# EasyPres: An Easy-to-Use Tool for Creating Synchronized Multimedia Presentations

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**Abstract**

This paper introduces EasyPres, a new open source tool designed for creating multimedia presentations and lectures for distance education and training purposes. EasyPres was designed with the key goal of providing a quick and easy-to-use single interface for lecturers to create a rich and comprehensible multimedia presentation which may include video, animation, slides and a synchronized audio explanation. The final presentation may be recorded in different media qualities, and thus may be distributed over different media types, from low bandwidth computer networks to a DVD disk. Compared with previously built tools for creating presentation, EasyPres is more portable and provides a much more complete set of  features, including user choice for media quality, media type and media format.

## Keywords:
Authoring Tool, Multimedia, Distance Education, Synchronized Presentations, Tool.

## 1   Introduction

The main goal of distance education is to extend the traditional university, or school in general,  and to overcome its inherent problems of scarcity and exclusivity [7]. In the last few years, distance education has become one of the most important tools for knowledge dissemination and democratization of the information [2]. In other words, the use of distance education systems makes it possible for a school to offer not seats, but the opportunity to learn to students that would otherwise be excluded [3,7].

The use of the Internet for distance education is becoming increasingly popular. A recent study concluded that there is little doubt that Internet-assisted instruction will become a major method for delivering educational content during the 21st century [20].  In fact, a number of major universities in US have already developed their own distance education systems for content delivery through the Internet [23, 24, 25]. Furthermore, as the available bandwidth at the Internet backbone and "last-mile" connections (e.g., DSL and cable modems) increase, the diffusion of multimedia content through the Internet becomes more popular. In the near future, virtual communities and virtual environments will be as present in people's daily routine as the telephone and television are.  Moreover, the use of multimedia content for training employees is also becoming increasingly popular among companies, motivated by the cost reductions and by the possibility of involving a great number of people located in distant places, at the same time.

One key challenge to the dissemination of distance education among schools and universities is the process of generating the educational content. Since we do not expected the content creator to be a computer expert, this process must be as simple, easy and quick as possible. Furthermore, the final product (i.e., the presentation) must be as rich and comprehensible as possible. However, most existing  tools  for creating multimedia presentations are not simple to use and do not generate a presentation with synchronized multimedia objects. Many of them produce only limited presentations with synchronized audio; they do not allow the inclusion of neither animations nor video screen captures as part of the presentation. Finally, all previously built tools are commercial softwares. We are not aware of any open source tool for creating presentations for distance education.

This paper proposes a new model for creating presentations where the content creator (i.e., the lecturer) builds his/her own presentation using his/her computer desktop. The process of content creation consists of three simple steps. First, the audio is recorded. Second, it is synchronized with the rest of the presentation which is created by capturing video screens of the desktop with all the actions dictated by the content creator. Finally, the presentation is recorded in one of several media types, formats and qualities, according to the user's wish for distributing the content (i.e., through the Internet, or in a CD/DVD disk).

EasyPres is a new open source content creation tool that implements the proposed model. It provides an easy-to-use interface for quick creation of rich and comprehensible multimedia synchronized presentations. The presentation is built by synchronizing the audio explanation with video screen captures of the desktop. Therefore, they may include a variety of different media: video, animation, slides, and any other software or application that runs in the computer desktop. Furthermore, it allows the content creator to add dynamic references to previously recorded videos. In other words, one can also include previously recorded videos as part of his/her EasyPres presentation. Compared with the previously built presentation creation tools, EasyPres provides a much complete set of features in addition to have better system portability and leaving to the user the choice for media format, type and quality.

The remaining of this paper is organized as follows. Section 2 discusses related work and section 3 introduces and discusses the main characteristics of EasyPres, the new tool for creating synchronized presentations. Section 4 shows the system interface the user has to interact with for producing a presentation in EasyPres. Section 5 provides an evaluation of its features and compares it with alternative existing tools. Section 6 concludes the paper and discusses possible directions for future work.

## 2    Related Work

A number of different commercial Windows-based tools for creating multimedia presentations have been developed. Presenter One [17] is an authoring tool that allows one to use the Real One platform [10] to create compelling Web-based presentations. It allows one to add and synchronize previously recorded audio and video to PowerPoint slides [9] and then delivers them to an audience over the Internet. Presentation Maker[14] is a media creation software that allows one to create limited media presentations consisting of audio explanation synchronized with PowerPoint slides.

ShowAndTell [15] is a software designed for non-technical people to quickly record presentations by synchronizing PowerPoint slides with audio voice narration and automatically publish them to a website. Unlike Presenter One and Presentation Maker, where the newly created presentation can be saved in only one pre-defined format (Real [10]) ShowAndTell also allows the user to export the new presentation to a CD format.

Visual Communicator Pro [6] is an authoring software that creates professional video presentations. This toolkit includes templates, royalty-free graphics and music, transitions (change of  scenarios and banners rolling the image) and an integrated teleprompter and allows the user to export the presentation to a CD format. Furthermore it also permits the inclusion of video screen captures in the presentation. To get a good presentation with Visual Communicator you have to be a trained user.

These four commercial tools are available only for Windows systems. They include synchronized audio with the presentation. In all four tools, the media format of the final presentation is fixed and the media quality must be defined at the beginning of the creation process. Furthermore, the tools are not as easy-to-use as desirable and require a relatively long learning period before the user is able to fully utilize all its features. Although shorter in the ShowAndTell software, this learning period is still longer than one might expect.

A recent academic study has proposed a system for creating presentations where different types of media are used and synchronized to get a complete presentation [1].  The system tries to make the best use of the available computational resources and uses the best characteristic of each media object (audio is  good for the explanation of the presentation, html for text , images for details in video) to create a presentation that has good quality. However, it requires different computer servers to store and distribute the presentation and the synchronization of different media objects is complicated. Furthermore, the process of  creating the presentation is complex and lengthy.

Finally, VNC, which stands for Virtual Network Computing [5], is a remote control software which allows one to view and interact with one computer using a simple program (i.e., the "viewer")  running on another computer anywhere on the Internet.  The two computers do not have to run the same operating system platform. VNCrec [13]

is an enhanced version of the VNC viewer. It allows one to record and play VNC sessions but does not allow one to export them in any video format. VNCProxy works just like VNCRec.

## 3    Overview of EasyPres

The design of EasyPres was driven by the key goal of being a simple, easy-to-use open source tool for quick generation of educational multimedia presentations for distance learning, so that anyone with varying levels of computer expertise could easily use it. Furthermore, it should be able to produce presentations that could be later disseminated in different media, from low bandwidth networks (e.g., modems) to CDs or DVDs. Moreover, it should run and their presentations should be reproducible in a large variety of computer platforms, including Windows and Unix systems.
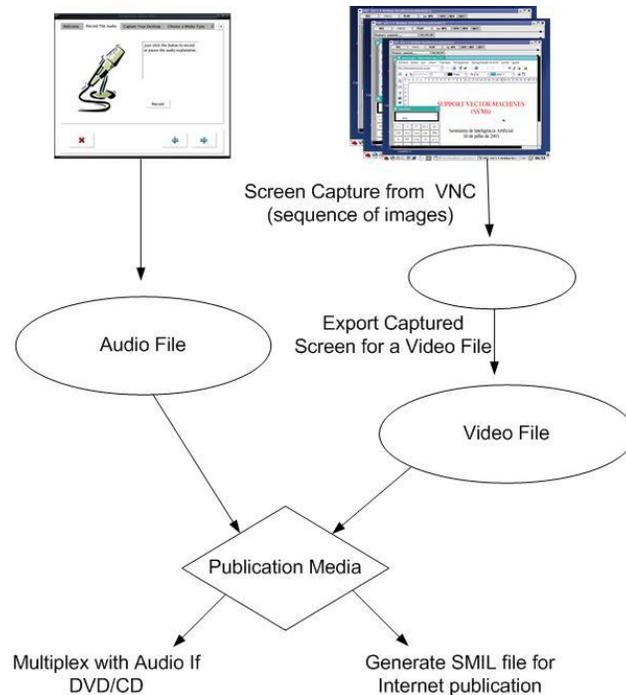


**Figure 1: Process of creation**

The whole process of creating a complete multimedia presentation using EasyPres has three steps:

1.  Audio recording

2.  Other media capturing and synchronization

3.  Presentation encoding

The first step for creating an EasyPres presentation is to capture the explanation audio, which may already exist in a text format. In this case, the content creator may read the text just like a tele-prompter and record it using the EasyPres audio recording component. Once the explanation audio is recorded, the next step is to capture the slides, video, and any animation or software that can be displayed at the desktop and that will be part of the presentation in a video file and synchronize it with the audio. To do that, the recorded audio is played back while the user does the animation of the presentation in his/her desktop, showing slides, video, starting up animations/applications at specific points in the audio. In other words, the user does the presentation transitions (e.g.., move the slides) at the time of the pre-recorded audio he/she wants. Thus, at this step, all that is required from the user is that he/she interacts with the desktop as he/she would when playing the presentation. At the final step, the captured audio and animation are encoded to generate a media file, which can be delivered over the Internet, CD or DVD disks. At this point, the user can choose the media format and quality, as described at the end of this section.

Note that, unlike other tools, discussed in Section 2, the media quality is defined only at the end of the creation process. Furthermore, the user can even save multiple versions of the presentation, with different format and/or quality, without having to start the creation process from scratch for each version. Moreover, expert users can cut down the time required to create a presentation by capturing and synchronizing audio and other media objects at the same time, using an advanced version of EasyPres.

In order to capture the desktop screen and generate a video file, synchronized with the audio file, we use a modified version of VNC [11]. As discussed in section 2, VNC allows one to open a desktop area inside a window in the current work area, creating then a recording area, isolated from the current work area. Thus, the user can design and develop a complete presentation inside the recording area, without stopping or interfering with the work he/she is currently doing. As discussed in section 2, VNC tools [11, 13, 18] allow a user to capture windows activities but do not generate movie files and do not synchronize with other media files. To build EasyPres, we modified VNCrec [13] to capture user actions such as pause and resume and to output the captured video screen shots to a temporary file. This temporary file, consisting of a sequence of images, is then encoded into a video file and synchronized with the audio in a way that depends on the final media type and media quality the user chooses to encode and publish the file, as discussed below. Figure 1 illustrates the process of creation and synchronization of video and audio files.

Unlike other authoring tools, which use a fixed video codec, EasyPres is more flexible allowing the user to choose out of a pre-defined set of codecs as well as to define his/her own encoding tools. The default codecs used by EasyPres are MPEG [22] and XVID [16], for video, and MP3 [21] for encoding the audio file. MPEG files are more common and require fewer computer resources whereas XVID produces higher quality videos at similar required bandwidth, but requires more computational resources during decoding. The types of media EasyPres can produce are:

- Internet High Quality: requires bandwidth of approximately 1Mb/s for MPEG video files and 400 Kb/s for XVID files.

- Internet Medium Quality: requires approximately 500Kb/s of bandwidth for MPEG and 250kb/s for XVID files.

- Internet Low Quality: the required bandwidth is lower than 100Kb/s.

- DVD Quality: audio and video files are joined in a single MPEG-2 file (4 Mb/s), which can be recorded in a DVD disk. A simple DVD disk can hold up to 4 hours of presentations.

- VCD Quality: audio and video files are joined in a MPEG file that requires approximately 1Mb/s of bandwidth. The resulting video+audio file can be played in any computer with a CD-ROM or in DVD players. The media quality is better than VHS.

For the first three media types, which aim at the distribution of the presentation over the Internet, we choose to do the synchronization of the MP3 audio and the video files through the use of a SMIL [12] file. SMIL, or Synchronized Multimedia Integration Language is a popular and simple-to-use HTML-like language, which enables the synchronization of multimedia objects in a single file that can be viewed in any web browser. In EasyPres, if a user selects an Internet media quality for storing his/her presentation, the video and audio files are joined in a single SMIL file for future visualization. If the user selects DVD or VCD qualities, the audio and video files are multiplexed and joined in a single MPEG-2 or MPEG file, respectively.

Note that the lowest media quality produced by EasyPres requires bandwidth below 100 Kb/s (Internet low quality). At first, one might think that the observed quality of the generated media files is very poor for such low bandwidth. However, we point out that, unlike general movies, which usually require much higher average bandwidth for a reasonable observed quality at play-out, presentation videos do not usually have significant changes over consecutive frames. For instance, the background may not change throughout the presentation. Therefore, for a fixed bandwidth, one can experience a much higher media quality. In a preliminary set of experiments using EasyPres to create a number of different presentations, we have verified that the observed quality was reasonably good even when the Internet low quality was selected as the presentation media type.

EasyPres was implemented in C++ given its great system portability and performance. The interface, shown in the next section, was designed using QT [19], a multi-platform C++ GUI/API and supports both Portuguese and English. Extensions to include other languages can be easily added.

## 4 Producing an EasyPres Presentation

This section uses a simple case study to show how easy it is for the user to create an EasyPres presentation by following, step by step, the interfaces a user has to interact with during the creation process. The main interface is the *Wizard*. A wizard is not common in open source software. Even in the existing commercial tools, wizards are not as clear and prompt as desirable. In EasyPres, the Wizard interface, shown in Figure 2 introduces the tool and explains what the user will be requested to do in the next steps for creating the presentation. The next three windows the user has to interact with, one for each main step of the creation process, described in section 3, are shown in Figures 3 – 5.

Figure 3 is a screen shot of the EasyPres interface that appears to the user as soon as he/she clicks in the right arrow (*Next* button), on the right lower corner in the Wizard interface (Figure 2). The user records his own voice using a microphone plugged in his computer. He may read the content from a previously written test, like in a tele-prompter. The user may pause and resume the audio recording anytime by simply clicking on the *Pause/Record* button. Once the user is done recording the audio, he/she may click on the right arrow to proceed. The user may also restart the recording at any time by just clicking on the left arrow to go back to the Wizard.
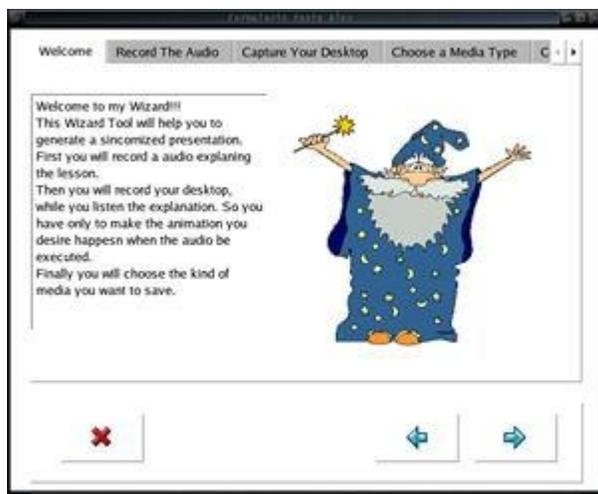


Figure 2 : Wizard Tool          Figure 3: Capturing Audio

The third window the user has to interact with is a modified VNCRec interface for capturing the other presentation objects and screen actions of the user. Figure 4 shows an OpenOffice presentation and a calculator being manipulated to create an animated presentation. Note that the presentation objects are restricted to a recording window, which is isolated from the other work areas in the desktop screen. The user can pause or resume the recording, start playing the audio (for synchronization), stop the video screen capturing, restart the screen capturing from scratch and save all captured screen images to a file, by clicking on one of the buttons shown on the top of the recording window.
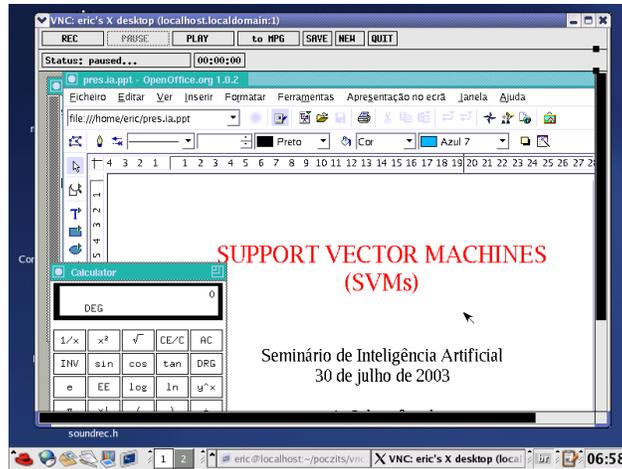
**Figure 4. Capturing The Presentation**

Once all presentation objects and user actions have been recorded, EasyPres pops up a window for the user to select the type of delivery media he/she wants to generate, as shown in Figure 5. We point out that the user may also configure the encoding tools, allowing for more flexibility in the final product. After the user has selected the media type, a final window, shown in Figure 6, informs when the presentation is ready.
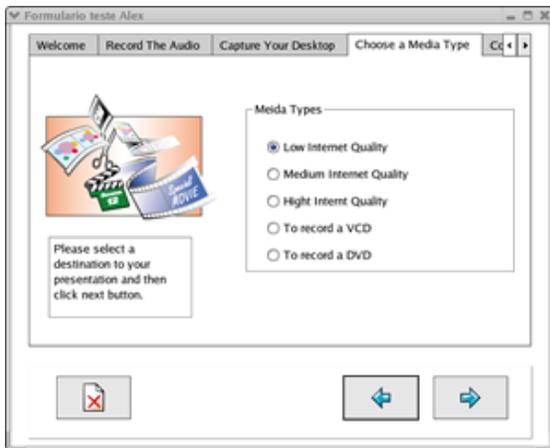


**Figure 5. Choosing a Format**



**Figure 6. Encoding the presentation**

Concluding, Figures 2-6 illustrate how simple it is to create rich and comprehensible multimedia presentations using EasyPres. After quick interactions with only 3 windows (not including the wizard introduction), the user has a complete presentation ready. The generation of the video and synchronization of video and audio are completely transparent to the user. All the user has to do is to record his/her own voice and manipulate the VNC recording windows as he/she would if playing the presentation in his/her own computer in a real situation.

As discussed in the previous section, an advanced version of EasyPres allows the user to record the audio while manipulating the other presentation objects, in the recording area. In this case, the user goes directly from the Wizard interface to the VNCrec window, shown in Figure 4, skipping, thus, the interface illustrated in Figure 3.

## 5   Evaluation

A preliminary evaluation of EasyPres was performed by comparing, qualitatively, its features and functionalities with those available in other previously built tools, briefly described in section 2. The criteria used and the results of this comparison are listed in Table 1. Note that subjective criteria such as easiness-to-use and user satisfaction were

not explicitly included in this evaluation as it would require the participation of a number of independent users to test and compare each tool. A more thorough evaluation of EasyPres is left for future work.

**Table 1: Qualitative Comparison of Software Features**

| Software | Support Multiple Codecs | Flexible Choice of Media  Quality | Export to CD/DVD | Synchronize Audio | Support Screen Capture | Platform | Availability |
|---|---|---|---|---|---|---|---|
| **EasyPres** | Yes | Yes | Yes | Yes | Yes | Linux and Windows | Open  Source |
| **VNCrec** | No | No | No | No | Yes | Linux | Open  Source |
| **Presenter One** | No | No | Yes | Yes | No | Windows | Commercial |
| **Presentation Maker** | No | No | No | Yes | No | Windows | Commercial |
| **ShowAndTell** | No | No | No | Yes | No | Windows | Commercial |
| **Visual Communicator Pro** | No | No | Yes | Yes | Yes | Windows | Commercial |

EasyPres is the only available tool that allows the user to choose among a list of pre-defined codecs. Furthermore, it is possible to the user to add new codecs to the toolkit if it is necessary or desired. The format generated by the other tools is fixed, generally Real Player format [10] or Windows Media Video format [26]. By default, EasyPres uses MPEG-1 and MP3 to generate the video and audio files, respectively. However better results, similar observed quality at lower required bandwidth, are obtained using XVID. Moreover, unlike all other tools, the choice of media quality in EasyPres is flexible in the sense that it happens after all objects that are part of the presentation have been recorded. Thus, the same presentation can be encoded at different media qualities without having to restart the creation process. In all other tools, the media quality is defined at the beginning of the process, before recording the presentation elements. EasyPres, like Presenter One and Visual Communicator Pro, has the capability to generate CD or DVD content.

EasyPres, like all other tools (except VNCrec) has the capability to synchronize audio with the presentation. However, except for Visual Communicator Pro, which supports the audio synchronization with objects of different media types, all other tools allow audio synchronization only with PowerPoint presentations. This is because EasyPres, VNCrec and Visual Communicator Pro are the only available tools that have support for video screen capture. Screen capture is a very useful feature as it makes it possible for the user to create richer presentation, including any animation or application that runs in his/her desktop. In terms of the quality and richness of the presentation produced, Visual Communicator Pro seems to be the most competitive application to EasyPres. However, our experience with that tool is that the process of creating a presentation is significantly more complex, requiring a longer learning period, than the simpler three-step EasyPres. Furthermore, Visual Communicator Pro is an expensive commercial product, whereas EasyPres is an open source software, which can be modified and optimized by anyone interested in.

Finally, it is important to note that only EasyPres may be portable through different platforms. In particular, as far as we know, it is the only tool for creating multimedia presentations (including audio) available for the Linux operating system.

## 6   Conclusion

The use of Internet to deliver educational content is growing very fast. The number of companies that discover the advantages of the training for the qualification and update of its employees is getting bigger. Due this big interest in Distance Learning, new technologies and tools are needed to create the presentations of an Educational material, in an easy and quick way.

EasyPres is a helpful toolkit to create a synchronized multimedia presentation for Distance Learning. It is possible to teachers record the audio, create an animation in the desktop using all elements of the screen and synchronize then in a simple and quick way. The final product can be used for different purpose like streaming over Internet a

distance learning class or through a DVD. The Wizard tool allows end user to create their presentation without any specific knowledge.

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