

Creating Virtual Learning Companions on a Shoestring Budget

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Virtual pedagogical agents, characters, pedagogical agents as learning companions, avatars, on-screen narrators, or other virtual representations for social presence and a guide are useful and important to include in instruction, whether online, blended, or face-to-face with media presentations. These learning companions can be used in a variety of instructional roles to coach, model, teach, demonstrate role-plays, motivate, and introduce and conclude the lessons. Because of the higher cost of site licenses, laboratories, and programming to produce pedagogical agents and avatars, many educators wonder how they can produce them if they are novices, only have a small budget, or are working without a laboratory or skilled programming staff to create them. This presentation offers examples, the processes, and a small amount of coding that can allow designers, educators, E-commerce, or marketing personnel to create a variety of virtual characters or human-like learning companions in low cost ways for projects.

Keywords video; Vox Proxy; animated agent; life-like character; social presence; background removal

1. Introduction

For a safe, less stressful online learning environment there are basic strategies that are worth the effort to help learners feel more comfortable in your course so they do not do poorly or drop out. These learning companions can be used in instructional roles to coach, model, teach, demonstrate role-plays, motivate, and introduce and conclude the lessons. By having a social presence and a means of having support—a web buddy or learning companions, either virtual or human, learners may not feel as alone. Comparisons of well-known popular systems, software, and programming options are available, such as those offered by Khowaja and Guha [1] in a table comparing Visual Agent Programming, Multimodal Presentation Markup Language, and the Internet-based subscription service, SitePal. However, as demonstrated in this presentation, this work can also be accomplished in simple, low-cost ways to create virtual characters. In this presentation some characters will be used to introduce topics and make comments for ways that presenters can see how these pedagogical agents could be added in their own projects and environments.

2. Methods of Adding Social Presence or Scaffolding

2.1 Video taping yourself as the instructor

In a talking-head video, discuss the course or introduce the lessons, tricky material or assignments, or telling a story as you would in a face-to-face class. This can be a short video, but it adds a human element to develop web presence and motivation.

2.2 Adding digital photos of learners or role models

Use photos of people who are near-peer, or similar to your learners, or else other examples you wish to portray. Onscreen characters are learning agents who help guide your learners and the learning process during your instructional or marketing presentation.

2.3 Adding audio files

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Make audio files using actual human voices of other students' comments, experiences, stories, concerns, and solutions. Combined with the photos, learners view and hear these more "personalized" onscreen narration examples with interest and added retention. One caution: do not combine the narration and photos with much text, or do not use any text [2] in order to avoid cognitive overload.

2.5 Pedagogical agents, 3D animated characters, and simulated worlds

Although we mention three software options to create agents and characters, we will offer more details on using the Vox Proxy software within a PowerPoint presentation, since that is the prominent one used in our presentation.

2.5.1 *breve* is a free, open-source Mac OSX software package which makes it easier to build 3D simulations of multi-agent systems and artificial life. Users define the behaviors of agents in a 3D world and observe how they interact. *breve* allows you to simulate realistic creatures, and an OpenGL display engine to visualize your new world. This requires more programming skills, however.

2.5.2 Vox Proxy software has a variety of characters that are add-ins for talking animated characters for slide shows. Add your own .wav files for natural, human voices. You can also use the electronic computer voices from text-to-speech engines that are included in the easy-to-use wizards from drop-down menus. Vox Proxy software programming for PC PowerPoint use offers a choice of 3D full-bodied human characters, heads only, and full-bodied animals. The Vox Proxy reader is free so others can see and hear the show, but the Vox Proxy software costs around \$200.00. Inside the PowerPoint software program, use a Script Writer dialog box to write a script to animate each slide. Character animation is aided by a "Wizard" feature that simplifies selecting character movements and speaking options. A software add-on called CDPrep creates a Vox Proxy scripted PowerPoint presentation that can run directly from a CD drive. Thus, users do not need to have PowerPoint installed on their computer.

3. Basic Video Clips

3.1 Getting video to your computer

There are basically three ways to get video to your computer. The first is to use a webcam, the second is to use a video camera and a firewire, and the third is to use a digital camera.

3.1.1 Using a webcam is the easiest and least expensive option if you have to purchase the equipment. Webcams are available for as low as around \$30.00 and range up to the low \$100.00 and above. The high-end webcams can give you higher resolution (the size of the movie in pixels), quality or color depth (how the movie looks), and frame rate (how often a picture is displayed on the screen). Most webcams come with software to capture the video to your hard drive (which is what you will need). You will want to compare these features to make sure the webcam can provide the video that you will need for your project. However, for most multimedia needs on a website or in a presentation, a low-end webcam will suffice. Webcams connect to your computer via a USB port. Your computer should have a USB port unless it is very old; however, you may want to double-check.

The main drawback to using a webcam is that your video recording is linked to your computer. If you have a desktop, you will have to do your recording where your computer is. If you have a laptop, you can be a little more mobile in choosing your location, but it does limit your options. To capture video using a webcam you simply connect the webcam to your computer, install the software and start capturing the

video. Your video will be saved to your hard drive in a file and folder of your choice, ready for you to use.

3.1.2 Using a video camera is the second option for getting video to your computer. This requires that you have a digital video camera that is capable of connecting to your computer, accomplished via an IEEE 1394 cable commonly called a firewire, as well as a computer with a firewire connection. These two requirements are not commonly found on video cameras or on computers. Many people already have digital video cameras, and some of those cameras have firewire capability, so you may already have one. Or, if you are in the market for a video camera anyway, you may want to make sure it has a firewire port. If not, you may not be willing to pay the cost of acquiring a video camera specifically for your project.

Your computer will also need a firewire connection. If your computer does not have one, you can add one for around \$30.00 - \$60.00 dollars. In addition, the software that actually captures the video from your video camera usually is included with the firewire card. Using a video camera enables you to shoot your video on location more easily, but it is a much more expensive option for capturing video to your computer.

Once your firewire card and software are installed, you are ready to capture your video by using a video camera. First, record the video with your camera onto the videotape inside your camera. Then to transfer the video from your camera to your computer, you will connect your video camera to the firewire port on your computer via a firewire cable. By using the capture software that is installed on your computer, you will be able to control your video camera from your computer and get it positioned to the beginning of the video piece that you want to capture. Finally, you will capture the video to a file and folder of your choice ready for you to use.

3.1.3 The third option for capturing video to your computer is to use a digital camera that has video capability. Many digital cameras have the ability to capture video and are already designed for transferring that video directly to your computer. You can buy these cameras for around \$100.00 and up. However, digital cameras store their data on small memory cards, and recording the video can use up that memory quickly. You may find that you will need to limit the length of your video or else purchase a larger memory card for your camera. This can add another \$50.00-\$100.00 to the cost of your camera. This option is a good one as it is relatively inexpensive (especially if you already have the digital camera), and you have the mobility to shoot your video on location.

To capture video using a digital camera, you need only put the camera in video mode and start recording. When you are ready to transfer the video to your computer, you simply connect your camera to your computer via the cable that came with your digital camera. Using the software that came with your camera, save your video to your computer in a file and folder that you choose.

3.1.4 Now that you have your video stored on you computer's hard drive, you need to prepare to use it in your presentation. What is required depends somewhat on what you are going to do with it. For instance, if you use it in a PowerPoint presentation, you probably do not need to do more than insert it into the slide where you want the video to be shown and then scale it to the appropriate size. PowerPoint handles many different video formats and will scale the video as needed.

If the program you are using cannot read your video's file format, you have two options. First (and it might be wise to do this before capturing your video) you can check to see if your capture software can save the video in a format that your destination program can read. Otherwise, there are many programs available on the web that can translate a video from one format to another. Do a search on the web for the format translation you require, and you will most likely find many (probably for free) that you can download to do the translation.

3.1.5 Preparing your video for use on the web. If all you want to do is allow people to see your video when they click on a link on your website, you can simply upload the video to your web server and create a link to it. When someone clicks on the link, their media program of choice will launch, and they will be able to view it. However, if you want to display your video within a web page on your website, the best thing to do is to translate it to Adobe's Macromedia Flash format. Flash is commonly supported in the web community, and almost everyone will be able to view your video on your web page if it is in the Flash format. There are many programs available from different companies that can do this as well as Adobe. You can spend from around \$50.00 to hundreds of dollars to acquire sophisticated software that allows you to do powerful things with Flash.

If all you require, however, is to get your video from its current format to the Flash format without making any changes, you can download Riva's FLV Encoder from <http://www.rivavx.com/?encoder>. This simple program will convert your video to the Flash format. Once you have your video in the Flash format, you are only part of the way done. There are still two other components that you need to make it all work: a Flash player and code on your web page.

There are many flash players available on the web with various options and costs, and if you have Flash software, you can even create flash players yourself. One such player (that is free) is located at <http://www.videospark.com/index.php?ssp=24>. Once you have your Flash movie (or movies) and Flash player uploaded to your web site, you need to put code in any web pages where you want the video to show. You will insert the following code:

```
<object classid="clsid:d27cdb6e-ae6d-11cf-96b8-444553540000"
codebase="http://fpdownload.macromedia.com/pub/shockwave/cabs/flash/swflash.cab
#version=7,0,0,0" width="534" height="509" id="player" align="">
  <param name="allowScriptAccess" value="always" />
  <param name="movie" value="..player.swf" />
  <param name="quality" value="high" />
  <param NAME=scale VALUE=noscale>
  <param NAME=salign VALUE="LT">
  <param NAME=FlashVars
    VALUE="contentPath=videos/webvideo.flv&affiliateID=&bufferTime=5&autoPlay=true
&startStreaming=true&hasInfoButton=false&hasVideoChrome=false&redirectURL=">
  <param name="bgcolor" value="#ffffff" />
  <embed src="..player.swf" FlashVars="contentPath=webvideo.flv&affiliateID=&bufferTime=5
&autoPlay=true&startStreaming=true&hasInfoButton=false&hasVideoChrome=false
&redirectURL= quality="high" scale=scale bgcolor="#ffffff" width="534" height="509"
name="player" salign="lt" allowScriptAccess="always" type="application/x-shockwave-flash"
pluginspage="http://www.macromedia.com/go/getflashplayer" />
</object>
```

This will make your video show on the page. There are some things in the above code that you will have to change and others that you may want to change. You must change the references to 'webvideo.flv' in the above code to the actual location and filename of your web video. Likewise, you have to change the references to 'player.swf' to the location and filename of the player file that you uploaded. You should change the parameters for the height and width to match your video. You may also want to change some of the options as appropriate, such as the autoPlay (whether or not the video starts playing when the page loads) and the redirectURL (a URL to go to when the video completes). Of course, there is more that goes into positioning the video on your web page and so forth, but we will leave that part up to you.

4. Changing Video Location or Incorporating Video Directly into a Presentation or Web Page

One of the more interesting things that you can do with video is to replace the background with a different background to give the affect of being in a different place, or even remove the background com-

pletely to place the person seamlessly into the page on which you are displaying the video. Both of these affects are accomplished first by removing the background.

4.1 Background removal / replacement

Background removal is something we have all seen before. It is commonly done on television– most notably in the news and weather. Professionally, this is done using a ‘green screen’ or similar background that is all one color when shooting the video. Then compositing software is used to take out the background by removing from the video all of the places where the color is green (or whatever color is used) and replacing it with the desired image. You can do the same thing, but it takes some preparation and time to get it right. The secret is in getting the background as uniform in color as possible. The better job you do, the more easily you will be able to remove the background.

One way to accomplish this is to hang a bed sheet on the wall, stretching it tight so there are no wrinkles. It helps to start with an ironed sheet. It is also a good idea to use a sheet that approximates the color of the final background you will be using. The reason for this is that the areas just around your subject will have a slight ring of the original background color around him or her if the colors contrast highly. For instance, if you use a white sheet and replace it with a dark night scene, the person will appear to have a white halo around him or her.

Another way to accomplish this effect is to hang a white bed sheet in a doorway or similar place where you can light the sheet from behind. You will shoot the video from the front and the sheet will be lit up brightly and evenly such that when you record your video, it will be too white, bright, and washed out. The brighter and more evenly you can light this sheet, the better. You can also use the brightness and contrast controls of your camera to additionally make the sheet look washed out. Of course, you will have to appropriately light your subject from the front as well, and lighting the sheet from behind helps to remove any shadow cast by your subject onto the sheet.

Once you have shot your video and transferred it to your computer, you will use video editing software that can do chroma key removal of the background and compositing to replace the background with your desired background. This, of course, requires that you acquire video editing software. There are many companies that produce this software, and they range in price from \$30.00 to \$200.00 and more. One that is free on the web can be found at <http://www.zs4.net/>.

4.2 Placing a person seamlessly into a web page

One other interesting use for video is seamlessly placing a person into a web page. You can do this fairly easily by combining a few of the tricks we have talked about. First, set up a white sheet with the back-light as explained above. Then record your video and transfer it to your computer. Next, convert the file to the Flash format and place the video on your web page. If you use a white background for your web page, the background of the video will not show (being white as well) and the person in the video will simply appear to be walking, pointing, or dancing on the web page itself.

References

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