TUHH

Technical University Hamburg-Harburg
Department of Software Technology & Systems

Project work:

Migration from face-to-face SAP courses to eLearning

International Master Program
"Information and Media Technologies"

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Abstract

Training has always been an important topic for companies that feel the need of having their employees up-to-date in their working skills and to teach them how to work in accordance with company strategies. The usual way of solving these training needs is by face-to-face courses, led by subject matter experts in a classroom environment. This is a highly expensive technique due to time and place restrictions.

For these reason eLearning has become not only a topic of interest to solve every day training needs, but also a pillar for time and cost saving strategies in a company. The problem arrives when subject matter experts are forced to develop the eLearning courses, before subject matter experts had only to prepare some course material by using basic Office software, now they need some extra IT knowledge.

This project presents a solution for the subject matter experts of the PSYD (Procurement Services, Sub domain Processes & Systems) Department of Airbus Germany GmbH, to create their own eLearning courses for SAP, without significant investments in dedicated training and IT expertise.

For this project, an analysis of the eLearning requirements is done to come out with a check list that could help to analyze the authoring tools offered in the market and to find the one that best fits the eLearning needs according to these requirements.

Afterwards, a structure that will define the concept for the eLearning courses to be developed at the PSYD department will be created; this structure will serve as a model to follow, being the core concept for future developments of eLearning courses.

Finally, a prototype based on the aforementioned model will be developed to help in the creation of the future eLearning courses, not only for SAP but also for other applications used in the company.

Preface

This report describes the project work that I developed from February to May 2004 as part of my studies during the 3rd semester at the Master program “Information and Media Technologies” in the STS (Software Technology Systems) department of the Technical University Hamburg-Harburg under the supervision of Prof. Dr. Joachim W. Schmidt and Research Assistant Rainer Marrone in cooperation with Multimedia Producer Hartmut Gau from STS TUHH and Ms. Felicitas Kaiser, System Analyst of the PSYD (Procurement Services, Sub domain Processes & Systems) department at Airbus Germany GmbH.
The project work is mandatory for every Master Student at the TUHH.

I have enjoyed writing this project because it gave me on the one hand an insight into the every day training needs of a big company like Airbus Deutschland GmbH, and on the other hand I got to know the wide variety of Authoring Tools in the market that can help in solving the Rapid eLearning necessities of a Company. The experience of developing a project for Airbus has enriched my personality, since I got the chance to be in a great international working environment where the employees are considered a major resource for the success of the Company.

This project work could not have been as fruitful as it was, without the support and interest of the University on this project, the inputs from individuals and their willingness to share their experience and knowledge, and the time given to discuss topics related to this project.

Hamburg, May 16th 2004

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1 Introduction

1.1 Background of the project

1.1.1 Airbus Germany GmbH

The Aerospace industry is a very critical area of manufacturing, because of the relevance of building products of high technology that has to guarantee 100% of reliability to the customer, since the customer has in his hands a big responsibility in human lives. The industry involves products of high aggregated value and technical advances.

In this industry, Airbus is the leader aircraft manufacturer based in Toulouse, France. It has 4 main subsidiaries, which are Airbus France, Airbus Deutschland, Airbus España and Airbus UK. Airbus employs around 50,000 people of over 50 nationalities. The plant in Hamburg has functions ranging from design and development to product management and customer service; Hamburg also delivers electrical power, electronics, hydraulics, air conditioning and water systems. It carries out static and dynamic testing and is the site of final assembly for the A318, the A319 and the A321 airplanes.

To go ahead in the future as a leader in its field, Airbus comes up with many strategies in different fields from technological until organizational.

As a transnational company, business success depends upon the close integration of all its subsidiaries in every business process throughout the supply chain, this is why Airbus is trying to make the barriers of geographical distances as invisible as possible. All this implies new strategies, which force employees to deal with new working procedures and even to develop new skills when dealing with software technologies. In particular, the Route 06 project aims to standardize by 2006 all processes across the subsidiaries in the different countries, where common tools are to be used, for example the Sup@irWorld tool which functions as common purchasing portal. To get to know new working procedures and how to apply them in software technologies like SAP R/3, Sup@irWorld modules, etc., there is the unavoidable need of training. In this context eLearning plays an important role, and the project described in this report ***is part of that effort.***

1.1.2 SAP R/3

The Systems, Applications and Products in Data Processing (SAP) AG with his product R/3 for client/server architectures, is a standard application software targeted to most industries and one of the most powerful and successful software products all over the world, because of its support to a large number of business functions, leaving room to adaptability to the specific needs of a company. It solves a big range of information management problems. Software like this is considered of importance to companies like Airbus, being used in most activities through the supply chain.

The Material Management modules of SAP R/3 are of great help to the PSYD department and support them in many of their work related activities. This means, that the employees of the PSYD department have the knowledge in purchasing features and material logistics of SAP R/3 and are the right people to teach and share the knowledge in the area, to other workers with purchasing activities in the company including employees from all categories, from technical to management positions, i.e. having different backgrounds, experiences and age.

1.1.3 Training and eLearning

According to research done by the American Society of Training and Development, it has been found that companies that reported improvements in business performance also reported a higher level of spending on training.

Training activities in Airbus have also been an important topic, since it is recognized the need to keep employees up-to-date in their working skills, as well as to teach them how to work in accordance with their strategies. Until now the usual way of solving these training needs has been by means of face-to-face courses, led by subject matter experts in a classroom environment. This is a very expensive technique due to time and place restrictions, many times subject matter experts even have to travel to subsidiaries in other countries to give courses. So it is not practical from an economic viewpoint to hold training events that must be physically attended by geographically dispersed employees every time that a change is made to a product or service. The costs of taking people out of their operational environment on a regular basis are simply too high.

But training expenses are not something to avoid for cost saving reasons, since it is known that there is a direct relationship between training investments and company performance. So this is when eLearning helps to fulfil the training needs reducing the typical costs resulting from time and place restrictions of face-to-face courses.

For this reason, eLearning is taking the attention of many companies and Airbus is not an exception. The challenge, however, revolves around how to rapidly create, update and distribute eLearning content in a cost-effective manner.

There are several authoring tools in the market that claim to make the process of developing eLearning courses the easiest thing to do, and produce eLearning content that is as varied in format as in function and appearance, some of them can publish content as HTML, XML and Java applets. So there is a hard work to do, to find the best authoring tool that best suits the particular needs out there in a crowded market.

1.1.4 PSYD Department

The Procurement Services, Sub domain Processes & Systems department of Airbus Germany is where my project takes place.

As main tasks they have the optimization of processes, online help support, reporting, administration of users and buyers profiles, consistency of material master data, administration of Material Master Data for Purchased Parts, which includes; standard parts, catalogue parts, equipment, raw material, indirect material. Besides many other activities, they supply the Material Master Data to dependent Systems like SAP R/3 taking into account their specific interface requirements.

They have close contact with SAP R/3 to implement new modules and adapt existing functions, a main recurrent activity is the user training for SAP R/3 and sourcing. So the employees of this department have helpful knowledge in the buying activities, and there is a need to share this knowledge across the company. To do this they give courses to other employees all over the company and even to subsidiaries outside Germany. They hold many courses related to Purchase, which involve SAP, that aim to solve every day working needs.

With time, eLearning courses become a more viable alternative to face-to-face courses, as part of a cost saving strategy that does not negatively impact the quality of training. Some time ago, they made a contract with another company so that they could develop this eLearning courses for them, but the experience out of it was not successful, instead they lost time and money for some product that was not of their total satisfaction, the PSYD department felt the need of making the courses on their own, to avoid depending on third persons every time there was the need of changes and updates for a course.

So the creation of eLearning courses will be another task to be added to the recurrent activities of the department. On the other hand, the demands of time and changes in procedures imply that the creation of these eLearning courses should be

as fast as possible and there should be not so much expertise in eLearning required for the development of the courses. This is why the PSYD department is looking for an authoring tool in the market that can solve their eLearning needs in a fast and easy way that could help them to develop their own eLearning concept.

Since the global strategies of the company rely (among others) on the application of cost saving strategies and knowledge sharing, the creation of eLearning courses is a valuable activity for the PSYD department.

1.2 Problem Statement

Getting to know the overview from the needs and actual state of the PSYD department is easy to understand their problem as following:

How is it possible to solve the everyday training needs of a transnational company through the development of eLearning courses, where subject matter experts do not wish to invest too much time in development?

2 Analysis

To solve the described problem in the previous chapter, authoring tools come into consideration; there should be some authoring tool that can help in the development of eLearning courses for the specific needs of the PSYD department.
But before starting the research, it was considered important to make an Analysis of the concrete requirements of the PSYD department, to get to know more about the profiles of the developers and targeted groups, with this knowledge it could be possible to know the kind of authoring tool that should be looked for, i.e. the features it should offer, the permissible complexity in learning the tool, development time, and many other factors, that could help to categorize the required authoring tool and to make a division of the market, so that research should be targeted into certain market sector and to save as much time as possible.

A working schedule was made to place Analysis, Design and Development activities to come out at the end with a concept of eLearning courses specific for the PSYD department requirements by the use of an Authoring tool that best fits these requirements. This paper describes how this problem was solved.

2.1 Objective of the eLearning courses in Airbus

Getting to know first the objectives of the eLearning courses helped me in finding out the requirements of the courses, for this purpose, my assistance to the face-to-face courses offered by the PSYD department, at the beginning of my project was of much importance, because this gave me the chance to get to know the content of the courses, the way these courses were structured and the targeted people.
A regular face-to-face course held by the PSYD department consists of:

No. of instructors per course: 1 to 2
No. of participants per course: 10 to 16
No. of days for a course: 2 to 3

Where the main activities are to show common use cases related with purchasing activities and concepts around them, for example: purchasing principles, types of suppliers, types of purchasing orders, how to create a purchasing order, how to show lists of suppliers, how to show statistics, etc.

Another way to find out the objectives was of course by talking to the people of the PSYD department. As a result, the following first characteristics of the courses where obtained:

❖ Content of the courses

The content of the courses has the main objective of showing specific use cases that employees find very often when dealing with purchasing activities in SAP R/3, for example:

- Show material master data
- Showing supplier information
- Show purchase requisition

In the face-to-face courses, these use cases are first introduced and then showed step by step in the computer, afterwards the teacher gives a task to be solved for the use case. The task has to be solved, following the same steps explained beforehand.
Sometimes, the explanation of some concepts related to the use cases is also important. This way it is easier to understand the procedures and solve the task. For example, to make a purchase, one has to know first some conventions about the types of purchase orders.

From this information, it can be concluded that the eLearning courses should offer **step-by-step simulations** where the user is not only able to see the way a use case is solved but also interact with the simulations and the **theory** to help in explaining some concepts and their importance.

❖ Opportune training

The courses take place around 4 times a year due to the fact that around 1130 employees have to deal sometimes with purchasing activities sooner or later in their work activities, others that have purchasing positions like Procurement Manager or Accounting clerk, so there is a big demand for courses. All these people have also to be trained when there are changes in the purchasing procedures.
This means that courses are **developed on demand** with the objective of training the employees in a timely and convenient way. Thus, these situations reflect the need of rapid development of courses in the order of days.

❖ Skill development

Because of the content of the courses, these are classified as Skill-based training, as content addresses learning how to use software packages or new product features. This aims to improve the job satisfaction, challenge the employees to learn more, get more involved in their jobs, and most important: work according the actual requirements of the company so that their work is done properly from the beginning.

❖ Targeted people

So what is the kind of employees that these courses target?

The eLearning courses aim to support the training of new employees to introduce them to the procedures they have to deal with and also to update the purchasing skills with SAP R/3 of experienced workers in the company, whenever there are changes in procedures.

2.2 Actors and Roles

The eLearning concept to be created affects mainly 2 groups of people: the future developers of the eLearning courses and the users of the courses.

❖ Developers

The developers of the eLearning courses are around 15 employees of the PSYD department, which have the most experience related to the purchasing procedures all over Germany. They deal with the logistics applications of SAP R/3, more specifically with the Material Management module, to manage the purchasing processes involved in the supply chain of goods.

❖ Course users

The courses are targeted to the clients of the PSYD department, which are divided into internal and external clients; together making a total of 1130 users that have different backgrounds from technical to management positions and from new to experienced employees.

The internal clients comprise employees of German procurement organizations as well as other German employees performing purchasing activities but not working for a procurement organization.

Location / Organization	Procurement			Customizing		Others	
	PAD	**PBD**	**PCD**	**BLO**	**BSO**	**Mxx**	**Others**
Hamburg	X	X	X	X	X	X	X
Bremen	X	X				X	X
Nordenham		X				X	X
Stade		X				X	X
Varel		X				X	X
Toulouse						X	

PAD Procurement Airframe structure Deutschland

PCD Procurement Equipment Deutschland (devices, engine of airplanes)

PBD Global Procurement Deutschland (good that are not for the airplanes)

BLO Cabin equipment components

BSO Single Aisle stand

Mxx Manufacturing

Others: Construction, Development, Testing, etc.

The external clients are different employees of EADS (European Aeronautic Defense and Space Company) and Airbus, which are integrated in purchasing work streams.

Location/Enterprises	Airbus			Subsidiaries			EADS	
	France	UK	Spain	MSC	KID	AIC	EFW	HQ
Toulouse	X							
Filton		X						
Madrid			X					
Hamburg				X				
Buxtehude					X			
Laupheim						X		
Dresden							X	
München								X

As seen from this information, they have clients in different countries and so they have to deal sometimes with different languages, this implies the creation of eLearning content in different languages.

2.3 eLearning requirements

The second analysis step was to get to know the desired characteristics of the eLearning courses, in other words, which technical features should the eLearning courses offer according to the wishes of the department. These requirements helped me to have a checklist and start looking for the most convenient authoring tool. The gathered requirements are here listed from most to least important:

2.3.1 Simulations

As a result of attending the face-to-face courses at the beginning of my project I came to the conclusion that simulations are one of the most important requirements, which was later corroborated by those in charge in the department. The courses aim to show in a step-by-step fashion how to use SAP or another application. Therefore, the authoring tool should offer **screen recording features** that allow the creation of step-by-step movies as a result of the recording actions while using an application, including mouse movements and keyboard activity. Since this is an important requirement because that is the way most of the content of the eLearning courses will be created, it should be expected from the authoring tool, as much flexibility in recording as possible. For example it should be possible to **customize the recording window size,** especially for an application like SAP R/3 where the complexity of the interface provides so much information at a time.

2.3.2 Media synchronization – Special effects

It should be possible to present the content of the eLearning courses with different **editable media object**s like text, graphics, video and animations in an integrated synchronized way.

For example, the developer should be given the opportunity to add media objects to the simulation and to define their order of appearance and timing properties with the objective of controlling the flow of information, preserving the temporal relationships among the different media, focusing on important points and adding interest to the course. The authoring tool then should offer multimedia features that allow editing the simulations to enrich the content of the eLearning courses.

2.3.3 Accessibility

Is also required that the courses be reachable via a Standard **Browser** from the corporate **network**, thus minimizing the Total Cost of Ownership (TCO) of the proposed solution (by avoiding the support costs associated to locally-installed fat client software).

2.3.4 Interactivity

Most of the time it is very useful for the user, for understanding purposes, to interact with the simulations and not just watch a movie. This allows the user to solve real world tasks without having to interact directly with the real application. Learning by practice is more engaging for the user.

For this reason the eLearning courses should offer interactivity within the simulated applications, implying that the authoring tool should provide **widgets (GUI elements) for interactivity** purposes, like buttons, text entry boxes, etc.

From these requirements, I considered of relevance that there should be the possibility of **branching** so that the content can be customized according to the response of the user. For example, upon success or failure at a task, the lesson should be able to branch to the next appropriate content based on the user response.

For this interactivity context, feedback is considered also important for the user to enhance the learning process and as a complementary functionality for branching, so that there is feedback according to the user's responses. **Feedback captions** should then be offered as a feature in the authoring tool. These can help for example: To offer hints about the correct action or answer, prompt the user to try again, offer praise for correct answers.

2.3.5 Quizzes

Sometimes it is also needed that the users of the eLearning courses have the possibility of answering questions to help in learning definitions, procedures and basic principles that are needed when solving the problems. For these reason the authoring tool should offer quiz functionality with multiple kinds of quizzes like multiple choice, true/false, etc.

2.3.6 Score Tracking

At the moment this is not a primary requirement but still a characteristic that the authoring tools should offer, because the eLearning courses should also offer tests, so that the user is able to make a self-inspection of its abilities. It is also considered that in the future, might be the need of tracking the scores of the user for controlling purposes.

These controlling purposes demand the use of a Learning Management System (LMS), where the scoring information can be stored and assigned to a user. To make this possible, the authoring tool should be **SCORM/AICC compliant**, this means, the scoring data could be exported in SCORM or AICC compliant format to

the LMS. The authoring tool should be able to create an XML file as output, which is required by the LMS to interpret the scoring data.

2.3.7 Standardized look&feel

The eLearning courses should have a standardized look&feel to keep a comfortable yet formal interface. To help to realize this requirement, the authoring tool should offer **template** facilities to allow defining major project characteristics, like backgrounds, caption styles, etc. This could not only help in standardization but also to speed up the development of the courses.

2.3.8 Export of texts

The eLearning courses should be developed in the 4 official languages of Airbus (French, English, Spanish and German). To make this process easier, the authoring tool should offer **exporting capabilities**, so that all the text captions inside the course can be exported to a Word document to be later translated.

Audio is not required, since the explanations of the eLearning course are thought to rely on movies and texts. Besides sound is out of place in an office environment where there is people around that want to remain concentrated in their work, so it should be possible for someone who does not own earphones to understand the course.

As a summary of the above information, Table 1 shows the desired characteristics of the eLearning courses and Table 2 lists the technical features to look for in the authoring tool.

Table 1: Desired Characteristics of the eLearning courses

Content:	1. Software simulations
	2. Special effects
	3. Interactivity
	4. Quizzes
	5. Standardized look-and-feel
Output:	6. Score tracking
Accessibility:	7. Reachable via Browser
Others:	8. Rapid development (in days)
	9. Available in different languages

2.3.9 Features check list

Table 2: Technical features to be found in the Authoring tool

Content:	1. Screen Recording features
	2. Customisable Recording Window Size
	3. Special effects
	4. Editable media objects
	5. Widgets for interactivity
	6. Branching
	7. Feedback captions
	8. Quizzes
	9. Templates
Output:	10. Score tracking
	11. SCORM Compliance
	12. AICC Compliance
	13. Exporting content to text files
Accessibility:	14. Accesible via Browser

2.4 Authoring tools

Once a better overview of the requirements of the PSYD department was achieved, the market research started. The information gathered previously, helped me to understand that I had to look for an authoring tool that allowed the development of a Rapid eLearning solution (REL). By Rapid eLearning it is understood material that streamlines learning by focusing on immediate and specific business training needs, thus accelerating and simplifying the training process by using online technology, software applications and common business tools.

This way it was easier to discard many tools in the market that are more oriented towards creating courses for certification programs (such as Microsoft Certified System Engineer, etc), which demand more time in learning and developing.

Here I present an overview of the authoring tools that were considered as candidates for solving the PSYD department needs. These tools were chosen because of their Rapid eLearning capabilities and also because they seemed at a first glance to fulfill the eLearning requirements of the department. For each of the tools, I first present a checklist showing the requirements they fulfill, afterwards an overview of the tool and its authoring characteristics are presented.

2.4.1 Breeze

Requirements to fulfil		
Content:	1. Screen Recording features	No
	2. Customisable Recording Window Size	No
	3. Special effects	Yes (Power Point function)
	4. Editable media objects	Yes (Power Point function)
	5. Widgets for interactivity	Yes (Power Point function)
	6. Branching	Yes (Power Point function)
	7. Feedback captions	No
	8. Quizzes	Yes
	9. Templates	Yes (Power Point function)
Output:	10. Score tracking	Yes (for Quizzes)
	11. SCORM Compliance	Yes
	12. AICC Compliance	Yes
	13. Exporting content to text files	Yes (Power Point function)
Accessibility:	14. Accesible via Browser	Yes (with Flash plug-in)

Overview

This is a Macromedia, Inc. product, which is specialized in web communication, training and online-meetings. Breeze uses Power Point as the tool for the content development of eLearning courses; it can be seen as a plug-in for Power Point that enables the export of the Power Point presentations to Flash files. The advantage of this tool is that it is possible to create rapid eLearning products due to the widespread knowledge of Power Point plus some extra multimedia capabilities (like audio recording and synchronized animations) as well as quizzes that can be tracked and managed.

The eLearning content produced by Breeze can be accessed using a Flash-enabled browser. There is also a navigation panel that is automatically inserted into the presentations, so that the user is able to navigate through the courses as he wishes.

Breeze contains several modules, which can be deployed individually, so there is the possibility of purchasing only the Breeze modules that best suits the customer's needs. These modules are:

- Breeze Live used for Web Conferencing.
- Breeze Presentation that enables the recording of voice to narrate Power Point presentations so that they can be delivered through a Browser in a Flash format.

- Breeze Training used for administering accounts, setting up users, groups, courses (where the content of the courses are the presentations produced with the Breeze Presentation module) and permissions to the courses.

Authoring environment

Authoring interface type

- Power Point

Most of the content creation of the courses is done in Power Point, where the texts, images and animations are prepared.

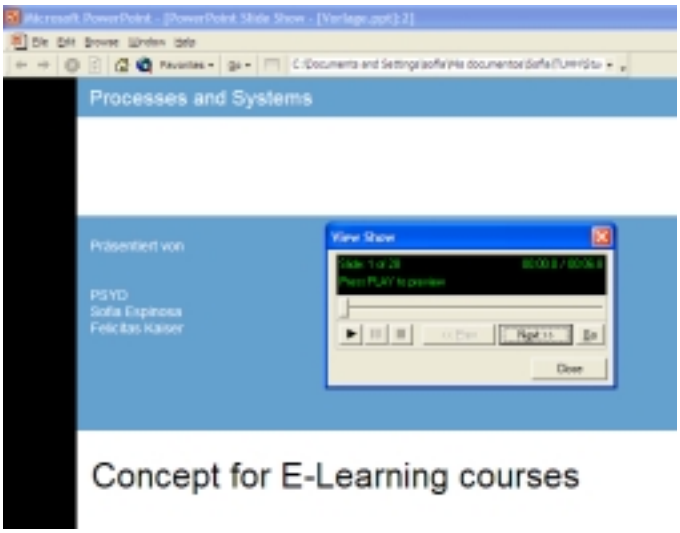
- Wizards

There is a wizard that helps in each step required to complete the online presentation that is to be animated and published, there is also a wizard that helps in creating quizzes whose results can later be tracked for learning management purposes.

Components of the authoring system

- Audio editor

This tool permits the edition of the audio files that are related to each of the slides in the Power Point file, where you can copy, delete, insert silence and recording in between and set volume properties.

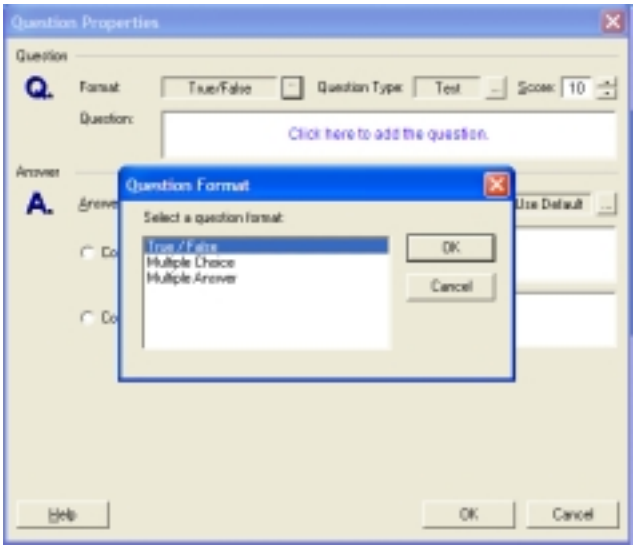


- View Show

This is a player that allows previewing the generated presentation and checking the performance in timing and animation. It contains a set of buttons that help in the preview process, like play, pause, stop, previous and next.

- Publisher

This is a wizard that enables the conversion of the Power Point files to a Flash file.



- Quiz manager

There is a wizard that permits the user to add quizzes to the Power Point presentation, where the questions can be scored or not (to differentiate between Quizzes and Surveys). Three types of questions are available: multiple choice, True/False and Multiple answer. The quiz manager gives an overview of the quizzes existing in the presentation so that you can add or delete the existing quizzes.

Besides these authoring components there are others components, that form part of the Training and Live modules, they allow:

- Administration of the presentations within a library.
- Control of accesses and permissions to presentations.
- User administration.
- Reporting on courses, students and test results.
- Live meetings using different types of media like PowerPoint presentations, digital video, Flash documents and simulations.

Description of the authoring process

1. The author begins the development process by creating a Power Point presentation, where the presentation should be entirely prepared with the corresponding animation effects (Power Point effects).

2. As a next step (and before recording the narrations), it is recommended to write a script for every slide, this way the recording process will be much easier. The scripts can be written and assigned to every slide in the “Record Narration” window, this way the scripts of the corresponding slide are shown during the recording process, so that the user can read them.

3. The next step is the recording of narrations for every desired slide in the Power Point presentation, for this purpose the Recording utility will first try to set the level of the microphone, once the level is set, the “Record Narration” window will appear to guide you through the narration process by using playback controls and the microphone.

4. After the recording process, the resulting presentation with the narrations should be previewed to determine the timings for each slide.

5. To change the timing of each slide, the Audio Edition tool comes into play, where you can add new recording in between, add silence to the slide, so that the timing of the slide can increase.

6. Afterwards it is possible to add quizzes with a wizard that will guide step by step the process of defining the properties of the quiz, e.g. the kind of actions to take after answering, results to show after the quiz and how to navigate through the quiz slides.

7. Write the questions for the quizzes, completing a form where the questions and their format, corresponding correct answer(s), feedback and scores are assigned.

8. When the content is ready for deployment, the Power Point file can be converted to an online presentation using the Publishing tool, which uploads the presentation to a hosted service offered by Macromedia Breeze. You have to login into Macromedia Publisher, to enter into the account library.

9. Once in the account library, the next step consists in selecting the location of the presentation in an archive system, where the presentation is to be kept. Then some metadata will be asked, like Title of the presentation, Summary, Information of the Author, Outline with the Author's photo, etc.

10. Finally settings for user access are customized, where it is possible for example to define who can watch the presentation.

Authoring features

Rapid Development features

Beyond the entries listed in the table below, Breeze offers a wizard for guiding the user in creating an online presentation

Can use persistent navigational controls (without having to have a copy of them in each page)	Yes
Import utility for direct import of Microsoft Word content	Yes (Power Point function)
Has a library for reusable media objects	Yes
Can create and save your own templates	Yes (Power Point function)
Templates	Yes (Power Point function)

Development and formatting features

High level course view	Yes (Power Point function)
Quick preview function	Yes
Spell checker	Yes (Power Point function)
Branching scenarios	Yes (Power Point function)
Alignment tools for screen objects	Yes (Power Point function)
Spacing tools	Yes (Power Point function)
Pixel precise placement of objects (Grids)	Yes (Power Point function)
Built-in formatted rich text	Yes (Power Point function)
Synchronize time-based media objects	Yes (Power Point function)
Creation of hyperlinks to other URL	Yes (Power Point function)
Creation of hyperlinks to other pages within the course	Yes (Power Point function)
Can print content in hard copy	Yes (Power Point function)

Extensibility

Provides scripting language	Yes (Power Point function)
Ability to store content in a DB	Yes (Office function)

Assessment capabilities

Assessment capabilities are provide by a Quiz tool, which allows tracking the user abilities. This tool also provides feedback upon correct or incorrect answer. The resulting score can be exported to an AICC compliant Learning Management System. The offered questions may be of the following types:

- Multiple answer (more than one answer is correct)
- Multiple choice (only one correct answer)
- True/False

Built-in LMS features

The Breeze Training component offers LMS capabilities such as scheduling courses, inviting participants and tracking attendance, to obtain statistics. Users and their permissions can also be administered. Reports about courses, users and test results can also be obtained.

ELearning output

Output formats

The files produced with Breeze have the next format:

- Flash
- XML

Price

The Price is not public available and the requested pricing information was never answered.

2.4.2 Lecturnity 1.6

Requirements to fulfil		
Content:	1. Screen Recording features	Yes
	2. Customisable Recording Window Size	Yes
	3. Special effects	Yes
	4. Editable media objects	Yes
	5. Widgets for interactivity	No
	6. Branching	No
	7. Feedback captions	No
	8. Quizzes	No
	9. Templates	No
Output:	10. Score tracking	No
	11. SCORM Compliance	Yes
	12. AICC Compliance	Yes
	13. Exporting content to text files	No
Accessibility:	14. Accesible via Browser	Yes

Overview

Lecturnity is a product of imc AG, a company specialized in Learning solutions based in Saarbrücken, Germany. Lecturnity allows combining different media forms like audio, text, video, screen grabbing and annotations to produce a learning unit that is accessible via a Standard Browser. Lecturnity works on the principle of recording, so that the multimedia-based explanation is recorded synchronously on a time basis.

This tool is installed as a plug-in for Power Point (where most of the content is produced) and allows recording videos of the screen display, thus making possible the creation of software trainings with simulations. Still this feature has its limitations, since it's not possible to add interaction to the software simulations. The resulting files produced with Lecturnity show the content as a movie in .avi format, so no interaction is possible besides the player for the movie. The player can be the one offered by Lecturnity or any player for RealMedia or WindowsMedia formats.

Authoring environment

Authoring interface type

- Power Point

  Most of the content of the learning units is first done in Power Point, where texts, images and animations are created.

- Wizards

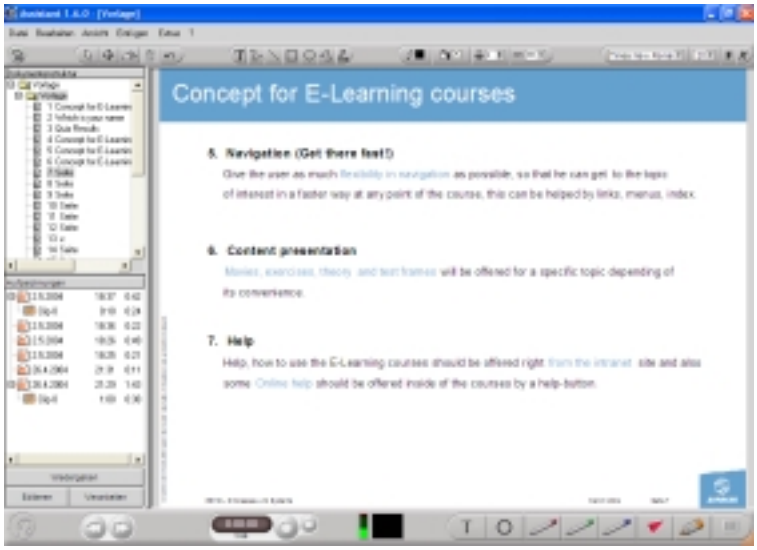
  There is a wizard that helps in transforming the presentation into a movie file.

- Toolbars

  There are a wide variety of toolbar objects that can be used to apply further changes to the Power Point presentation during recording time.

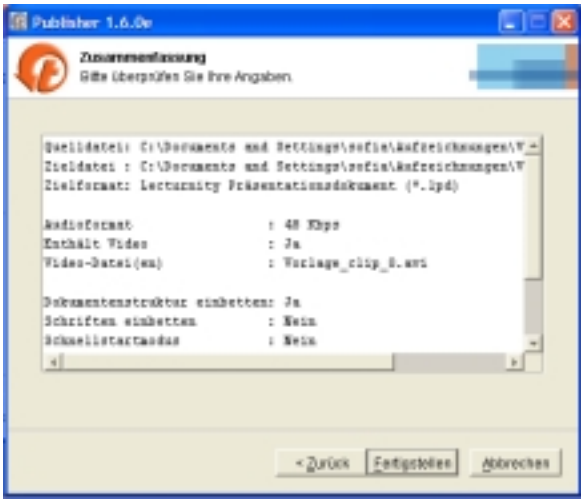
Components of the authoring system

- Assistant



The Asistant is a tool that helps to further edit the Power Point presentation and has the main purpose of recording the learning content. This component can be started directly from Power Point.

With this tool, the Power Point slides are recorded together with other media effects like text insertions, notes, drawings and screen grabbing.

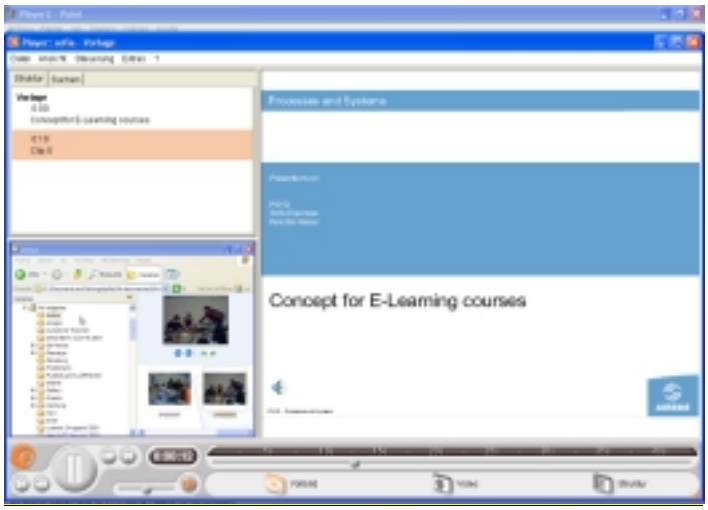


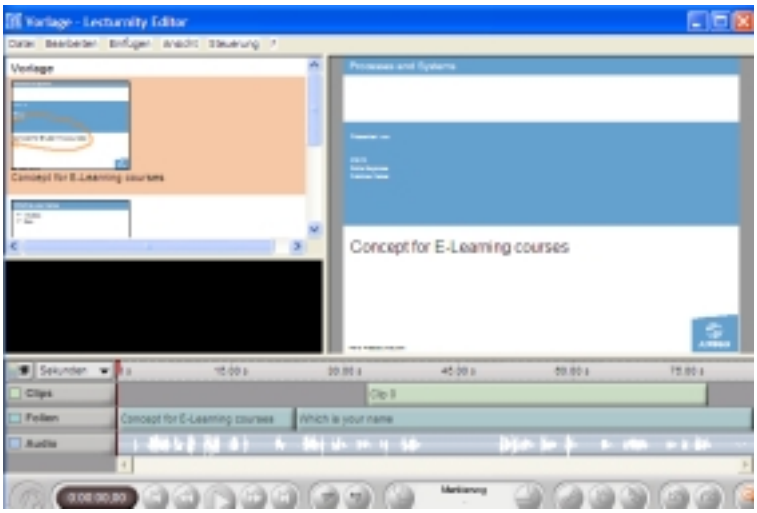
- Publisher

This is a wizard that helps in the conversion process from the presentation recorded in the Assistant to a movie file for RealMedia, WindowMedia players or to an .avi for the Lecturnity Player.

- Player

The produced learning content can be visualized through the player offered by Lecturnity, it provides easy navigation through a playback control and direct positioning in the whole content via content overview and thumbnails.





- Editor

Permits the edition of the content by offering different views of the project. It is possible to cut, copy and paste in the media. It is also possible to integrate different Lecturnity documents together, export and import videos and delete any object in the presentation. It has preview functionality for direct check of the editing operations.

Description of authoring process

1. The base of the eLearning content is prepared in PowerPoint, where the presentation should be entirely prepared with the corresponding animation effects.

2. The next step is to open the presentation directly from Power Point into the Lecturnity Assistant. From the Assistant, the presentation is recorded.

3. During the recording process the author can narrate the presentation and add text, figures (rectangles, circles, polygons), use markers and grab the screen. This is done for every slide in the presentation.

4. After recording, the next step is to convert the presentation using the Lecturnity Publisher wizard, where the .lrd document produced in the Assistant can be converted into one of 3 possible formats (RealMedia, WindowMedia, Lecturnity presentation document).

5. The presentation can be further edited through the Editor tool and the changes made can be then previewed with the use of the Lecturnity Player. After preview, the author can decide to make further changes and publish the project with the final changes.

Authoring features

Rapid Development features

Beyond the entries listed in the table below, Lecturnity offers a wizard for converting the presentation into a streaming media file.

Can use persistent navigational controls (without having to have a copy of them in each page)	Yes
Import utility for direct import of Microsoft Word content	No
Has a library for reusable media objects	No
Templates	No
Can create and save your own templates	No

Development and formatting features

High level course view	Yes
Quick preview function	Yes
Spell checker	No
Branching scenarios	No
Alignment tools for screen objects	No
Spacing tools	No
Pixel precise placement of objects (Grids)	Yes
Built-in formatted rich text	No
Synchronize time-based media objects	Yes
Creation of hyperlinks to other URL	No
Creation of hyperlinks to other pages within the course	No
Can print content in hard copy	No

Extensibility

Provides scripting language	Yes (Power Point function)
Ability to store content in a DB	No

Multilingual capabilities

The Lecturnity tool is available in the next languages:

- English
- German

Assessment capabilities

Lecturnity produces an .avi file, so there is no possibility of interaction with the file besides the movie playback offered by the Lecturnity player.

Built-in LMS features

Lecturnity has no LMS features.

ELearning output

Output formats

The files produced with Lecturnity may have the following formats:

To watch the presentation in RealPlayer:

- .ra Real Audio
- .rm Real Video
- .ram RealMedia metafile
- SMIL Multimedia Presentation
- HTML Document

To watch the presentation in WindowsMedia Player:

- .wmv
- .wax /.asx WindowsMedia Metafiles
- .wma Windows Media audio

To watch the presentation in the Lecturnity Player:

- .lrd Lecturnity Recording Document

  This file resulting from the recording process in the Lecturnity Assitant, which is composed of several data files, it does not contain any Thumbnails or videos, but only screen grabbing-clips. In this file it is possible to apply changes.
- .lpd Lecturnity Presentation Document

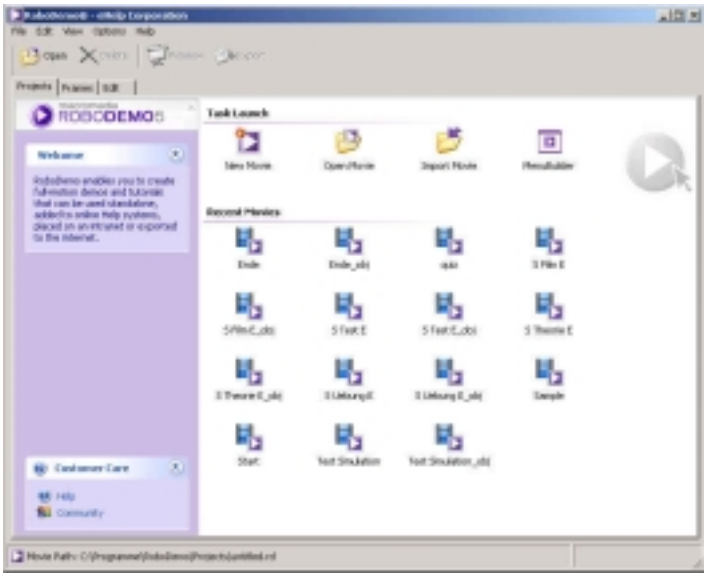
  This is a compressed file, which contains Thumbnails, Videos, Screen-grabbing clips, scripts. Changes are not possible to apply to this file.

Price

One license for a Company costs 1,990€

2.4.3 RoboDemo 5.0

Requirements to fulfil		
Content:	1. Screen Recording features	Yes
	2. Customisable Recording Window Size	Yes
	3. Special effects	Yes
	4. Editable media objects	Yes
	5. Widgets for interactivity	Yes
	6. Branching	Yes
	7. Feedback captions	Yes
	8. Quizzes	Yes
	9. Templates	Yes
Output:	10. Score tracking	Yes
	11. SCORM Compliance	Yes
	12. AICC Compliance	Yes
	13. Exporting content to text files	Yes
Accessibility:	14. Accesible via Browser	Yes



Overview

RoboDemo is a product of eHelp Corporation, a company recognized for its products for Help authoring and user assistance. It is based in San Diego, California and is a member of Macromedia.

RoboDemo is a tool specialized in recording screen shots and transforming them into movies. The output movies have a Flash file format (.wsf) and they are generally very small. They can be viewed in any platform using any standard Web browser.

RoboDemo offers a variety of objects that help not only in documenting these videos (like caption, call out boxes, images, audio and others) but it is also possible to add interaction to the movies and to add quizzes.

Its primary use is the creation of product demonstrations and software simulations for eLearning.

Authoring environment

Authoring interface type

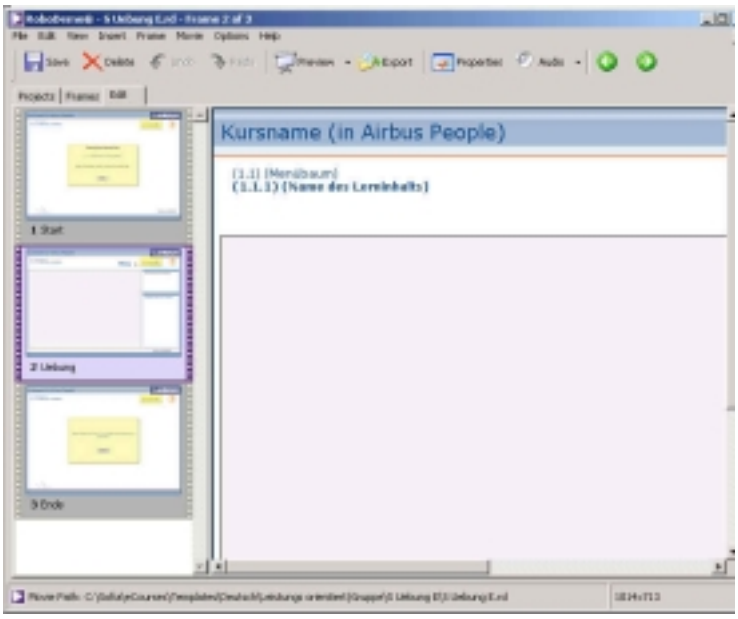
- Frames

Much of the work you do in RoboDemo is done on a frame level, where the content of the resulting movies is edited.

- Property windows

The edition of the frames is enriched for their presentation by adding objects that can be edited by changing their properties.

Components of the authoring system

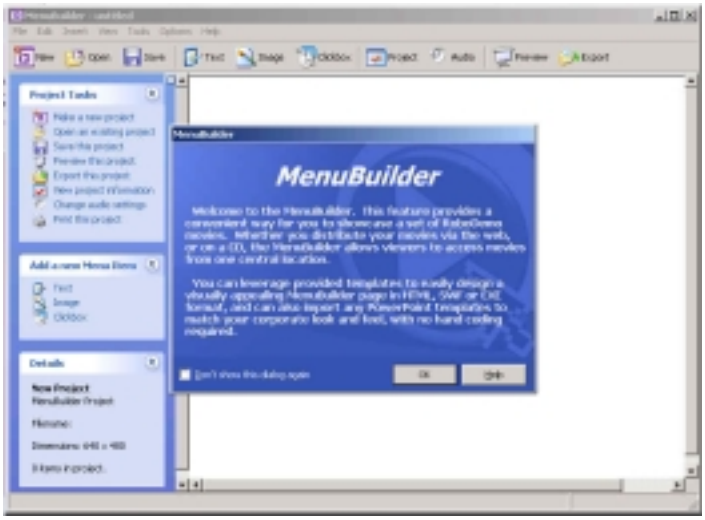


- Frame editor

This is the tool through which the developer views and organizes all elements of a frame. Using mostly dialogs and property pages, the developer defines which elements will appear on the screen and in which order.

- Menu Builder

This component provides a way to showcase a set of RoboDemo movies, so it allows creating a single central location for viewers to access multiple movies.

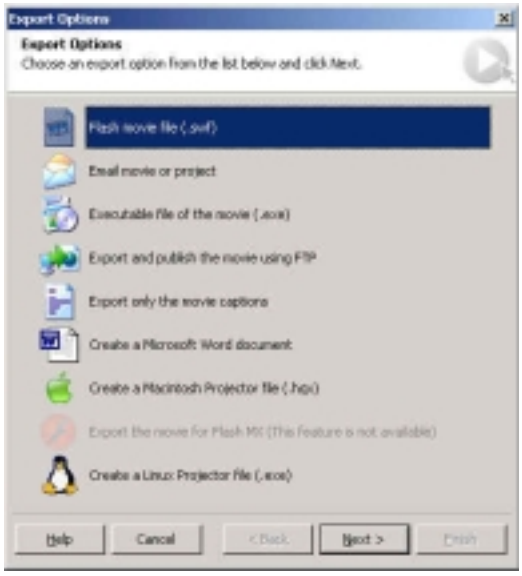


- Player

This player allows generating RoboDemo movies (.rd files) to be previewed as flash files, this allows checking the performance of the resulting file and apply the necessary changes before making the conversion from .rd files to flash files.

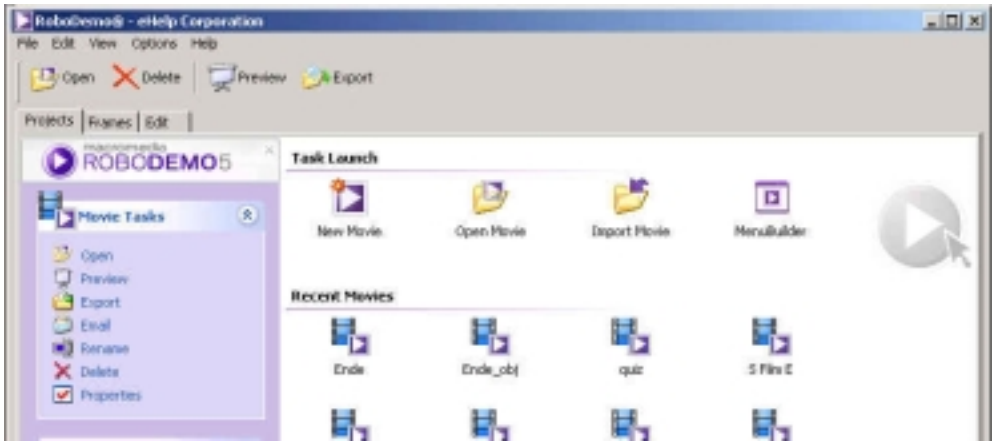
- Exporter

This tool enables the conversion of .rd files into different formats like HTML, Flash, executable file, Word document, Macintosh projector file and Linux projector file.



- Task launcher

Allows managing the developed projects, for their creation and edition.



Description of the authoring process

1. The author begins the development process by choosing from a range of recording options. These options will define the size of the recording window. The following options are available:

a. Record only the window of a specific application
b. Give a custom size to the recording window and record anything that appears inside this window
c. Record the entire screen of the computer
d. Record a window for the size of a Pocket PC
e. Choose templates
f. Or just obtain a blank project in which no recording has been done so far.

2. The next step is the recording of the application by manual recording with the use of the keyboard, automated recording where there is a screenshot every time the mouse clicks or by full motion recording which produces movies in .AVI format.

3. After the recording process, a set of frames is created where the author can add objects for interactivity.

4. There is the option of adding extra frames in-between to the resulting filmstrip, this frames can be chosen from a variety of types offered, like colored frames, animations frames, text animation frames, power point frames, quiz frames.

5. The editing of the frames is previewed to make sure the performance is satisfactory, and see the content in action from the perspective of the learner.

6. When the content is ready for deployment, the .rd file, where the frames are, is exported to the desired format, e.g. html.

Authoring features

Rapid Development features

- Wizards

There is a wizard for the creation of Menus in the MenuBuilder component that makes possible to relate the elements of the menu with the corresponding movie file.

- Templates

There are templates for the creation of movies, these templates contain a predetermined set of frames that includes for example: title, introduction and “Contact us” frames to which a movie can be added.

There are also templates for the MenuBuilder pages, where backgrounds for the pages are found, so there is no need for time in design, personally I think the look of the templates is not visually appealing, they look like power point presentations.

Can use persistent navigational controls (without having to have a copy of them in each page)	Yes
Import utility for direct import of Microsoft Word content	Yes
Import utility for direct import of Power Point content	Yes
Has a library for reusable media objects	Yes
Can create and save your own templates	Yes

Development and formatting features

High level course view	Yes
Quick preview function	Yes
Spell checker	Yes
Branching scenarios	Yes
Alignment tools for screen objects	Yes
Spacing tools	No
Pixel precise placement of objects (Grids)	Yes
Built-in formatted rich text	Yes
Synchronize time-based media objects	Yes
Creation of hyperlinks to other URL	Yes
Creation of hyperlinks to other pages within the course	Yes
Built-in storyboarding tool	No
Can print content in hard copy	Yes

Extensibility

Provides scripting language	No
Ability to store content in a DB	No
Export content as XML	Yes
Import XML-based content	No

Formatting Objects

1. Captions
2. Highlight Box
3. Click Box
4. Text Entry Box
5. Image
6. Rollover caption
7. Rollover image
8. Button
9. Animation
10. Image frames
11. Colored frames
12. Blank frames
13. Text animation frames
14. Power Point frames
15. Flash frames
16. Animation frames
17. Quiz frames

Multilingual capabilities

RoboDemo is capable of automatically creating captions that help to comment the movies, when the auto-recording feature is enabled. Text inside captions can appear in English, German, French, Italian, Dutch, Norwegian, Swedish, Spanish and Portuguese.

Authoring tool available in other languages

- English
- French
- German
- Japanese

Assessment capabilities

Quiz frames assess user performance using a scoring feature. The learner can obtain feedback upon correct or incorrect answer, directly after each answer and as a summary at the end of the question session.

Like in other tools, three types of questions are offered: Single choice, Multiple choice, True/False.

The actions that follow a user response can be determine, for example, if the answer is correct, then the course should continue to the next frame, otherwise the course should wait until the correct answer is given.

Tracking and Reporting capabilities

The quiz frames allow to track number of attempts, correct and incorrect responses, and send pass/fail data to a Learning Management System. The only limitation is that the user must complete the movie, so that the scoring can be reported to the LMS.

Built /in LMS features

Robo Demo is fully oriented towards authoring: there are no management tools like in an LMS.

ELearning output

Output formats

- HTML
- Flash
- XML
- Word documents
- Executable file

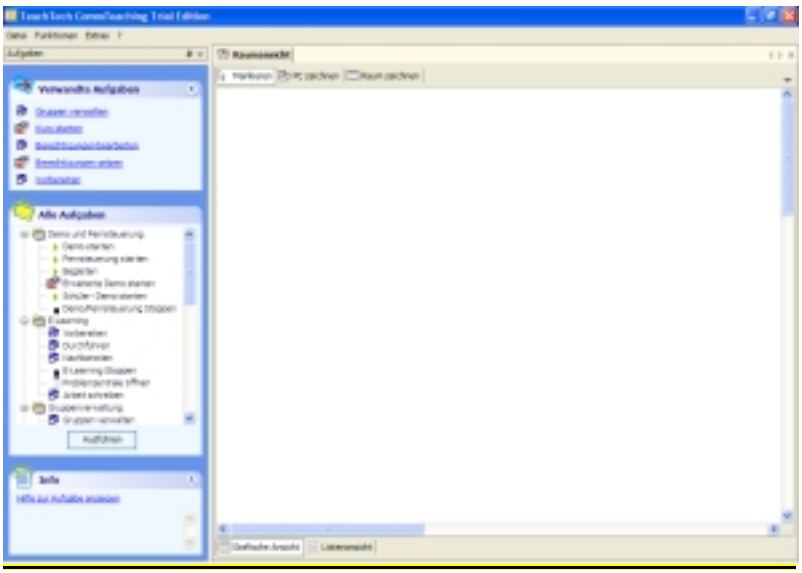
Price

The RoboDemo 5 English Edition has a Retail price of $599.

2.4.4 Commteaching

Requirements to fulfil		
Content:	1. Screen Recording features	Yes
	2. Customisable Recording Window Size	No
	3. Special effects	Yes
	4. Editable media objects	Yes
	5. Widgets for interactivity	Yes
	6. Branching	No
	7. Feedback captions	No
	8. Quizzes	Yes
	9. Templates	No
Output:	10. Score tracking	Yes
	11. SCORM Compliance	No
	12. AICC Compliance	No
	13. Exporting content to text files	No
Accessibility:	14. Accesible via Browser	Yes

Overview



CommTeaching is a product of TeachTech Corporation; a company specialized in software production, based in Hamburg, Germany.

CommTeaching is a tool that offers an eLearning Platform with authoring features that help in the creation of courses that can be stored in a library structure, statistics that show which courses where taken and with how much success they where solved and a problem central where the users can write and store doubts about the course, so that others, that know the answer can write the solution. On the other hand CommTeaching supports computer assisted instruction scenarios, where the teacher from his own computer administrates the computers of a classroom, defining rights upon software, internet, start menu and drivers.

This is then, an interesting software which primary use is targeted to classroom environments with authoring and administration capabilities.

Authoring environment

Authoring interface type

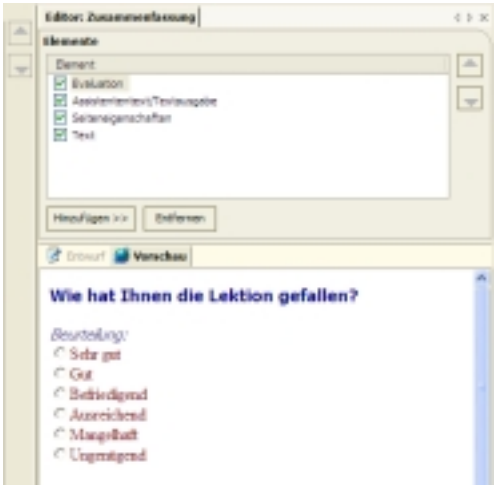
- Pages

The content of the courses is created in a type of blank frame that simulates the page of a book, where the multimedia elements are added to the page.

- Form based content entry

The multimedia elements that constitute the content of the course can be edited through property pages.

Components of the authoring system

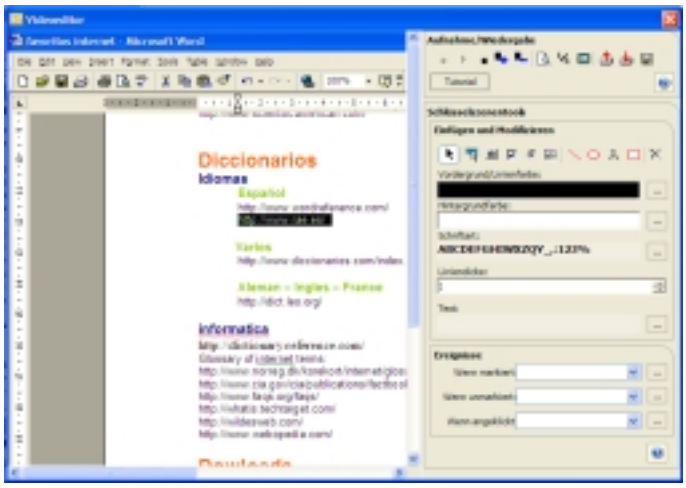


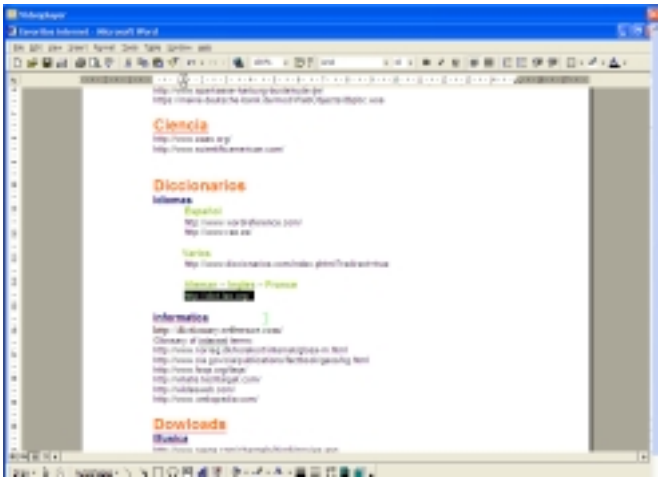
- Editor

This is the tool through which the developer has a view of the working area for the creation of the content. From here the developer can add the different elements that will enrich the content of the course and edit the properties of the elements.

- Video Editor

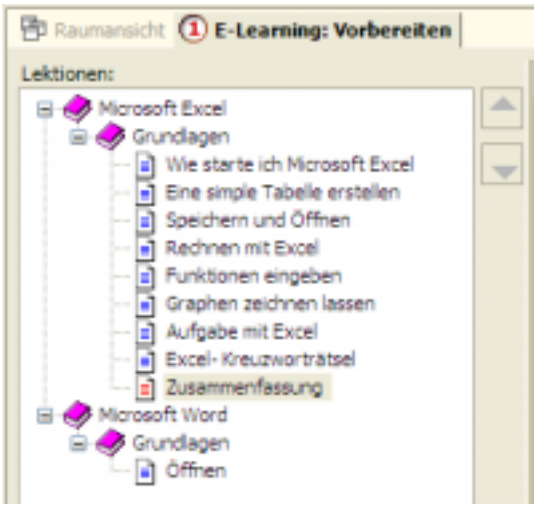
This component allows recording the screen of the computer to create software simulations. After recording, the video can be edited using widgets offered in this editor.





- Player

This player allows previewing the recorded movies and if there are interactive widgets inserted, then the user can already interact with the video.



- Course organizer

Allows managing the developed projects, for their creation and edition in a Book, Lesson and Page analogy.

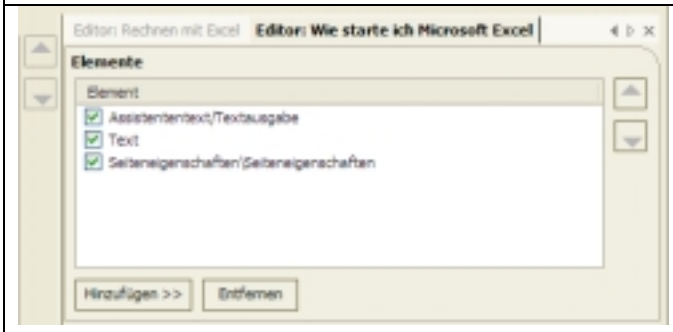
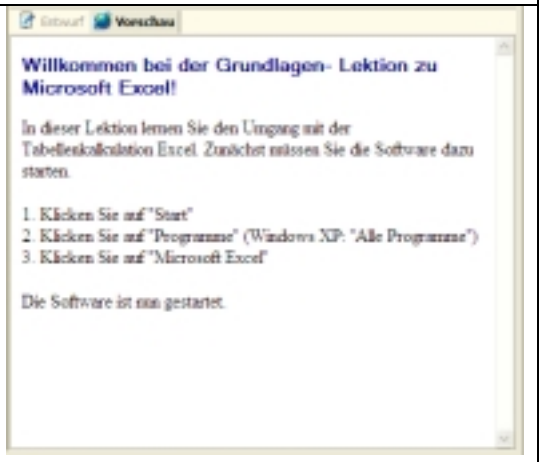
Description of the authoring process

1. Before starting the authoring of the course the structure where this course will be stored is first created, by giving the name of the course that will be categorized as the highest in the hierarchy of topics, and it will be represented with a book, in an analogy of books, lessons and pages.

2. Then the name of the lesson is given, below which the course will be categorized as a page.

3. The name of the page (course) is given and the authoring process can start.

4. A working space (blank frame) is open, where the multimedia elements can be chosen from a menu to be added to this space. The position of the elements can only be changed in order of appearance, there is no synchronization between the elements, they all appear at the same time in the page, so the list of added elements will appear in the same order in the page.
   As the next example shows:

List of element	Blank frame
	

5. The course can be finally previewed and saved.

Authoring features

Development and formatting features

High level course view	Yes
Quick preview function	Yes
Spell checker	No
Branching scenarios	No
Alignment tools for screen objects	No
Spacing tools	No
Pixel precise placement of objects (Grids)	No
Built-in formatted rich text	No
Synchronize time-based media objects	No
Creation of hyperlinks to other URL	Yes
Creation of hyperlinks to other pages within the course	Yes
Built-in storyboarding tool	No
Can print content in hard copy	No

Extensibility

Provides scripting language	Yes
Ability to store content in a DB	Yes
Export content as XML	No

Formatting Objects

1. Text
2. Image
3. Flash animations
4. Quizzes
5. Crossword puzzle
6. Animation
7. Fraction exercises
8. Push button
9. Click area
10. Check box
11. Text entry box
12. Line
13. Elipse
14. Rectangle

Multilingual capabilities

CommTeaching is only available in German language.

Assessment capabilities

Assessment capabilities are achieved by the use of quiz elements, which allow tracking user performance.

The types of questions offered are:

- Single choice
- Multiple choice
- Text

Tracking and Reporting capabilities

The quiz elements allow tracking the user's answers, thus helping to prepare statistics. Similar functions have the evaluation elements, which are helpful for the users to evaluate the content of the courses.

ELearning output

The output format of the courses is HTML.

Price

The license of CommTeaching Small Business Edition 2004 for 25 Client computers and 1 instructor computer amounts to 499€.

The license of CommTeaching Enterprise Edition 2004 for an unlimited number of client and instructor workplaces amounts to 1699€.

2.4.5 Knowledge Presenter

Requirements to fulfil		
Content:	1. Screen Recording features	Yes
	2. Customisable Recording Window Size	Yes
	3. Special effects	Yes
	4. Editable media objects	Yes
	5. Widgets for interactivity	Yes
	6. Branching	Yes
	7. Feedback captions	Yes
	8. Quizzes	Yes
	9. Templates	Yes
Output:	10. Score tracking	Yes
	11. SCORM Compliance	Yes
	12. AICC Compliance	No
	13. Exporting content to text files	Yes
Accessibility:	14. Accessible via Browser	Yes

Overview

KnowledgePresenter is a product of Deakin KM, a company specialized in Change Management, Documentation, Training and eLearning Consultancy, based in Australia.

KnowledgePresenter is a tool specialized in the creation of eLearning content for software simulation and multiple choice quizzes through synchronized multimedia presentations that can be accessed via any standard Browser. The learning unit produced has an HTML format, being also SCORM compliant so that it can be used in conjunction with third party Learning Management Systems.

Knowledge Presenter offers a variety of objects that help not only in documenting the content (like caption, call out boxes, images, audio and others) but it is also possible to add interactivity.

It is possible to create from a simple slideshow to detailed software simulations.

Authoring environment

Authoring interface type

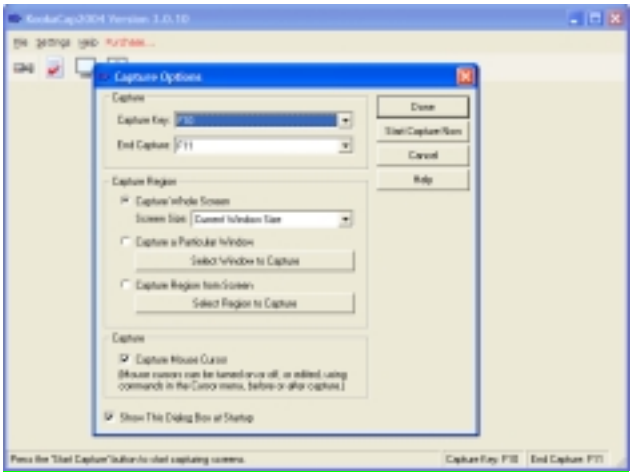
- Canvas

Most of the work done in KnowledgePresenter is done on a frame level, where the content of the resulting movies is edited.

- Property windows

The edition of the canvas (frames) is enriched for their presentation by adding objects that can be edited by changing their properties.

Components of the authoring system

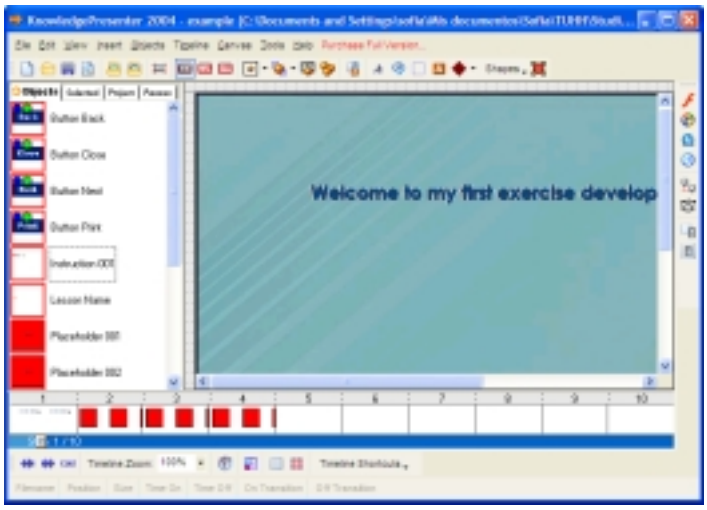


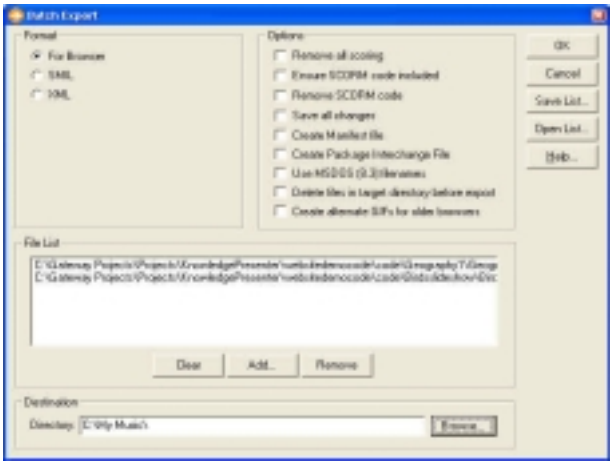
- KookaCap tool

This is a screen-recording tool. The recording process can only be done manually by pressing a key that will take a screen shot, so that at the end of the recording session a set of .png (Portable Network Graphics) images will be produced. There are no other recording options like automatic recording or full motion recording.

- Editor

This is the tool through which the developer views and organizes all elements of a frame. It provides a general view of the project, so that it is possible to observe which frame you are editing at the moment.





- Exporter

This tool enables the conversion of the project into different formats like HTML, .AVI, XML, DHTML, SMIL.

Description of the authoring process

1. To start creating a project with a software simulation, the first step is to start recording the software using the tool KookaCap, where a wizard to determine recording properties is to be followed.

2. Once the recording properties are set, the manual recording can start by pressing a key, e.g. F7 for every screen shot, to indicate the end of the recording session another key has to be pressed. The resulting screen shots have to be saved so that later can be imported into the knowledge presenter editor.

3. Having the pictures to be used in the software simulation, the edition can start, by opening the knowledge presenter and giving general properties of the project, like size in pixels of the frames, number of frames, title of the project, background color/image for every frame, navigation buttons

4. The project with the general properties set before is created and ready to start adding objects, like text, images, etc. The properties of each of the objects can be changed.

5. The screen shots can now be imported, for this there is an object called Placeholder that is a guide for an image or images to import, then the loaded image will take on the size and position of the placeholder automatically.

6. After including the images for the software simulation, the edition of different objects will help to enrich the presentation and add interactivity. Properties like Mouseover, Mousedown images and events are to be set for the so-called hotspots, which are kind of click boxes that allow the interactivity with the application.

7. The project should be previewed to make sure the presentation is satisfactory, otherwise the respective changes are to be done in the editor.

8. Finally the project can be exported to the desired format, e.g., HTML, .AVI, XML.

Authoring features

Rapid Development features

- Wizards

There is a wizard available to start up the creation of a lesson, ready to add images, text and presentation content. There is another for the screen recording process where the recording window properties are set, e.g. capture keys, capture region, capture mouse cursor.

- Templates

There is a variety of templates for the creation of different types of canvases, like assessments, multiple choice quizzes, evaluations, presentations, software simulations, slide shows and user created templates, these templates contain a set of canvases which already contain objects according to the type of template.

Can use persistent navigational controls (without having to have a copy of them in each page)	Yes
Import utility for direct import of Microsoft Word content	Yes
Import utility for direct import of Power Point content	Yes
Has a library for reusable media objects	Yes
Can create and save your own templates	Yes

Development and formatting features

High level course view	Yes
Quick preview function	Yes
Spell checker	Yes
Branching scenarios	Yes
Alignment tools for screen objects	Yes
Spacing tools	No
Pixel precise placement of objects (Grids)	Yes
Built-in formatted rich text	No
Synchronize time-based media objects	Yes
Creation of hyperlinks to other URL	Yes
Creation of hyperlinks to other pages within the course	Yes
Built-in storyboarding tool	Yes
Can print content in hard copy	Yes

Extensibility

Provides scripting language	Yes
Ability to store content in a DB	Yes
Export content as XML	Yes
Import XML-based content	No

Formatting Objects

1. Text
2. Flash animations
3. Pictures
4. Arrows
5. Shapes
6. Hotspot
7. Placeholder
8. Buttons
9. Message box
10. Text entry box
11. Instruction text object

Multilingual capabilities

Authoring tool available in other languages

- English

Assessment capabilities

The multiple choice quiz engine assesses user performance where the learner can obtain feedback upon correct or incorrect answer.

Also events can be scored, for example when a mouseover click event to a button has occurred then a point can be assigned to it. So the user interacts with objects that have a score associated with it.

The learner can obtain feedback upon correct or incorrect answer, directly after answer showing their current score and the total final score at the end of the lesson.

The types of questions offered are:

- Single correct answer
- Multiple correct answer

Tracking and Reporting capabilities

Scoring is where KnowledgePresenter keeps a track of the actions of a user, and determines whether they get certain tasks and steps right or wrong.

Built-in LMS features

KnowledgePresenter Professional edition is SCORM compliant, so it can communicate with interactive activities created in KnowledgePresenter. It can keep track of the progress of the user through a course, recording times and dates activities that were taken, scores, times attempted. All of this information is stored in a database and retrieved when a user enters the correct name and password.

ELearning output

Output formats

- DHTML
- XML
- .AVI
- SMIL

Price

The Knowledge Presenter 2004 has an approximate price of $958,50.

2.5 Selection of an authoring tool

RoboDemo 5.0 is the authoring tool chosen for this project.
Besides the fulfillment of all the requirements that were evaluated in the different authoring tools, it has additional advantages as explained in what follows.

Enables the development of opportune training

RoboDemo 5.0 is a quite helpful tool, because it can easily fulfill the eLearning needs of anybody who needs to develop eLearning courses on demand, where the content of the courses should offer software simulations, interactivity, quizzes, surveys and synchronized multimedia without a steep learning curve. Thus, RoboDemo provides one of the most clear and easy to understand interface that I have seen until now in comparison with many other tools, where the content of the courses is created in a comfortable GUI. This makes the delivery of courses an easy procedure that can be achieved in days, to fulfill the training demands on time.

Specialized in software simulations

RoboDemo 5.0 is an authoring tool that specializes in the creation of software simulations (which is the main purpose of the eLearning courses at PSYD department). Thus, the recording features are quite flexible, it is possible to choose from a variety of recording types that can be also customized; these recording features can be seen as the core functionality of RoboDemo.
Recording features are also found in other authoring tools, but they do not provide so much flexibility as RoboDemo does.

Offers a rich object library

RoboDemo has a wide variety of widgets that help to enrich the content of the simulations. The widgets make possible not only to document the content but also to add interactivity. The variety of widgets is quite complete in comparison with other authoring tools that allows interaction only by means of playback controls or quizzes. It is not so easy to find a tool that provides so many different kinds of widgets as RoboDemo does.

Allows to construct branching scenarios

Interactivity is well supported by the functionality of the widgets. With the widgets it is quite easy to simulate branching scenarios with their corresponding feedback, to guide the user to a certain point in the course, to a URL, to another course, etc.
Other analyzed tools offer at most branching scenarios by the use of links, while RoboDemo offers branching functionality as part of various widgets.

It provides other eLearning features

From the quizzes and other interactivity objects like click boxes, button, text entries, etc. it is possible to score and track the abilities of the user and incorporate this information into an Learning Management System (LMS), because of its SCORM and AICC compliance.

Accessibility

RoboDemo produces high-compressed files in flash format, this allows reaching the eLearning content through a standard Brower. This is quite convenient since over 98% of all computers already have a Flash player.

Export and Import

The importing and exporting capabilities make the creation of the content a flexible process, since it is possible to import/export objects between RoboDemo projects, to export/import the text content of Captions objects to a third software like Word.

RoboDemo makes the process of developing eLearning courses quite easy. A very convenient aspect is the flexibility offered in using different objects that help to enrich the content. This flexibility allows creating from the simplest eLearning content, to quite interesting designs. The development of an effective and engaging content is left to the developer. The developer of the courses has to take care more about design and didactical issues, than about technical skills.

3 Design

To start developing the courses, it was first important to come out with some structure that reflects the eLearning concept that the PSYD department wishes to offer. To do this, the Word documents that the PSYD department owns and that helped to document the face-to-face courses were taken as a basis for the organization of the courses. These documents were organized by a topic categorization as the next example:

Course 1: “Einkauf Grundlagen”
Topics:
1.1 Stammdaten
1.1.1 Materialstamm
1.1.1.1 Aufbau des Materialstammes
1.1.1.2 Fachbereichsspezifische Daten
1.1.1.3 Einstieg in das Materialstamm-Menü
1.1.1.4 .....

1.2 Genereller Aufbau des Einkaufsbelegs
1.2.1 .....

So taken into consideration this topic categorization, eLearning courses were to be developed for the topic in the lowest part of the hierarchy.
This strategy was followed because the employees of the PSYD department (which will be the future developers of the courses) are very used to this organization.
Before developing the structure of the courses, some desired characteristics of the course where then more specifically defined. These characteristics are defined for the “Design requirements”.

3.1 Design requirements

A user-friendly interface is the most important principle in man-machine interfaces; for that the following issues are to be included in the design.

3.1.1 Learning modalities

There are certain topics that are better understood by interaction, others that only need some theoretical knowledge, etc. Depending on the topic of interest, there will

be one or more modalities offered for the same course. The modalities that can be offered are:

Modality 1: Theory

Helpful when there are some concepts to learn.

Modality 2: Step-by-step Movie

Helpful when showing how to do something step-by-step is enough.

Modality 3: Exercise

Helpful when interactivity with the application under study is important, the user can learn by himself.

Modality 4: Test with interactive simulations

Helpful when there is the need of tracking the user's abilities by his interaction with the application.

Modality 5: Test with questions

Helpful when there is the need of tracking user knowledge about the application.

3.1.2 Standardized look&feel

It is wished to have a well-standardized design, in a way that every time a new course is developed, there is always the same look and feel. This has the main purpose of helping the end user to get used to a certain interface and independent of the content of the course, the structure will remain the same, so the end user will not have to lose time in understanding how to go through the eLearning course each time.

3.1.3 Courses access

The courses should be reachable through the intranet, the so-called Airbus People. To access in a faster way the topic of the course, in which the end user is interested in, there are 2 accessing ways offered:

- Alphabetic oriented order

This is useful when the users are looking for a very specific topic and they want to find the course by keywords.

- Thematic oriented order

This is useful when the user is looking for an area of study and not for a specific topic, this way the user can learn through the different topics offered for this area.

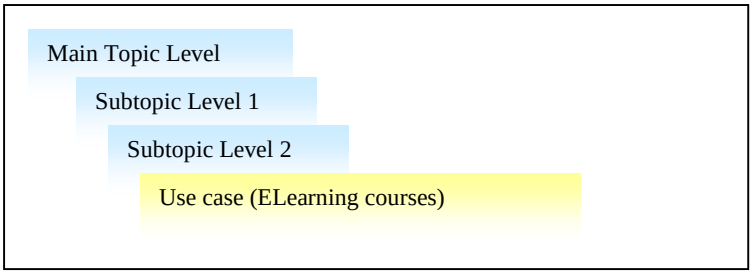
3.1.4 Concept differentiation

This means that every object used in the course, like captions, failure messages, hint messages, should have their own look throughout the course, this will help the user to better understand and maintain the standardized look of the courses.

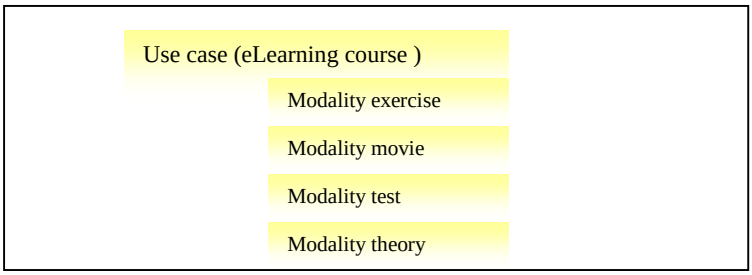
3.1.5 Size of resulting files

At certain point in time, there will be the need of changing the content of the course. To make this easier, the files created for each eLearning course should be as small as possible.

To decide this issue, it was reasonable to consider the development of E-Courses for very specific use cases and not for wide and general topics, instead, these general topics are divided into subtopics, and the subtopics into use cases. Only at the lowest level in the categorization, uses cases are found and eLearning courses are developed.



For every eLearning course developed, each modality offered in the course will also be developed independently. So at the end we have modality-oriented courses for the same topic, as the following graphic shows.



The advantages of this division are:

- Faster to update the eLearning courses.
- When changes in the content categorization are made, it is easier to adapt the courses to the new categorization.
- Smaller file size.

3.1.6 Navigation

The user should feel free of navigate around the course without restrictions; the purpose is not to force the user to wait until something is finished to continue with the next part of the course.

This is realized by the use of the Playback control offered by RoboDemo and by links throughout the course. This flexibility should help the user to get to the topic of interest in a faster way at any point of the course.

3.1.7 Help

The help offered should have the purpose of guiding the user in how to navigate through the courses; it is a reference to get to know the structure in which these eLearning courses are based.

The help should be offered from the intranet and from the eLearning courses as a link.

After analyzing the desired characteristics of the courses, a structure was developed in such a way that all this characteristics are reflected in it.

3.2 Interface Design

To define the layout of the courses, several aspects where taken into consideration, having in mind on the one hand, that the layout should help to engage the user into the courses and on the other side, that such a layout would not imply too much unnecessary work for the developer. For this purpose the next aspects where considered:

3.2.1 Information to be displayed

A trade-off between **concurrent and sequential presentation of information** was found to give the user of the courses as much understanding as possible, trying to reduce working memory load.

It was then decided to present several different information types at once, with the main purpose of complementing the software simulation with contextual information, like:

1. Course name.
2. Use case under study.
3. Path followed in the simulated software from the first step until the actual step.
4. Information about concepts related to use case, for example:
   When adding a new item to the material master data, the composition of the material number is explained.
5. Modality of the course (Exercise, Test, Movie, Theory).

The sequential presentation of information fits naturally to software simulations, since the software is simulated step by step. It was decided then, to leave as sequential information, texts that aim to give directions, hints and feedback.

3.2.2 Presentation Design

An effective interface should not be overcrowded, to avoid mistakes in reading. For this reason, a way to present a good amount of information was solved by making groups of data to be placed together always in the same place and to make it easier for the user to find the related data items. This was solved by 3 categories of information:

1. Navigation
2. Location
3. Content

These categories will be explained in the next chapter.

3.2.3 Use of Colors

Different colors were chosen to differentiate between different kinds of information:

- Light Yellow: directions to follow.
- Blue: descriptions of the simulated software.
- Yellow: hints (provided as default by RoboDemo)
- Red: errors (provided as default by RoboDemo)
- Green: success messages (provided as default by RoboDemo)
- Orange: to highlight areas of the simulated software.

Besides this, pastel shades with the colors of Airbus where chosen for background, to integrate the eLearning concept with the “Airbus People” intranet design.

3.3 Templates for the courses

3.3.1 Navigation structure

As commented before, there should be some flexibility offered to the end user, so that he can get to the topic of interest in a faster way. To achieve this, the navigation concept is divided into 2 phases:

- Navigability to access the courses
- Navigability inside of the courses

3.3.1.1 Navigability to access the courses

The starting point to access the courses should be from the intranet where the eLearning courses are listed by links. There are 2 different ways to get to the content:

a. Thematic oriented order
b. Alphabetic oriented order

a. Thematic oriented order.

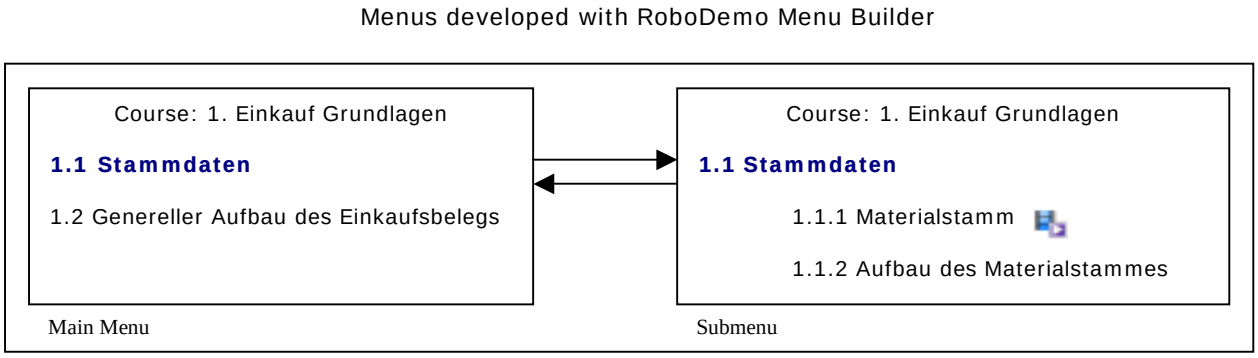
The links located in the intranet listing the courses will access the root topic in the hierarchy of the content, for example for the next hierarchy:

Course 1: “Einkauf Grundlagen”
Topics:
1.1 Stammdaten
1.1.2 Materialstamm
1.1.2.1Aufbau des Materialstammes
1.1.2.2Fachbereichsspezifische Daten
1.1.2.3Einstieg in das Materialstamm-Menü
1.1.2.4.....

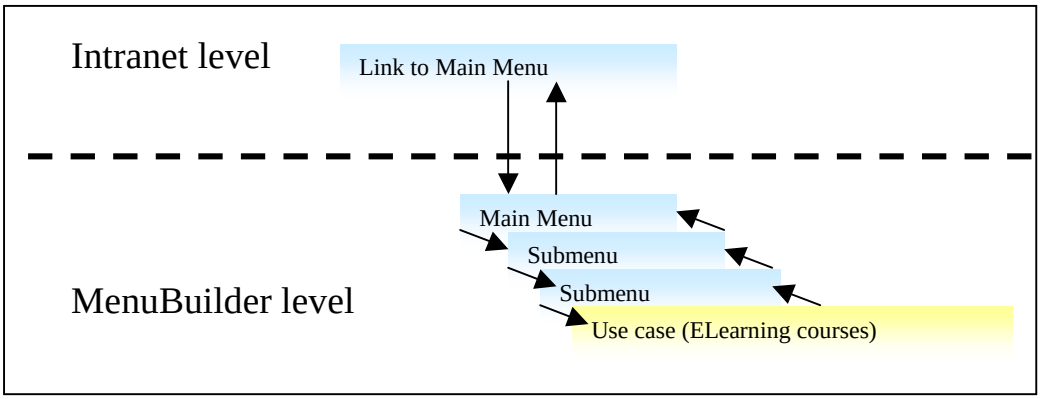
1.2 Genereller Aufbau des Einkaufsbelegs
1.2.1.....

The link in the intranet should have a link called “Einkauf Grundlagen”, that calls a Menu developed in RoboDemo Menu Builder, which contains the topics of the highest level in the content hierarchy.
The topics listed in the menu might also be links that will call a submenu, where the topics of the next level in the hierarchy are listed.

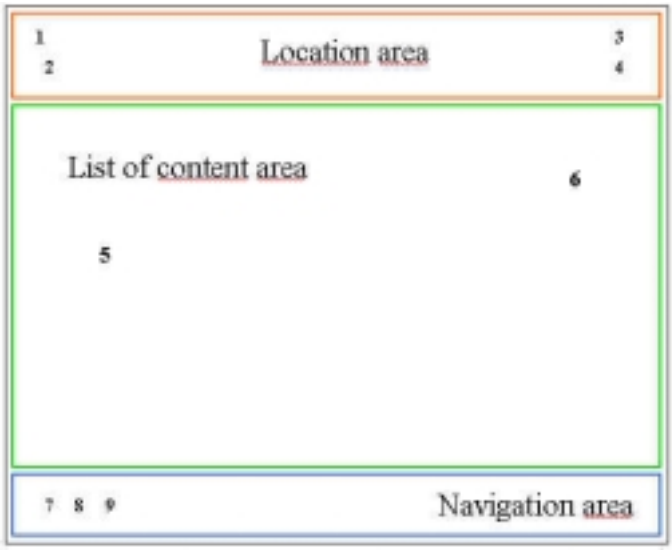
For example:



How deep the hierarchy is and how many submenus are called, should be considered by the course designer where the last submenu will list the courses.
The navigation then should look as follows:



The structure of the Menu has 3 main areas.



Location area

The elements inside of this area are:

1. Course name
2. Subtopic (when we are located in a submenu)
3. Airbus logo
4. Online help

Content listing area

The elements inside of this area are:

5. List of topics

   Some of the topics could link already a course or could call a submenu.

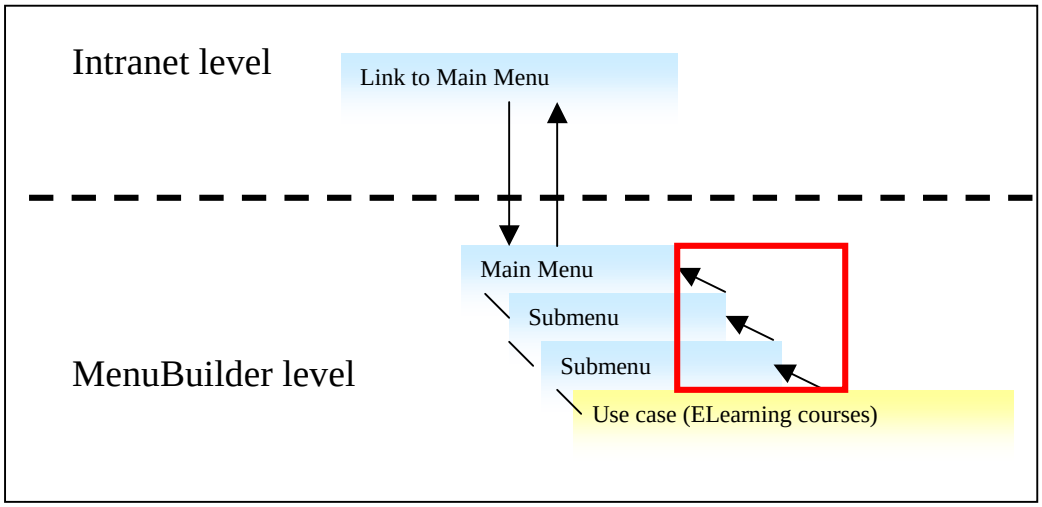
6. Logo of the Application under study (SAP, Buyside, etc.)

Navigation area

The elements inside of this area are:

7. Button “up”

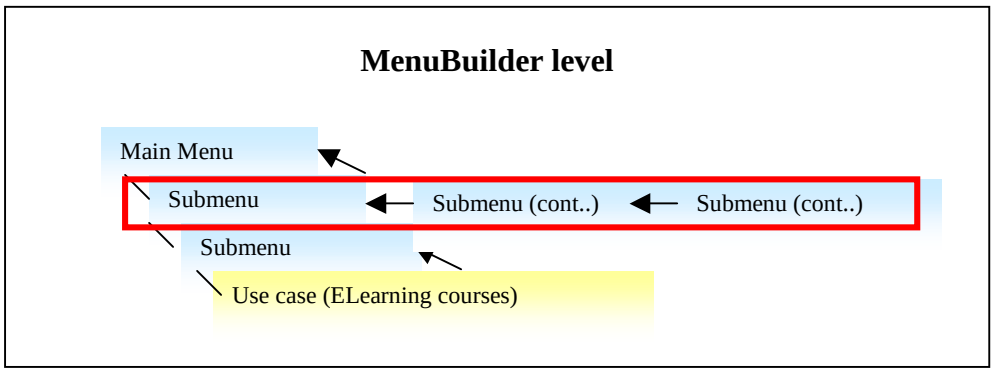
   This button allows going from a submenu to a menu one level up.



8. Button “previous”

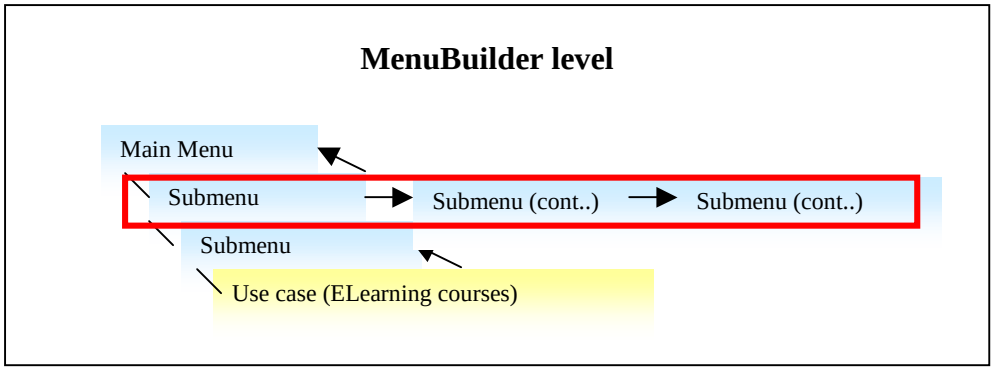
When there are too many topics that need to be listed in a menu, then a continuation of the menu with the next topics is created.

This results in a group of menus for the same level in the hierarchy, so this button will help to go back to the previous menu of the same hierarchy as shown in the next picture.



9. Button “next”

This button will help to go forward to the next menu of the same hierarchy as shown in the next picture.



b. Alphabetic oriented order.

To access the courses in an alphabetic oriented order, a link with the name “Index” will be placed in the intranet, this link will call a Menu, which is also a Menu created with RoboDemo MenuBuilder, where all the available topics at the moment will be listed in an alphabetic order.

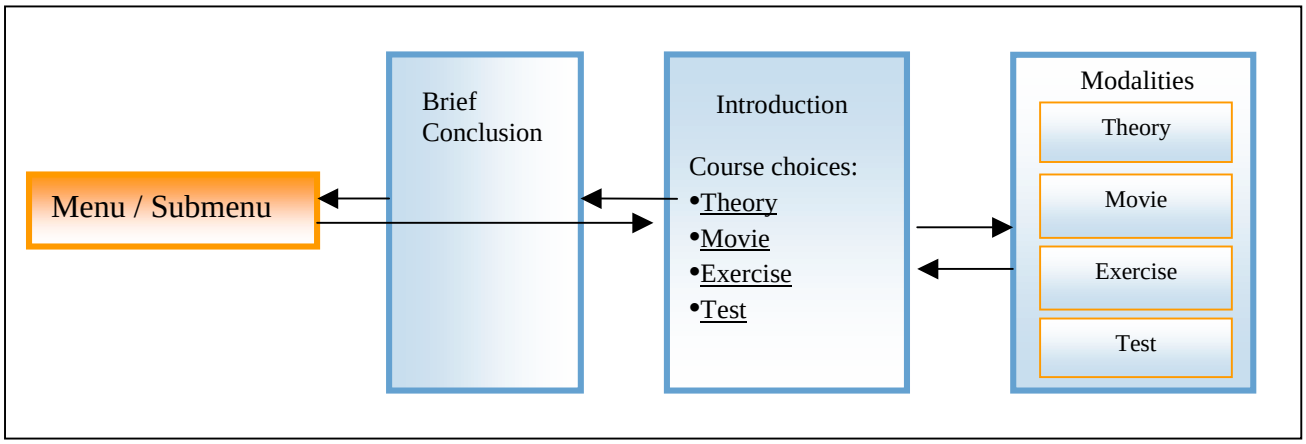
3.3.1.2 Navigability inside of the courses

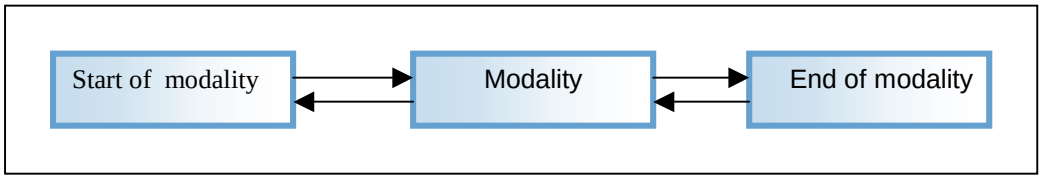
Once a course is opened, the navigation inside of the course will allow the user to change between the different modalities of the course as he wishes.

For each course there is a short introduction describing the purpose of the course and a conclusion.

For each modality of the course there is a starting point marking the beginning of the modality and an end point marking the end of the modality.

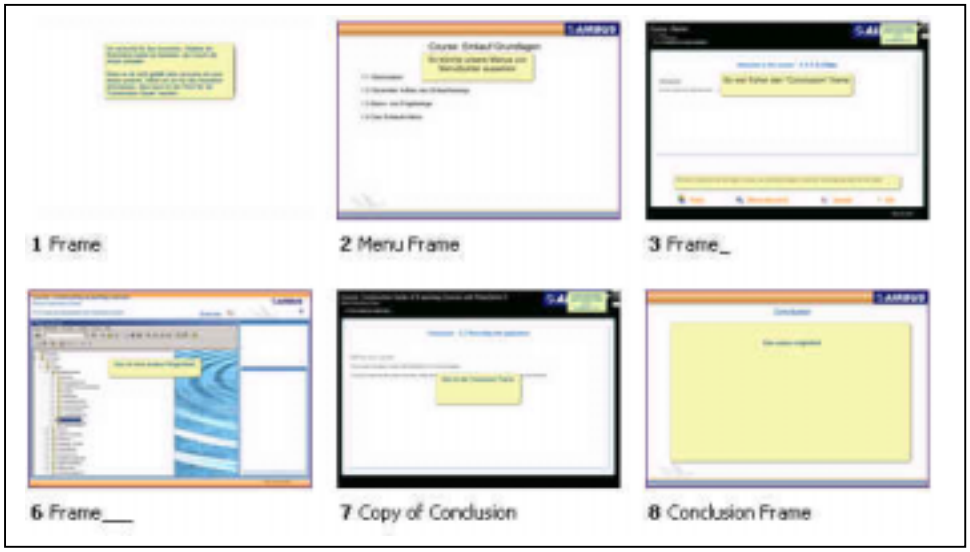
Every time the user decides to go back to the menu and close the course, he will always briefly see the conclusion of the course before closing it.





3.3.2 Frame structures

RoboDemo produces movies in flash format comprised of frames.



An individual frame represents one shot in a movie. So most of the work is done on a frame level, it is in this level where structures for the different modalities in a course were created.

Each modality has different characteristics and so they use different objects to show the content of the course, but still they have a common structure:

The numbers indicate the next elements:

1. Course name

   Depicts the name of the course in the higher level of the hierarchy, this is the name of the link that is found in the intranet Airbus People.
2. Use case topic

   Depicts the name of the use case that is being presented in different modalities.
3. Company logo
4. Online Help

   This is a link for the online help that shows how to navigate inside of the courses.
5. Modality indicator

   Here will be indicated the modality in which the user is in.
6. Playback control of RoboDemo

   This is a tool offered by RoboDemo to navigate in the .rd files, they allow the users to set the pace of the movie as necessary.
7. Link to go out of the modality

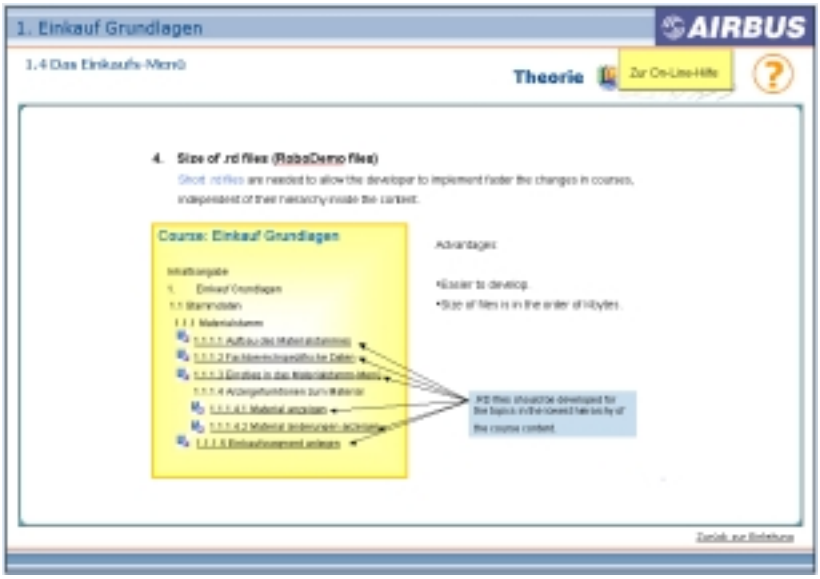
   This link will guide the user to the Introduction frame where the user can choose another modality or go entirely out of the use case.
8. Content of the course according to the modality

These are the elements that form part of the general structure of every frame, but for every modality offered, there are some extra elements with a specific function as explained next.

3.3.2.1 Modality frames

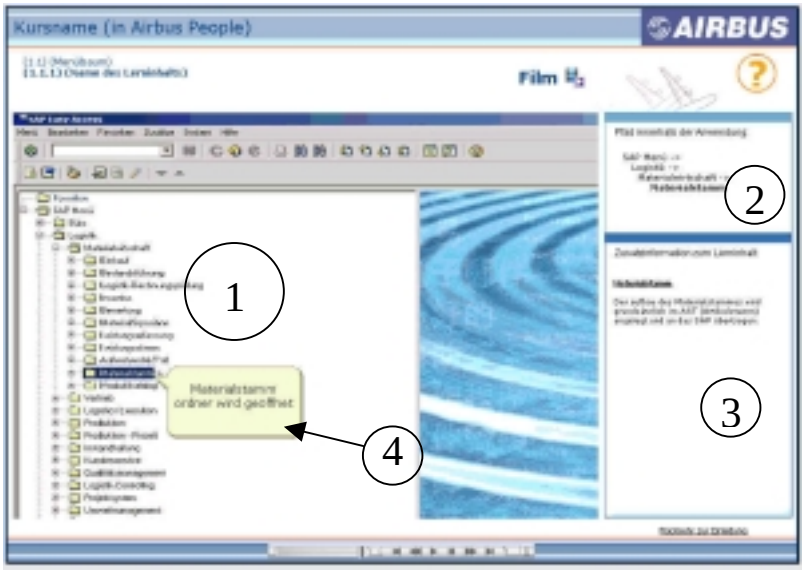
Modality: Theory

The theory frames are the ones that include only text or Power Point presentations to explain the topic, this information is found in the middle area of the next structure.



Modality: Step-by-Step movie

These Frames are the ones used for the creation of the modality Step-by-Step movie, so they show the steps to follow for the interaction with an application and their structure is as follows:



Elements:

1. Application Image

   This area shows the actual step in the application to be simulated and that is obtained as a result of the recording feature of RoboDemo.

2. Path

   This area shows the path that has been followed inside the application to reach the actual state. This is very useful for the user to get a quick overview of the steps that he has done/seen before.

3. Help

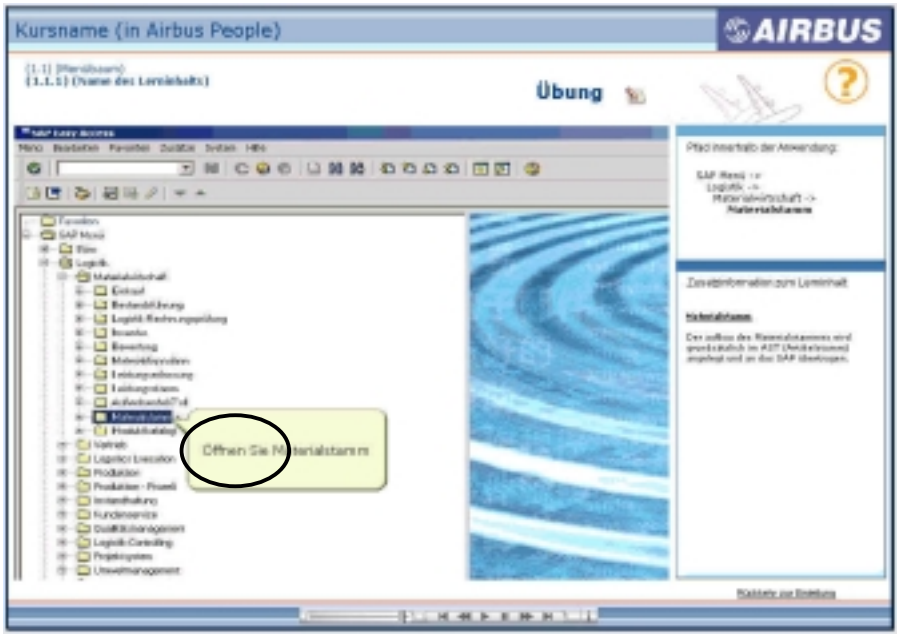
   This area shows some extra description about the application that might be of interest to the user.

4. Captions

   Caption elements are used to describe where and what actions to do inside of the application, the captions have a different outlook depending on their purpose, for giving instructions or for giving an explanation.

Modality: Exercise

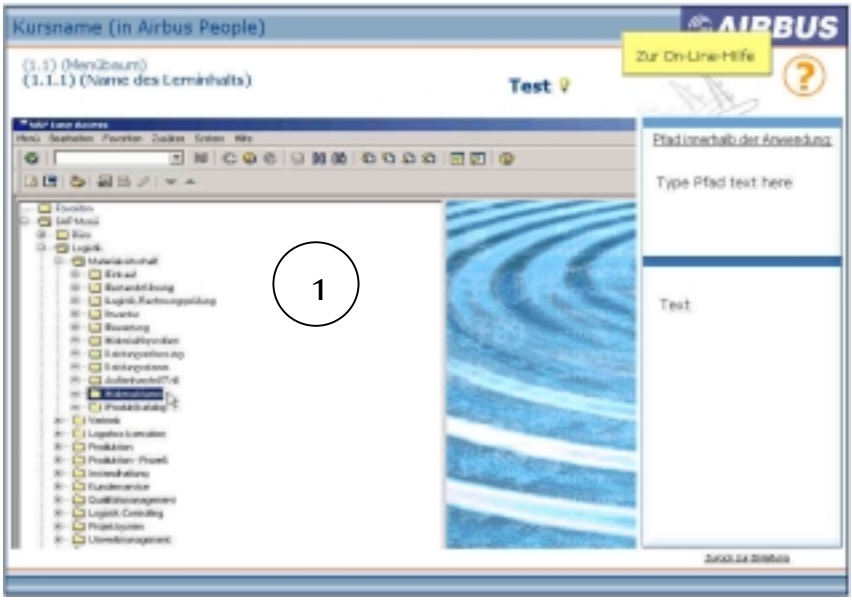
These Frames are the ones used for the creation of the modality “Exercise”, so they allow the user to interact with the application. The structure of these frames is the same as the one from Step-by-Step movie modality. The only difference is that they use some objects (like buttons) that allow the interactions with the application.



Modality: Test with simulations

These frames are used in the modality “Test with simulations” where the user is able to interact with the application, like in the exercise modality, with the only difference, that here there is no help offered, no hints, no caption elements that explain the user the steps to follow. Every step of the user in the course can be scored.

The structure then looks as follows:



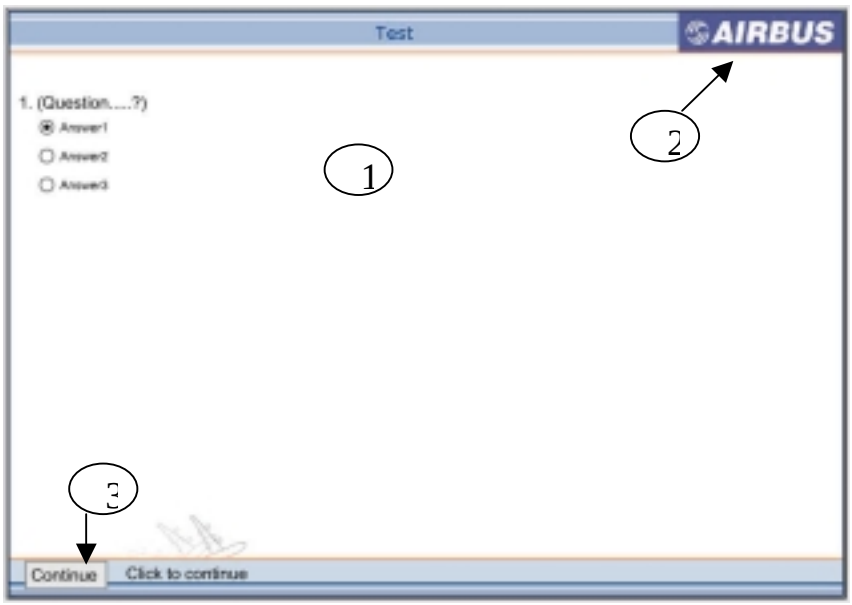
Elements:

1. Application simulation

   In this area the application is shown, so the user can interact with it.

Modality: Test with quiz

These frames are used for quizzes, RoboDemo has a predetermined structure for these kind of frames these is why the structure changes according to these limitations, this is the only kind of frame where some of the elements of the general structure do not appear, so that we have a structure as follows:



Elements:

1. Quizzes

   The quiz objects produced by RoboDemo are placed in the center.

2. Company logo
3. Button “Next”

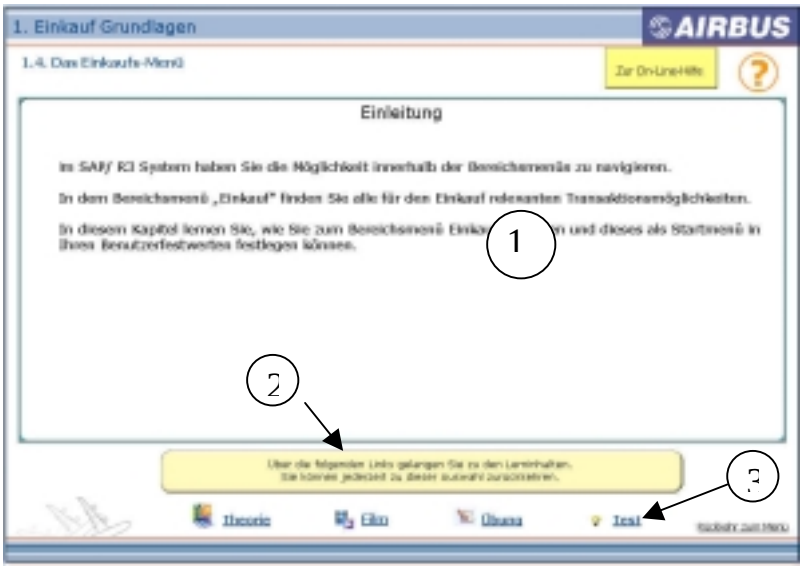
   This button will guide the user to the next quiz, this is automatically provided by RoboDemo structure for Quiz Frames.

3.3.2.2 Other frames

Introduction

This frame is always included at the beginning of a course and it aims at describing the use case in study, so that the user has an overview of the course and decides if he wants to continue with it. If the user decides to take the course, he still can get out of it at any time.

In this frame the links to the different modalities of the course are included, so the user is able to choose from them. The next graphic shows the structure for this frame.



Elements:

1. Introduction

   Contains the text of the introduction describing the course and its objectives.

2. Indications

   Contains a short text with indications on how to proceed to take the different modalities offered.

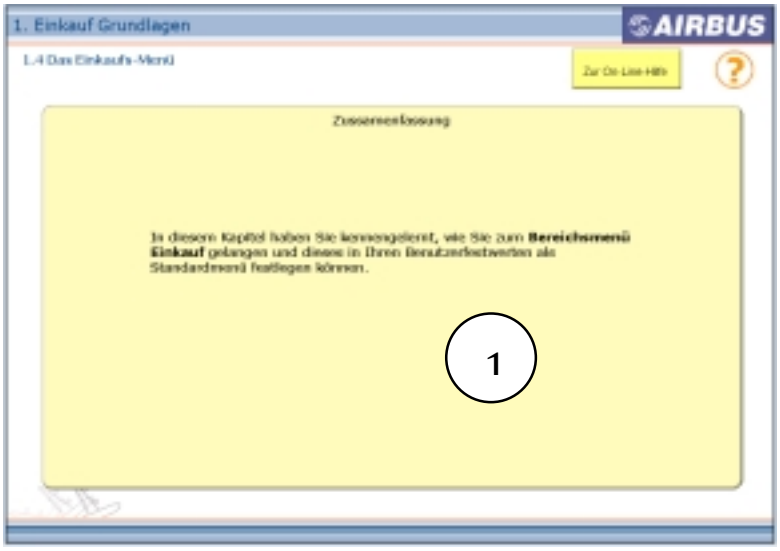
3. Modality links

   The links to the different learning modalities of the course are listed in this area. It might be that a course does not have all the modalities, in this case only the modalities included will have an enabled link.

Conclusion

This is the last frame of the .rd file and it has the objective of giving a conclusion of the learned topic. The flow of the course is designed in such a way that every time the user decides to go back to the menu and look for another topic, he will always see the conclusion of the course, before getting to the menu.

Its structure is:

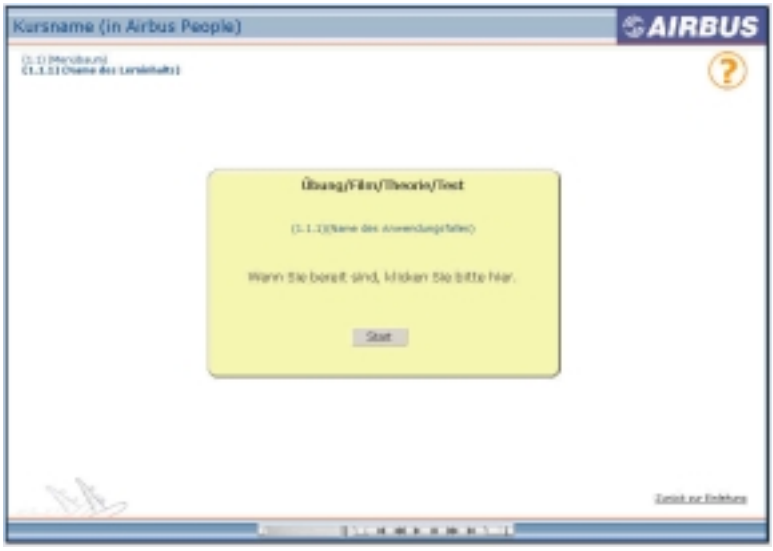


Elements:

1. Conclusion text.

Start of modality

This frame is used to indicate the user that he is going to start a certain modality of the course and to give some indications about the modality. This information is found in the middle of the general structure.



End of modality

This frame indicates that the modality of the use case is finished and gives some indications to go back to the introduction. This information is also found in the middle of the general structure.

3.3.3 Organization strategies

To facilitate the work of the developer, 3 strategies for the organization of resources were generated:

- **Content organization**

Where the different elements that are created when developing an eLearning course are organized.

- **Naming conventions**

Naming conventions were developed to:

1. Differentiate between learning modalities
2. Differentiate between course versions
3. Emphasize changes or updates to a course
4. Differentiate between phases in the development of a course

- **Templates**

Templates support the concept of the eLearning courses for the PSYD department; they represent the main resources used for the creation of the courses. So a strategic organization to find these resources in a fast way was necessary.

4 Conclusion

4.1 Results

The eLearning concept created in this project helps subject matter experts of the PSYD department in Airbus Deutschland GmbH to author Rapid eLearning courses. The creation of these courses will support the training activities of the department to start the migration of most of their SAP R/3 face-to-face courses to eLearning.

The migration of the courses offers the following advantages:

- Fulfillment of training demands

  Due to the constant demand of courses from a wide variety of clients, the PSYD department was not able to fulfill this demand. Face-to-face courses imply finding common place and time for a variety of people, causing dates to be postponed until a reasonable quantity of participants were found, or sometimes repeating the same course to small groups of people. With the eLearning courses the time and place restrictions no longer apply.

- Better learning pace

  The eLearning courses now offer flexibility while learning, because the user can now learn at his own pace, contrary to face-to-face courses where the participants have to accommodate to others' time.

- Cost saving strategies

  The eLearning courses represent an important financial strategy, that can help to save around 7700€ for each migrated course. The nature of face-to-face courses implies a variety of expenses, e.g. transportation, accommodation, man-hours, car rental, etc. as the next information summarizes[1]:

  Course profile:

  No. of instructors per course: 1 to 2

  No. of participants per course: 10 to 16

  No. of days for a course: 2 to 3

  No. of courses per year: 4 to 6

  Transport expenses:

  When the courses take place in Toulouse

  Airbus Charters cost 620€ round trip, for 2 instructors makes a total of 1240€.

[1] Source of information: Airbus Deutschland GmbH, PQ3 department.

When there is no more place in the charters, then commercial Airline is used, with cost of around 340€ per way, per instructor.

Accommodation expenses:
Oscillate between 85 and 220 € per night.
Taking 2 nights of 220€ for 2 people, makes a total of 880€
Car rental: from 50 to 60€ per day.
Renting one car 3 days for 60€, makes a total of 180€
A Man-hour of each participant in the course costs around 15 €

- Man empowerment
  Anybody can transmit his/her know-how by means of eLearning units, whenever is needed, without having to travel and meet the people personally. This also gives the advantage that people interested in the topic can take the eLearning course as many time as wished.

- Autonomy from third party companies
  The employees of the PSYD department do not have to contract somebody else to develop the eLearning courses for them; this saves a lot of time and work whenever the eLearning courses need to be updated.

4.2 Further work

The eLearning concept for the PSYD department achieved in this project allows migration to start within the next months. A tool kit for the development of eLearning courses was produced which contains:

- Document:
  Construction Guide for the development of eLearning course with RoboDemo according to the eLearning concept of the PSYD department.
- ELearning courses:
  eLearning courses developed with the same concept of the PSYD department that supplements the construction guide document.
- Set of templates:
  Templates used for the development of the courses with the PSYD concept.

In the months to come this concept will not only be applied to produce courses for SAP R/3 but also for other software applications. Airbus has special interest in applying this eLearning concept to support the training of the Sup@irWorld tool (Supplier and Airbus World) that is to be used in the future in all the subsidiaries in

different countries as a common portal for purchasing activities. For this purpose the Templates for the creation of the eLearning courses will be translated at least to English and later to French and Spanish.

4.3 Insights

Training represents an important activity for the success of a business, especially to communicate new procedures that influence the daily work of employees, for these reason eLearning is having much acceptance. Thus, the demand for the development of eLearning units is growing. As a response to this demand, many software companies have developed a variety of authoring tools that aim to make the development of eLearning units a task that can be develop by anyone who has the knowledge to be taught. These tools are the so-called Rapid eLearning tools, which enable the authoring of eLearning solutions in a quick way without requiring deep technical expertise, providing an easy-to-use interface.

Rapid ELearning courses aim to teach a topic of interest in a much better way than in a classroom environment where the trainers have a set amount of work to cover, in a set time, and the participants need to proceed at their pace only; with eLearning courses it is possible to proceed at its own pace, in addition, it is possible to repeat sections without disturbing anyone else in the course. In addition, including software simulations in the courses serves as a bridge from the learning environment to reality. This learning bridge increases retention when employees return to their jobs.

Still eLearning can only be better than a classroom course if the content that is being presented has a dynamic and realistic presentation because only this way is it possible to engage the users' attention and willingness to take the course. For this purpose the interface design plays a major role.

Many areas must be taken into account when talking about design of the courses, like, didactically created content (so that is easy for the user to understand the presented information), based in a course logistic (that guides the user through a clear path in the course, e.g. start with a movie, proceed with an exercise and finish with a test), also specifying how the interface should function, how it should respond to the user. Good interface design is essential to avoid user frustration and encourage the user to take the eLearning courses. Designers should have a flair for good, innovative design. For this purpose, several guidelines, principles and techniques that show designers how to proceed are widely available giving advice on a wide range of human computer interface issues (ISO 9421).

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6 Glossary

AICC

The Aviation Industry CBT (Computer-Based Training) Committee (AICC) is an international association of technology-based training professionals. The AICC develops guidelines for aviation industry in the development, delivery, and evaluation of CBT and related training technologies.

PNG (Portable Network Graphics)

PNG is an extensible file format for the loss less, portable, well-compressed storage of raster images. PNG provides a patent-free replacement for GIF and can also replace many common uses of TIFF. Indexed-color, grayscale, and true color images are supported, plus an optional alpha channel for transparency. It doubles the compression obtained from GIF images.

Rapid E-Learning is a solution, which enables to build effective e-learning programs in weeks. The premise behind rapid eLearning is that "time to build" and "time to learn" is as important as instructional quality. Rapid eLearning tools enable this.

SCORM

The Sharable Content Object Reference Model (SCORM) aims to foster creation of reusable learning content as "instructional objects" within a common technical framework for computer and Web-based learning.

Skill – based training

Is a kind of corporate training that includes learning activities of a new software package and knowledge transfer, such as education about new product features.

XML Manifest File

This is basically an index to all files used by the learning object. Many Learning Management Systems and Content Management Systems require this file so that this content can be uploaded and included in their catalogs.