensorymotor skills and to provide professors with suggestions about the children performance during the play. Such system was designed using the AAII methodologies (Kinny, 1996). Finally, the study presents an analysis of some results obtained during the evaluation of the Lucia System in the school Santa Lucia, in Asunción, Paraguay.

Introduction

The blindness and residual vision impede to perceive appropriately the information received from the external world. For this reason children with visual disabilities should learn behavior patterns that sighted children learn from visual observation. To solve this constrain there are some techniques that go from Braille to the development of virtual spaces that can be navigated through sound. This can be illustrated with AudioDoom (Sánchez, 1997), a software that by using an spatial navigation through spatialized sound can transfer an interactive narrative. This software that uses an interactive non sequential narrative is known as hyperstory (Sánchez, 1997). AudioDoom is targeted to 6 to 12 years old children and uses non visual cues to interact with. The experience with this software goes deeper to solve cognitive problems to represent the virtually navigated space through model building by using Lego, sand, clay, and Styrofoam. This exercise helps teachers to realize how deep the virtual experience with AudioDoom was in order to help children to develop their cognitive structure for spatial representation. This can be a good tool to help them to solve cognitive conflicts and to improve their cognition. AudioDoom was built to improve the perception of blind children. Even though this application is somehow fixed and a prove-of-concept, it has had a huge impact and is being used to support hyperstory editors that appeared later on in order to give a more flexible tool to help teachers to design their own navigated spaces that better fit blind children needs (Sánchez, 1997).

Intelligent agents is a software paradigm that is being increasingly considered in the research community concerning virtual environments based on knowledge. According to Wooldridge and Jennings (Wooldridge. 1999) an agent is a computing software and hardware that has autonomy, social ability, reactivity, and pro activity. It also has one of these characteristics: mental notions, rationality, veracity, and leaning and adaptability. Some studies have demonstrated that agents situated in a pedagogical context have had positive impact on the learning experiences of learners (Elliott, 2000), (Shaw, 1999). This makes particularly interesting to merge the hyperstory paradigm with an agent system to help learners to construct knowledge and offer some recommendations to teachers in their task of designing a hyperhistory for a particular student.

AudioDoom was used by blind children from the school “Hogar de Ciegos” Santa Lucia, in Santiago, Chile, and with the children from the school Santa Lucia, Asunción, Paraguay. In both experiences they improve their cognition after interact with the virtual environment. This triggered to extend this tool to two different but related tools: hyperstory editors and a society of agents named Lucia System. This study centers on the design and evaluation of Lucia System.
**Lucia: a multi-agents system for children with visual deficiency**

The Lucia System (Figure 1) is composed of the following components: a broker agent (administrator), a class of child assistant agents (one per student) and a class of teacher assistant agents (one per teacher). They complete tasks in the context of a hyperstory and they communicate to each other and with the end user. Broker is in charge to assign an assistant to each end user of the system. The child assistant agent helps the visually impaired child while he interacts with the story, notifies him when he misses an action, he offers suggestions when the boy requests it, and communicates with the teacher assistant agents to inform the child’s performance. The teacher assistant agent, on the other hand, gives suggestions to the teacher based on the previous performance of the child.

![Figure 1. The Lucia System Architecture](image-url)

**Designing the Lucia System**

To make it easier to handle the complexity of the software development process increasing the quality of the resulting systems, agent oriented methodologies may be employed. Nowadays, a vast range of agent-oriented methodologies is available for agent-based systems designers. The researchers have followed the approach of extending existing methodologies to include the relevant aspects of the agents (Iglesias, 1999). These extensions have been carried out mainly in two areas: object oriented (OO) methodologies and knowledge engineering (KE) methodologies.

A survey of those efforts are presented in (Iglesias, 1999), (Wooldridge, 2000). We adopted AII methodology because it captures key characteristics of agents such as beliefs, desires and intentions. AII methodology adopts a set of diagrams that operate in two different abstraction levels: external and internal view. In the external view level, the system is specified in terms of agents, modeled like complex objects characterized by their goals, their responsibilities, the services that they offer, the information that they require and maintain, and their interaction with the environment. In the internal view level, designers model the elements of the particular architecture of each agent, which are its beliefs, objectives and plans (Kinny, 1996). BDI architecture is centered in the Beliefs, Desires and Intentions. Beliefs represent the knowledge of the agent on the world, including the information on the present state of the inferred atmosphere of the information received by their perception devices and the communication with other agents, as well as of its internal information.

Desires (objective) represent the state that the agent is trying to execute. The Intentions (plans) are the means that the agent chooses to reach his objectives, generally are expressed using procedures with pre–conditions and post–conditions (Thanagarajah, 2002). In this architecture the reasoning involves two processes: to decide what objective they are wanted to make, and how these objectives were executed. This process is known as deliberation (Thanagarajah, 2002). The mental state of the agent is represented by means first order theory logic formulae.

Moreover, AII makes a clear separation between the general aspects of the architecture of the multi-agent system and specific aspects of particular agent architecture. Furthermore, it lets the designer to specify the communication between the component agents of the system and to describe the roles and responsibilities of each agent.

Nevertheless, it is necessary to mention that AII does not cover certain aspects. Among them we found that it does not cover all the phases within the life cycle of an agents based application and it does not specify the communication of the agents with the no-agents components of the system.
Considerations about the use the Lucia System

Although the approach of the present study is centered in design aspects, we considered that it can be important to include a brief analysis of the obtained results being used the Lucia System. For the evaluation, questionnaires and concrete tasks are used. Concrete tasks are centered on the representation of the browsed virtual space in different way: walking and using materials like modeling clay, styrofoam, sand, and Lego blocks. These tools help to know the mental structure that the students have of the browsed virtual space. In this way we known the capacity that the Lucia System has to attend and to support to the student in the process of reconstruction of a space structure without arranging visual tracks.

Context of Test

The study is made with two groups of students; one of them plays with the Lucia System and the other group with Audiodoom. Altogether both groups add 11 children (3 belong to both groups) of the school Santa Lucia, in Asunción. As it is possible to be observed in Table 1 these children present diverse levels of visual impairment. These children belong to families of very poor cultural and economic level. Some live in the school and others retire when finalizing the day. The children did not present another type of added impairment. Eight children play with Audiodoom. Their ages were between 6 and 13 years (Table 1). The 6 children that play with the Lucia System have ages between 6 and 11 years (Table 1), three of these children already have played previously with Audiodoom.

<table>
<thead>
<tr>
<th>Child</th>
<th>Sex</th>
<th>Age</th>
<th>Vision problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>María P.</td>
<td>F</td>
<td>8</td>
<td>Blind</td>
</tr>
<tr>
<td>Antonio B</td>
<td>M</td>
<td>13</td>
<td>Blind</td>
</tr>
<tr>
<td>Pablo A</td>
<td>M</td>
<td>11</td>
<td>Visual Impaired</td>
</tr>
<tr>
<td>Juan F</td>
<td>M</td>
<td>12</td>
<td>Visual Impaired</td>
</tr>
<tr>
<td>Carlos M</td>
<td>M</td>
<td>7</td>
<td>Blind</td>
</tr>
<tr>
<td>Juan A</td>
<td>M</td>
<td>6</td>
<td>Visual Impaired</td>
</tr>
<tr>
<td>Fátima R</td>
<td>F</td>
<td>7</td>
<td>Visual Impaired</td>
</tr>
<tr>
<td>Ariel R</td>
<td>M</td>
<td>6</td>
<td>Blind</td>
</tr>
<tr>
<td>César C</td>
<td>M</td>
<td>11</td>
<td>Visual Impaired</td>
</tr>
<tr>
<td>Liz C</td>
<td>M</td>
<td>9</td>
<td>Visual Impaired</td>
</tr>
<tr>
<td>Fátima S</td>
<td>F</td>
<td>6</td>
<td>Visual Impaired</td>
</tr>
</tbody>
</table>

Table 1. Universe of study

Evaluation the Lucia System

The evaluation process takes into account the results of the student interaction with the Lucia System and the considerations made by the educational on the Lucia System. For the evaluation the following measures of learning are used:

- **Retention**: it evaluates the memory of the information presented. Table 2 shows the general results of the children’s experience in each task. The evaluation “D” it means that children had performance deficiency in the game, the evaluation “R” it means that children had regular performance and “B” it means that children presented correct conducts.

- **Transference of the resolution of the problem**: the student have to solve a new problem based on the principles learned in the respective programs. This measurement is obtained through of the cognitive tasks.

- **Motivation and Interest**: different parameter are considered: the level of motivation, interest, understanding, the found difficulty and the friendliness of the game. This measurement are obtained from the observation of the student during the game and questions made to them when finalizing the game.

The results demonstrate that both groups receive the same information but the students who use the Lucia System reach more correct actions during the game and are more motivated in the game that those that only had be interacted with Audiodoom.
The present study has introduced the Lucia System, a society multi-agent who attend the process of improve of the sensorymotor skills in visual impaired children. This system extends the capacities of a solution previously experienced and that had be provided interesting results: Audiodoom (Sánchez, 1997). Moreover, the work presents a comparative evaluation of the use of the Lucia System. It was used by a group of children of the school Santa Lucia, Asunción, Paraguay and was evaluated, with positive results, in three aspects of learning: Retention, Transference of the resolution of the problem, and Motivation and Interest. The obtained results demonstrate that the children are more motivated when they receive the suggestions of the agent (it gives their deeper security during the game). This makes us suppose that whichever most time children spent interacting with the learning environment, they obtain better results in the development and reinforcement of its skills.

### References


### Table 2: Evaluation Results

<table>
<thead>
<tr>
<th>Child</th>
<th>Audiodoom</th>
<th>Lucia System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Previous experience with computer</td>
<td>Fidelity of the model using modeling clay</td>
</tr>
<tr>
<td>Maria P</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Antonio B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Pablo A</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Juan F</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Carlos M</td>
<td>B</td>
<td>D</td>
</tr>
<tr>
<td>Juan A</td>
<td>B</td>
<td>R</td>
</tr>
<tr>
<td>Fátima R</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Ariel R</td>
<td>B</td>
<td>R</td>
</tr>
<tr>
<td>Fátima S</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Liz C</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>César C</td>
<td></td>
<td>R</td>
</tr>
</tbody>
</table>

Conclusions

The present study has introduced the Lucia System, a society multi-agent who attend the process of improve of the sensorymotor skills in visual impaired children. This system extends the capacities of a solution previously experienced and that had be provided interesting results: Audiodoom (Sánchez, 1997). Moreover, the work presents a comparative evaluation of the use of the Lucia System. It was used by a group of children of the school Santa Lucia, Asunción, Paraguay and was evaluated, with positive results, in three aspects of learning: Retention, Transference of the resolution of the problem, and Motivation and Interest. The obtained results demonstrate that the children are more motivated when they receive the suggestions of the agent (it gives their deeper security during the game). This makes us suppose that whichever most time children spent interacting with the learning environment, they obtain better results in the development and reinforcement of its skills.