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DINOHUNTER : GAME BASED LEARN EXPERIENCE IN MUSEUMS

Sebastian Sauer, ion2s – buero fuer interaktion, Darmstadt/Germany

Dr. Stefan Göbel, Digital Storytelling (Computer Graphics Center –ZGDV e.V.), Darmstadt/Germany

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Abstract

In this paper, we describe a suspenseful experience and learning environment that aims the transmission of knowledge within a game-based and mixed reality application in the museums context. Individual learning processes are combined within communication processes and collaborative user experiences. Within the scenario of DinoHunter the users will be introduced into the scientific field of paleontology though various application fields are possible. The multiplayer game is applied to a museum and combines mobile components like PDAs or TabletPCs, stationary information kiosk systems, Desktop PCs and location technologies. DinoHunter is based on the ion2s – fact-based User Interface Design Methods for integrated Media Systems, especially “Kids Innovation” (ion2s) and on Interactive Storytelling Technologies (ZGDV e.V.).

Today, museums of natural history have to deal with their old-fashioned image and their task of transferring knowledge to their visitors. Their exhibits consist in most cases of fossil skeletons, teeth and other fossil fragments. The visitor has only the admission to view the fossils of former times, even touching the fragments is prohibited. Visitors have no possibility to recognize how much work and fantasy is needed to reconstruct a fossil animal and how much information is located in the fossil artefact. DinoHunter was created to overcome these constraints and to let the customer dive into the world of paleontology.

Our goal was to create a collaborative multiplayer-game to entertain and support a group of people for a certain period of time during their museums visitation. Another focus is to support all usergroups (the museum, pupils, teachers, kids, groups. etc) not only during their visitation but also in the pre- and postprocesing phase. Elements of storytelling are applied to this edutainment scenario, intelligent user centred interface concepts and learning methods are combined within the integrated media systems which let the museum become a learning and evaluating environment. DinoHunter could be located in a museum of natural history or in a theme park related on this topic. Using storytelling means that the group will not fail because the participants will have a positive result anyway (opposite to computer games, they can’t loose). Beyond this, the game-based story should be so unique, that you can play it only in the museum and not at home with your personal computer. Special attention was

drawn on the implementation of proven technology from the "IZA – Tangible Information Kiosk" (ZGDV e.V.) and on the integrated "momuna - mobile museum navigator" system (ion2s). At last the visitors should get a real result – a tangible souvenir - to take home from their individual trip in the world of dinosaurs.

Keywords: Experience Appliances, Multimodal User Interfaces, Interactive Digital Storytelling, momuna, Mixed Reality, Mobile Devices, Kiosk Systems, User Experience Design, Kids Innovation, Edutainment Applications, Digital Information Booth, Integrated Media System Design, learning aspects, evaluation, communication, marketing

Introduction

Game-based learning environments within museums represent one particular type in the wide range of mobile edutainment applications. In addtition to traditional infotainment and learning scenarios, other typical examples are tourism applications such as eGuides, cultural heritage applications or any kind of indoor and outdoor infotainment and entertainment applications.

From the technical point of view, theses applications are enhanced by geographic information systems (location based services, global positioning systems) to locate and monitor users, virtual, augmented and mixed reality technologies are used to extend the information space or multimodal interfaces such as speech and gesture recognition or various physical and virtual avatars and metaphors are used to improve human computer interaction. Referring to organizational and financial requirements of museums and visitors or visitor groups and their characteristics (for example pupils and classes, elderly people, visually impaired or phyisically handicaped people), appropriated software and hardware components are considered. Besides, scalibility of information architectures is an important issue: Whilst multimodal information kiosks and mixed reality setups are useful to draw out attention for special artefacts within a museum or exhibition, less complex models and environments are necessary to transmit information to mobile devices such as a handy or PDA.

From the content-related point of view, authoring tools are used to integrate theme-specific facts, background information and further multimedia information into mobile edutainment applications. Apart from scientific experts in the field of palaentology or any other specific application field, various people are involved in the authoring process: In collaboration with administrative museum staff, interaction and information designer as well as pedagogues, storyteller and media system designer integrate dramaturgic and gaming aspects and create an interactive game-based learning appliance. Thus, users can dive into a story, learn about dinosaurs and the work of palaeontologists and become an active part of a story. Concerning methodic-didactic aspects, both individual and collaborative learning methods are proposed by the game-based learning scenario of DinoHunter.

The following chapters of this paper present various aspects of DinoHunter. Whilst chapter 2 introduces the global DinoHunter concept and its overall information architecture and components, chapter 3 concentrates on interaction techniques referring to human computer interaction between museum visitors and individual artefacts. Chapter 4 provides an overview of different DinoHunter peculiarities and points out practical strengths and weaknesses of theses DinoHunter applications. Finally, a summary and outlook provides some evaluation remarks and further research and marketing-oriented aspects of DinoHunter as one representative of a mobile edutainment appliance.

Concept

Figure 1 shows the overall DinoHunter scenario, whereby a distinction between the museum itself and the web separates the different user groups participating in the DinoHunter scenario. The interesting point is, how to establish a global information architecture combining all the different aspects of learning, entertaining, interaction, communication or evaluation and the various user groups.

Fig. 1 : "DinoHunter Scenario"

With regard to the realization of this high-level view as an interactive game-based learning environment the following paragraphs provide methods and concepts for the four major aspects information architecture, interactive storytelling, learning/pedagogics, marketing and user interface design. These aspects and components affect on the complete DinoHunter system including the overall exhibtion concept, whereas chapter three concentrates on user interaction metaphors for individual artefacts.

Architecture

The global information architecture consists of a traditional three layer architecture: A database layer provides information about the content of the exhibition, individual artefacts, scientific background information, story and learning models, additional multimedia information about artefacts and demographical user data etc. The business logic is settled on a powerful server in the middle-tier providing a narration engine (story engine and sub-units) as one main component of the run-time environment during the visitation process. Finally, different portals provide access for clients to connect to the middle tier and content layer. Different info terminals of the exhibition are connected to the sever of the middle-tier as well as the main mobile clients such as PDA's.

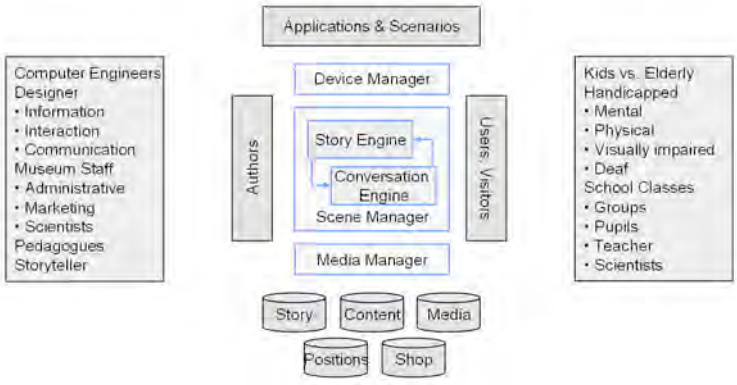

Fig. 2 : "System Architecture of DinoHunter"

Altogether, this information architecture as described above is integrated into the global museum infrastructure. Thus, the server contains the important functionalities like routing, user monitoring and reporting as well as billing components and an interface to the eShop of the museum. So, the storytelling components help to provide the content during the visitation. The authoring, tracking, monitoring, routing, billing or context sensitive shopping components support the museum staff and the visitors in the pre- and postprocessing phase and let this architecture become an integrated system.

Storytelling

As one central point of the information architecture and the complete DinoHunter scenario, the narration engine shown in figure 2 enables authors to create suspenseful stories on one hand and enables users to dive into a game-based and story-driven learning environment and become an active part of this story. The idea behind this storytelling approach is to take dramaturgic elements of Hollywood films, plays in a theatre or fairy tales and to combine these techniques with gaming aspects resulting in immersive and diversified narrative environments. Subsequently, users dive into a story and are (more) motivated to learn something and the learning results become better. This fact is underlined by different scientific studies in the context of entertainment and learning environments. Moreover, this trend of developing story-based applications and narrative user interfaces currently reaches traditionally form-based user interfaces such as SAP reporting software.

Fig. 3 : "Curve of suspense in Digital Storytelling"

Figure 3 exemplarily shows a curve of suspense: Similar to a hollywood film or a play in a theatre, the story starts with an exhibition, tension is rising up to the climax of the play before the denouement ends the story. Adapted to the DinoHunter scenario, visitors such as pupils of a school class enter a museum, come to a reception desk, get same game-based tasks and an introduction of a story (for example packed into a Dino Rallye within a 3D-Puzzle), then they start their individual museum tour, visit the different artefacts of the exhibition, search for special objects and information and interact with the artefacts respectively info terminals around the artefacts with their mobile companions. As soon as they have found achieved information, they get an award and have the chance to acquire further information. This is similar to computer games with level concepts (solving a problem in level 1 opens the door for level 2…). On the other hand, opposite to computer games, users can't loose a story. Instead, they get more information about individual artefacts and subsequently later on have more experience and knowledge about specific dinosaurs or the palaeontologic work, whereas other pupils are more interested in collecting as much information (e.g. bones of skeletons) as possible in a short time. Thus, these pupils finally get a more realistic view of their own dinosaur, but have less knowledge referring to other aspects. This difficulty directly leads over to methodic-didactic aspects. For example, pedagogues have the decision, which learning goals are more important than others. These learning goals and learning facts influence the methodic-didactic part of the story and the underlying story model.

Referring to the integration of these didactic aspects teachers can use an authoring environment of DinoHunter and personalize the visit of their school class corresponding

to the curriculum relevant to their school form and grade. On the other hand, the same multi-faceted authoring environment could be used by museum staff in order to enter scientific information about dinosaurs (interest of palaentologists) or to accentuate special artefacts (highlight of a museum, sponsorship – interest of marketing department). Referring to this conflict potential, storyteller and interaction designer establish basic story models and story frameworks in collaboration with those other groups and later on, individual users or visitors groups (respectively a teacher who prepares a museum visit) build their own instance of the story.

Improving and supporting learning within the museum

In general the momuna (mobile museum navigator)- concept, integrated as the basis of DinoHunter, developed by fact-based user interface methods, supports the whole three learning phases: preprocessing, learning process (interaction, transaction while visitation) and the postprocessing. During the visitation the highly interactive and integrated media system containing databases, desktop applications, mobile devices like the momuna.companions and kiosksystems, such as IZA (tangible information kiosk) transfers the knowledge within an exhibition by their artefacts. The visitors equipment, the mobile companion is one basic component of DinoHunter and offers the story driven rallye, within special hints and tasks to special artefacts and information-kiosks (like the DinoSim application, see Chapter 4). As already mentioned in 2.2 Digital Storytelling is one main and important form to interact and to provide the content containing the pedagogic aspect: follow content driven learning goals by a story without loosing and failures.

DinoHunter offers a wide range of more suggestive functions and possibilities for pedagogues and the learning cycle. That means that the users, for example pupils, have to use both parts of their brains (analog/digital) and have to use all their senses by interacting with auditive and visual content delivered by the digital devices, feeling the haptic of the artefacts (for example the structure of the surface of fossils or models) etc. Several kinds of “intelligences” will be trained like, the cognitive, social (for example by solving their tasks in a collaborative way) and emotional intelligence. Another point is, that the concept

follows the awareness of the different steps of memorizing between the short- and long-term memory and the awareness of the fact what we keep in mind: only 10% of the things we read, 20% of the things we hear, 30% of the things we see, 70% ot the things we say and 90% of the things we do by ourself.

DinoHunter, it´s basis-concept momuna and the aspects of Digital Storytelling and fact-based User Centred Design, contains a lot of tools to improve learning within the museum. For example in the postprocessing phase the museum can optimize their exhibition and information-materials for the teachers by proving the quality with automated evaluation and monitoring functions. During the visitation the users dive into a highly collaborative and communicative environment (e.g. social competence), getting information by interacting within the story driven visitation, have multimodal access by different kinds of interaction, information presentation (AR/VR, Visualization, Audio, Video) and User Interfaces (Haptical, Auditive, Graphical, Gesture Based and Solid UIs). The users have the possibilities to use implemented instruments for postprocessing and later learning activities, such as context-sensitive shopping of related materials. So, in the postprocessing phase they get their individual material on demand produced by using the memorize-function (see figure 4), personalized info brochures, 3D or touchable models of an artefact or their chosen products from the shop, like books, CD-ROMs or videotapes.

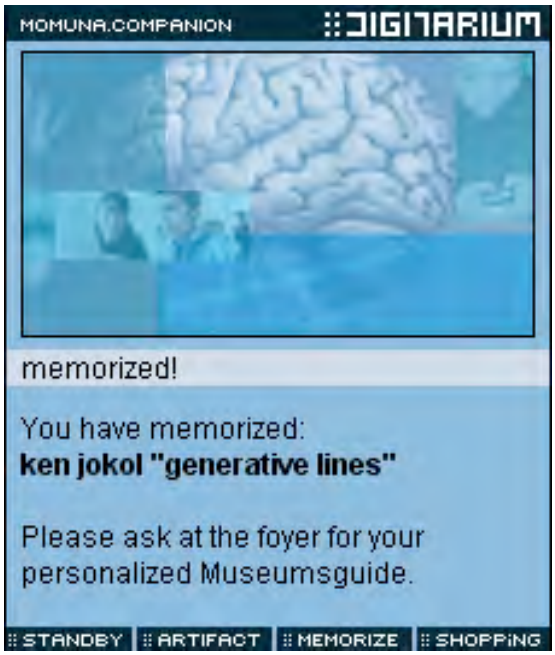

Fig. 4 : "Memorize (Digitarium momuna)"

Marketing and Financial Components

Within the museums-context often the question of money drives the decisions. Sure, new and innovative technologies, multimedia kiosks, mobile systems or immersive information presentations, like AR/VR are interesting and impressive marketing aspect for museums and help them in public relations for getting new visitors. DinoHunter goes some steps forward and contains instruments with functions and tools implemented to prove and enhance the quality of such applications and appliances while using, to prove the quality of the exhibition and of the whole investment by evaluation of demographic data, user monitoring and the exhibition usage. DinoHunter delivers directly possibilities for supporting a fast Return on Investment for example by cheap multiple usage of existing content, by functions to automated creation of materials like brochures, books, posters, 3D-Models or tangible informations and by the implemented functions of the shopping-module.

User Centered Interface Concepts

Different kinds of goals must be followed, supported by a wide range of methods and procedure-models, during the whole User Centred Interface development. The design of interaction principles and User Interfaces are more then beautification, are more then “nice” graphics, more then 3D graphics (AR/VR) more then informative auditive speeches or more then the technical software-ergonomics. The general product concept, the organization and architecture of information, the hierarchy and structures of functions, cognitive sciences, usability and user experience attributes have to focus the user, his knowledge, his tasks, his psychological and physical conditions, his surroundings, and his situative context and let the user be the centre in the conceptual and design process and let the technology move into the background.

In the museums context a lot of target groups, like school-classes, elderly people, middle-aged visitors, the museum staff or handicapped people influences the different kinds of access by multimodal User Interfaces and the aspects of information, content, functionality, accessibility or aesthetically pleasing. To center the user in the development process of user interface concepts the integration of them during the whole process is

inescapable to know und understand the user. For example the ion2s fact based UI method Kids Innovation point out the needs and wants of the young target group and build up a common knowledge by permanent interactions between the project group (e.g. UI designer, concept, didactic, technicians), partners (e.g. museums) and the kids as full members. The results are the requirements, tasks and the "do´s and don't´s" in designing the information and the user interfaces.

At the optimal case during the whole development process exactly the user related aspects let decide the UI conceptionist and designer what kind of devices we have to use in the media system and then what specifications and characteristics must have the user interface we have to design. That means that the Graphical User Interface with a WIMP-Interface (Windows, Icon, Mouse, Pointer) can´t be the only one solution. Multimodality is the keyword and offers for wide user-groups access and interaction by different kinds of user interfaces like Auditive UIs, Gesture Based UIs, Solid UIs, Command Line Interfaces, Conversational Narrative UIs or Transforming User Interfaces. This is the background why DinoHunter is a moduled media system which is so flexible in combining the different UIs, applications and devices.

In the last few years some more aims are upcoming besides the well-known and more technical usability goals – the user experience goals. These goals are more subjective and emotional then the normally easy measurable usability facts. Two charateristics of experiences are (and there we agree with Nathan Shedroff) not always digital and they "compete for attention, not technology or media". That means for the concept and design of digital appliances in the museums-context and of immersive learning environments that not only the technical devices are the important things but the suggestive combination of the real artefacts of the exhibition and the content driven entertainment applications. The listing gives an overview and comparison of common usability (usability engineering) and user experience goals.

Usability Goals	User Experience Goals
Accessibility	Aesthetically Pleasing
Attitude	Emotional
Effectiviness	Emotionally Fulfilment
Efficiency	Enjoyable
Flexibility	Entertaining
Learnability	Full Sensory
Memorability	Fun
Rate of errors by users	Helpful
Retention overtime	Meaningful
Safety	Motivating
Speed of performance	Multidimensional
Subjective Satisfaction	Rewarding
Time to learn	Satisfying
Utility	Supportive of Creativity
	Valuable (in terms of time and money)
	Very often interactive

Cognitive sciences, usability and user experience goals and the use of the related methods and process-models are combined in fact-based User Centred Interface development and let a pool of applications and devices become an integrated and intelligent media system like DinoHunter directly supporting, enjoying, inspiring and satisfying the different kind of users.

Interaction with AR/VR technology and mobile devices

The idea is to realize a mobile edutainment application for museums, designed for the game- and adventure-oriented mediation of educational material with spatially dispersed exhibits. Visitors of the exhibition can form groups and exchange information. As already mentioned the visitors get their mobile device. Aided by mixed reality technologies, additional information is cross-faded with museum exhibits on the mobile companion. To realize such a Mixed Reality application some features have to be implemented (see figure 5).

Fig. 5 : "DinoHunter mobile collaborative AR Application"

Augmented Reality and tracking technology:

Via a camera attached to the device, the surroundings are recorded and augmented with virtual components. The goal is to use the mobile device in order to superimpose virtual muscles, organs or skin on a dinosaur skeleton. Thus, dinosaur's movements are simulated by animated virtual models.

Interaction:

Realistic interaction types such as selection, alteration or recording of a virtual object, i.e. a dinosaur bone, could support users in a collaborative scene with shared tasks. For example the collective construction of a skeleton, by way of a pen-like instrument or a virtual laser pointer for 3D interaction. Alternatively a simple interaction like selecting a virtual object by clicking on its position on a PDA is conceivable.

Multi User Collaboration:

Individual users are enabled to communicate with other group members and pass along tips for completing the task. Alterations in the collaborative scene as a result of interaction would be passed along to all members of the collaborative group and displayed on their devices via a visualization component. Information required for the collaboration (e.g. concerning the manipulation of virtual objects) would be transmitted in real time over a cooperative and a central component. Subsequently, all group members obtain a uniform view of the augmented world.

Positioning:

To adapt information to the users context all users are tracked. Their position will be sent to the server and user and situation dependant information can be sent back. This aspect can be used to submit specific information to a user while standing in front of an exhibit. A localisation of a person could be realised with different positioning systems like positioning in wireless local area networks with help of access points, an Active Badge System, IrDA Beacon or simply scanning the barcode of an exhibit.

Storytelling:

A storytelling component helps to include a story as a medium to create curiosity and motivation and to convey the teaching material of the museum at the same time. Applications influencing further development, such as the storytelling component, can be linked via the collaborative components and thereby alter virtual objects themselves. Users interested in a collaborative group can register dynamically at any time. Upon registering, a system request is initiated for the position and orientation of the virtual objects in the collaborative scene to be passed on to the new user. The initialization of the objects occurs at system start of the new client with the current system parameters.

Due to the marginal performance of processors utilized in small mobile devices, it is useful to relocate the augmentation to the server. The camera image is grabbed by the mobile device and sent to another computer, where the superimposition and rendering occur. The augmented image is subsequently sent back to the mobile end device and visualized.

Designing User Interfaces for mobile systems

The DinoHunter Scenario comprised videoprojection, flexible kiosksystems and mobile devices to build up the entertainment and learning environment for the visitor of the museums exhibition. As already mentioned in 2.5 the surroundings, their characteristics and the situative context are the basis for the requirements of user interfaces. Especially these aspects are interesting for the user in the museum and his situation. The

surroundings are changing, for example reflections on the screen, the volume of noise and the main locus of attention at the artefacts can disrupt the interaction with the digital appliances.

The main difference between the mobile situation of mobile devices and kiosks is the possibility to move with the digital companion. That means that the situative context and the environment variables are permanent changing, other tasks and interest are upcoming and normally the mobiles are used additionally. That requires the focus on the development of Minimal AttentionUser Interfaces (MAUI). Standard Personal Digital Assistants (PDA) normally provides for interaction a broad mixture of hard-/softkeys and Auditive, Gesture Based (Pen Based) and Small Graphical In- and Output. All these User Interfaces support a various access to the content but can complicate the usage of them. The result of complex user interfaces is demotivating and unsatisfying the visitor, especially users with little media competence. Another requirement for designing Mobile System User Interfaces for museum visitors is that they often use such appliances for the first time and only in a short timeframe like for one or two hours.

Because of that we decided to reduce the user interface components for the mobile module of DinoHunter (the kids and pupils game based mixed reality puzzle). The input and interaction mechanisms of standard PDAs are now combined in the graphical and auditive output and the reduction into four main functions mapped on the four softkeys (see figure 6).

Fig. 6 : “Simple UI-reduction (DinoHunter)”

In the optimal scenario we enhance the interaction by tracking the user movements and offer a naturally interaction by motion based interfaces in a very easy and intuitive way to the visitor.

Fig. 7 : "VR-Simulation of DinoHunter"

Dinohunter application Modules

All the aspects, concepts and methods mentioned above are integrated into various DinoHunter application scenarios. Apart from the DinoExplorer scenario (see figure 7), two major applications of this DinoHunter series are DinoTalk and DinoSim, see figures 8 and 9.

DinoExplorer:

The basic idea of DinoExplorer is the establishment of an electronic reproduction of a museum. Starting with an architectural model, the museum is rebuilt as a virtual 3D model. Then, the most significant artifacts are modelled and animated. This animation enables virtual users to interact with the artifacts and get an dynamic impression of inosaurs and their behaviour, for example how do they breath, where are bones and muscles of the dinosaurs located of get further information about the vasolidation of dinosaurs. Further on, DinoExplorer enables teachers to prepare their individual museum visit or enable users (e.g. ill pupils) to visit the museum at a website.

DinoTalk:

DinoTalk is based on a knowledge-based system in Eliza-style enabling visitors to chat with the dinosaur and ask different questions such as "What's your name", "How old are

you?" or "What's your weight, size..?". These questions are sent to the knowledge base and the run-time system generates speech output using text-to-speech software (Embrola). In addition to this question-answer game, the dinosaurs provide some kind of emotions such as sadness, happiness or fun. Thus, if the user asks a bad question like "Do you have a girl-friend?" the dinosaur becomes sad, the speech goes down and the facial expressions characterize sadness.

Fig. 8 : "DinoTalk"

DinoSim:

The idea of DinoSim is to dynamically visualize both characteristics and behaviour of dinosaurs. In addition to DinoExplorer, here dinosaurs are integrated within a special environment where the dinosaurs are walking around, where they find a place to sleep or meet other dinosaurs. These animations of dinosaurs are based on scientific background and are produced in strong collaboration with experts in the field of palaentology.

Fig. 9 : "DinoSim"

Within DinoHunter a lot of applications, like DinoTalk or DinoSim are directly integrated, nearly the same as artefacts, within the exhibition. Another second focus of the Media System is to create easy applications for multiple usage of developed content (e.g. VR-Models). Examples are the DinoTriple or Memory-Game DinoMemo which can be played on an easy multimeda kiosk or bought on a CD-ROM.

The third and very important direction of the DinoHunter scenario is to support all user groups in all three phases (pre, visit, post) of a museums visitation by orientation, navigation, communication, evaluation, monitoring and shopping components. The flexibility of the combination of all the modules is the most interesting aspect. In the next part we want to describe some applications and functions besides the AR/VR-Modules for the museum staff (supervisors and museums-shop) and the visitors by an easy scenario. It reduces the full momuna-scenario to a cheap and technological easy arrangement with a central web based server with interfaces to existing databases, desktop-pcs, mobile companions and barcode-scanners.

We call it the “Walkaround-Scenario”, enhanced by the “Context-Sensitive-Shopping”-module and supported by partly-online technology and internet-applications. One visitor wants to explore the museum in an interesting and immersive way. For evaluation and personalization the museums employee has to personalize the mobile companion for later activities at the desktop application by synchronizing the demographic data of the user and the application-scenario (see figure 10, 11). The mobile companion is combined with a mobile barcode-scanner. This is the easiest and cheapest way to identify the exhibitions artefacts, DinoHunter-Kiosksystems and the users position by scanning simple barcodes. Every barcode includes information about the artefact and the user´s position.

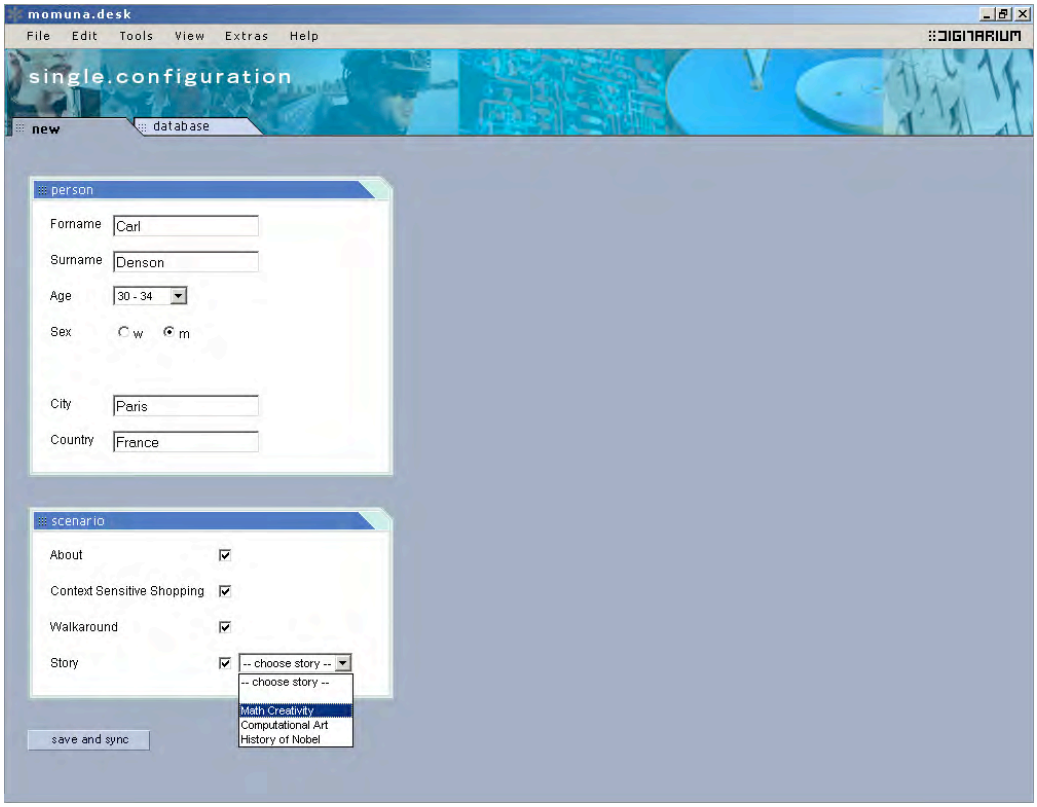

Fig. 10 : "Individual Configuration (Digitarium momuna)"

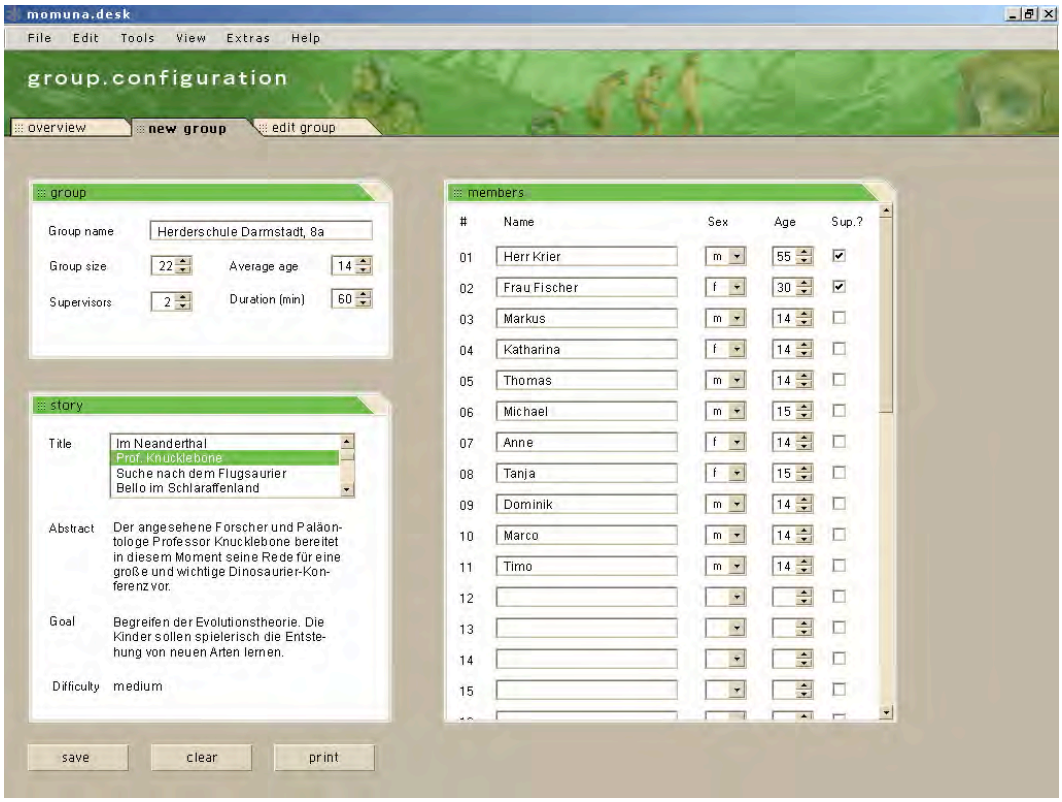

Fig. 11 : "Group Configuration (DinoHunter)"

Navigation:

By positioning and simple search-functionalities you can look up different points of interest and then you can activate the navigation component which shows your last position and the right way.

Fig. 12 : "Navigation (Positioning in DinoHunter)"

Information and memorization:

After scanning the barcode you get your own position or additional informations about the artefact, for example simple videomaterials. If you are interested in this artefact you use

the one-step memorize-function. This stores the users individual point of interests for later information materials (on demand) after the visitation.

Context-Sensitive-Shopping:

The mobile application is brought into a context, related to the scanned barcode including its informations. That offers the possibility for a direct access into the context driven museums-eShop (see figure 13, 14) without loosing the current point of interest or mentally getting out of the exhibition by browsing in the shopping-system. On one hand this function is very interesting for the museum itself (e.g. Return of Investment) or for buying media for school-courses. After adding the products in the shopping list by a simple interaction and the easy synchronization of the mobile companion the user can directly get his products in the museums-shop.

Fig. 13 : "Context-Sensitive-Shopping (Digitarium momuna)"

Fig. 14 : "Confirmation (Digitarium momuna)"

Evaluation:

The orientation, information, memorizing and shopping functions motivate the user to scan the barcodes and to give the usage-information to the museum. While using the mobile devices time-steps will be set and combined with positions and the three steps of the interest in one artefact (scanning, memorizing, context-sensitive-shopping), see figures 4 and 13.

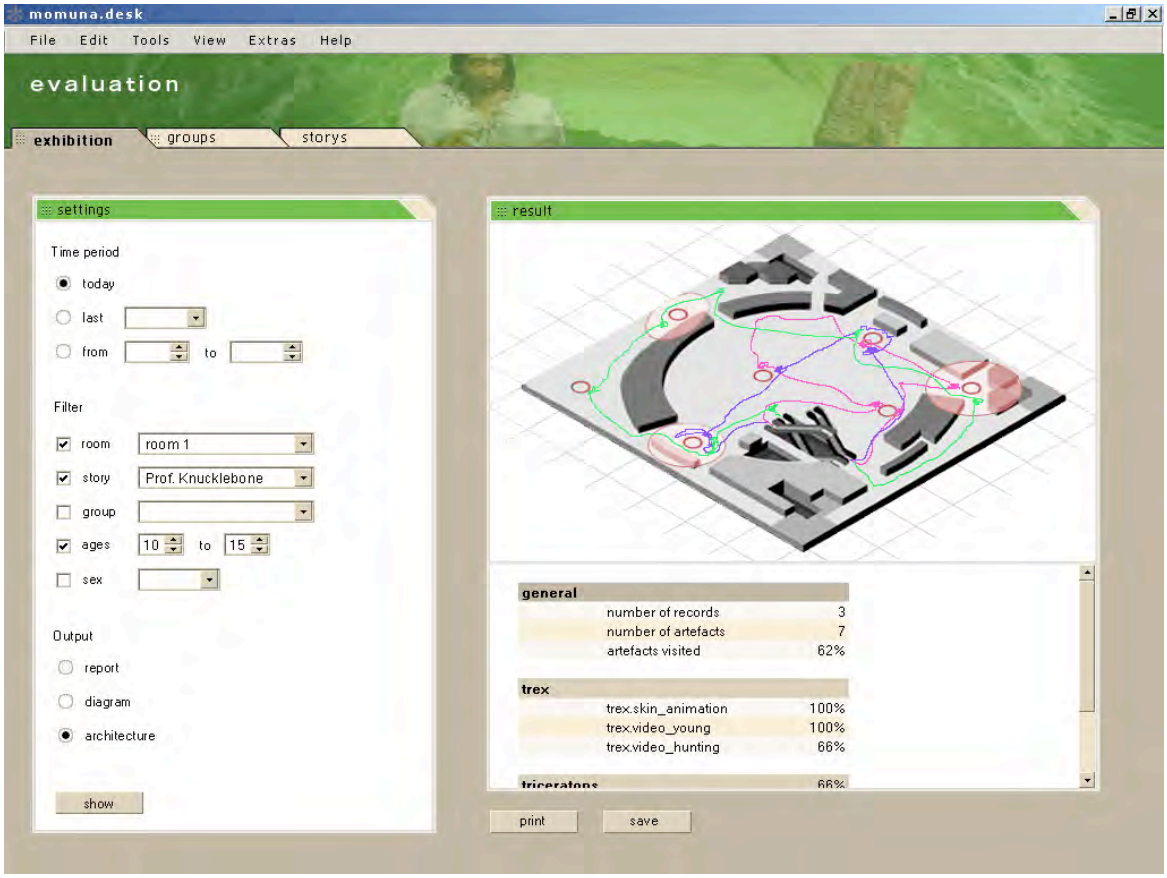

Fig. 15 : “Evaluation-Screen (DinoHunter)”

The advanced Walkaround-Scenario, enhanced by currently-online technologies, such as W-LAN or Bluetooth, integrates more exact tracking and evaluation tools and the communication-modules to let the individual visitor chat between themselves or to chat with users logged in the museum´s website. Other advanced functionalitiy is the integration of the interaction (after scanning a barcode) with a Chatbot, like DinoTalk.

The example of DinoHunter shows how complex the range of possible applications, digital devices and technologies in the museums context can be, but shows how easy you can build up an integrated suggestive media system and digital learning environment with multimodal access for each kind of user groups by the intelligent combination of its modules.

Resume

These Experience Appliances, with their Multimodal User Interface Principles, their basic technologies such as Mixed Reality Components and their intelligent and flexible Concept, based on methods of Digital Storytelling (ZGDV e.V.) and the ion2s fact based User Interface development methods, like Kids Innovation, can be transferred and transformed for different kinds of topics. DinoHunter and it´s modules supports all user-groups within the museums context. The goal is to build up an immersive entertainment and learning environment for the visitors to dive into it and to offer suggestive instruments for evaluation, quality inspection, marketing, shopping and for additional services which can assist the whole activities within the learning cycle for museums visitations. Today DinoHunter focusses the palaeontology context and get its first experiences in natural science museums in Germany. The first feedbacks show that it is easy to use existing databases within the DinoHunter scenario and that it is more then possible to transfer the Media System into other museums, like museums for art or history or to use it for large exhibitions. Modules of DinoHunter are really interesting for product presentations at trade fairs, as learning and training components, for example in the field of the aerospace industry or as evaluation or orientation tools for large shopping malls or theme parks.

Acknowledgements

Methods and concepts provided in this paper have been developed in collaboration between the department of Digital Storytelling at the Center for Computer Graphics and the user interaction specialists of ion2s - buero fuer interaction (engl. ion2s - office of interaction), both located in Darmstadt, Germany. Ion2s is responsible for Kids Innovation, momuna and Transforming User Interface. The digital storytelling department is responsible for the technical-oriented and storytelling aspects. Dino-Hunter is introduced as an integrated media system and product range based on intensive collaboration between the two institutions.

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