

8 Multimedia Didactics

8.1 Didactic Design of Text and Images



8.2 Media Didactics for Audio

8.3 Media Didactics for Animations

8.4 Media Didactics for Video

8.5 Learner Control

References:

Horton, Ch. 10, see www.horton.com/eld

Niegemann et al., Kap.11+12

Full Screen, One Window, Many Windows?

horton.com/eld

Task bars

Task bars are horizontal bars that show when tasks begin and end. They are the heart of the Gantt chart.

Tasks	Weeks
A	1 2 3 4 5 6 7 8 9 10 11 12
B	3 4 5 6 7 8 9 10 11 12
C	5 6 7 8 9 10 11 12
D	7 8 9 10 11 12
E	9 10 11 12
F	11 12
G	12
H	
I	
J	

Example A

Wolf Creek Development Timeline

Task Name	Start Date	End Date	Duration	2001	2002	2003
Research and planning	4/1/01	9/29/01	190d 6m	Q1	Q2	Q4
Subdivision plan approved	10/1/01	10/1/01	0d			
Environmental survey	10/1/01	10/15/01	14d			
Prepare grounds	10/15/01	11/15/01	24d			
Site approved	11/15/01	11/15/01	0d			
Survey for utilities and lots	11/15/01	12/31/01	31d			
Construct utilities	1/1/02	5/31/02	156d			
Construct roads	1/1/02	7/1/02	180d			
Market lots	7/3/02	9/2/02	45d 8m			
Construct homes	9/3/02	3/7/03	134d			

Task bars

The most significant parts of the Gantt chart are the task bars.

The task bars are those rectangular areas that show when tasks begin and end.

Let's look at how task bars represent the length of activities.

On a Gantt chart time flows from left to right. A bar is present over the duration of time that a task is being performed.

Let's look at what an individual bar tells about its task.

Notice the third bar from the top. This bar shows the length of Task C. We can tell that because it is in the same row as the name of Task C at the left. From the left edge of the task bar, we can see that it begins at the start of Week 11. From the right edge of the task bar, we can see that it ends at the end of Week 15. Measuring the length of the bar, we see that this task is planned to finish in 5 weeks.

Can you think of advantages/disadvantages?

Screen and Window Dimensions

Needed space:

- Content
- Navigation
- Identification, status
- Embellishments

Adaptation to screen size:

- Different versions
- Configuration
- Responsive design



Window Format

- Aspect ratio
- Portrait or landscape?
- Materials with fixed format
- Special applications



Scrolling / Non-Scrolling

Using Gantt Charts - Parts of a Chart

Solved a task before:

- The Taskbar
- Activity**
- Dependency links
- Pool
- Milestones
- Practice

Just remember, the left end of the bar shows when the task begins and the right end shows when it is completed.

Answer the following questions about the Acososa Product Plan:

Question	Answer
Which task takes the longest time to complete?	<input type="text" value="D"/>
Which task starts at the beginning of Week 4?	<input type="text" value="I"/>
Which task is completed at the end of Week 11?	<input type="text" value="J"/>
Which is the last task to begin (E = milestone)	<input type="text" value="J"/>

WELCOME

Welcome to Vision and the Church. This Web site is a "learning pathway," a Web-based process that enables congregational leaders to do three things:

- **think** critically, creatively, and contextually about an issue or topic;
- **discover and use resources** for discussion and decision making;
- **act** faithfully and positively on their decisions.

Vision and the Church is designed for the leader of a ministry leadership team, committee, task force, or working group charged with guiding the congregation in clarifying vision. This learning pathway will enable you and your congregation to recognize your current vision and expand it to account for who you are and how God works through you. Using this pathway, you and your team will lead your congregation to a clearer, more vital vision.

[PLAY](#) Be Thou My Vision (200112)

Location: Welcome to Vision and the Church 1 of 142

Embodied in a vision statement

A vision statement communicates your vision to others. In this pathway, you will state and resolve your vision. But what exactly is a vision statement and how does it differ from the vision itself?

A vision statement is the formal embodiment of the vision. But it is not the same thing as your vision. Your vision will always be more than any statement about it.

A vision statement enunciates and articulates your vision. It offers a banner around which the congregation can rally and about which it can feel good.

A vision statement is usually expressed as a concise paragraph that paints a concise word picture of your vision. It can also take the form of a poem, a chant, a hymn, a saying, a stained-glass window. Eastern religions enfold vision in a shawl, a banner, or a sacred syllable. Zen Buddhists may express vision as a shout or laugh.

Location: Embodied in a vision statement 2 of 142

Layout Types

- Fixed / fluid (liquid) / elastic design
- Mobile devices: adaptive / responsive design



Stages of Text Understanding

- Processing in basal ganglia
 - Unconscious process
 - Saccades
- Semantic-syntactic processing
 - Concepts and relationships
 - Construction of knowledge
- Elaborative processing
 - Connection to previous knowledge
 - Associations, ideas
- Didactic recommendations may contradict each other!:
 - Niegemann et al (p. 163) recommends to include stimuli and suggestions for elaboration in learning materials
 - But: Mayer's coherence and redundancy principles!

Didactic Rules for Text Presentation

- From motivation theory:
 - Information on learning goals (why to read this)
 - Subject-matter structuring (orientation)
 - Didactic structuring (e.g. from simple to complex)
- From cognitive theory of multimedia learning:
 - Completeness and consistency
 - Reduction, conciseness
 - Summaries
 - Close integration with images
 - Spoken text as alternative

Examples for Confusingly Complex Sentences

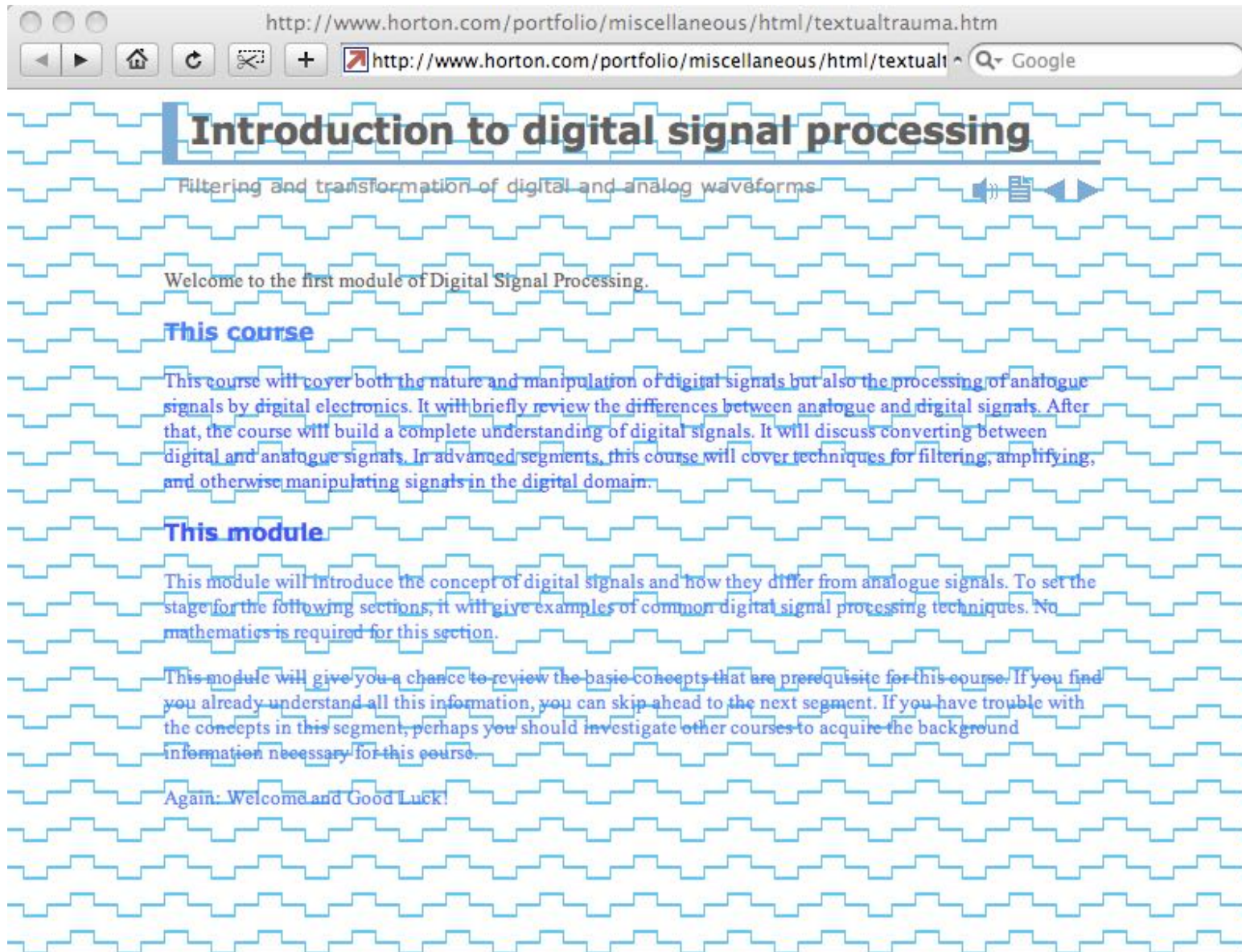
How can we simplify these texts?

- “High-quality learning environments are a necessary precondition for facilitation and enhancement of the ongoing learning process.”
- “If there are any points on which you require explanation or further particulars we shall be glad to furnish such additional details as may be required by telephone.”
- “Your enquiry about the use of the entrance area at the library for the purpose of displaying posters and leaflets about Welfare and Supplementary Benefit rights, gives rise to the question of the provenance and authoritativeness of the material to be displayed. Posters and leaflets issued by the Central Office of Information, the Department of Health and Social Security and other authoritative bodies are usually displayed in libraries, but items of a disputatious or polemic kind, whilst not necessarily excluded, are considered individually.”

Design Rules for Text Presentation

- Headings:
 - Based on subject matter, not formal
- Orientation:
 - Datelines
 - Boxes
 - Font, color, ...
 - Bullet points, pictograms, ...
- Classic typographic rules for screen presentation:
 - Sans-serif font, ideally screen-optimized font
 - Avoid italics
 - Avoid underlining

Background and Readability



The screenshot shows a web browser window with the address bar containing the URL <http://www.horton.com/portfolio/miscellaneous/html/textualtrauma.htm>. The page title is "Introduction to digital signal processing". Below the title, there is a sub-header "Filtering and transformation of digital and analog waveforms" and a navigation bar with a speaker icon, a list icon, and a double arrow icon. The main content of the page is as follows:

Welcome to the first module of Digital Signal Processing.

This course

This course will cover both the nature and manipulation of digital signals but also the processing of analogue signals by digital electronics. It will briefly review the differences between analogue and digital signals. After that, the course will build a complete understanding of digital signals. It will discuss converting between digital and analogue signals. In advanced segments, this course will cover techniques for filtering, amplifying, and otherwise manipulating signals in the digital domain.

This module

This module will introduce the concept of digital signals and how they differ from analogue signals. To set the stage for the following sections, it will give examples of common digital signal processing techniques. No mathematics is required for this section.

This module will give you a chance to review the basic concepts that are prerequisite for this course. If you find you already understand all this information, you can skip ahead to the next segment. If you have trouble with the concepts in this segment, perhaps you should investigate other courses to acquire the background information necessary for this course.

Again: Welcome and Good Luck!

<http://horton.com/consulting/portfolio/miscellaneous/html/TextualTrauma.htm>

Picasso Effect

In our daily lives we often confuse **urgency** and **importance**. Failing to distinguish these two characteristics can cause us **stress** and **confusion**. Let's see if we can untangle these two different concepts.

Urgency is the desire to do something immediately or at least soon. If something is **urgent**, we feel we must react at once. Things that are **urgent** have a deadline attached to them and the deadline is **imminent**.

Importance is the recognition that something will have a **major** effect on our lives or work. Something can be **important**, however, without being urgent. It is **important** that we begin saving for our children's college education, even though they may be years away from departing for college.

If the things that were **urgent** were always **important**, the distinctions between these two concepts would not be so ... important. **Problems** occur when things that are **important** are overshadowed by things that are merely **urgent**.

Obviously something that is both **important** and **urgent** should be dealt with immediately. But what about something that is **urgent** but not **important** or something that is **important** but not **urgent**?

This Lesson will help you handle Those situations.

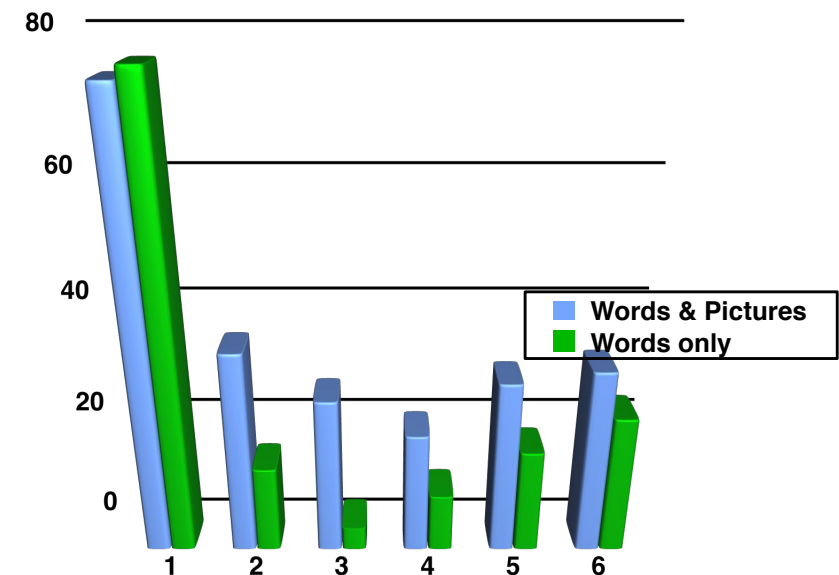
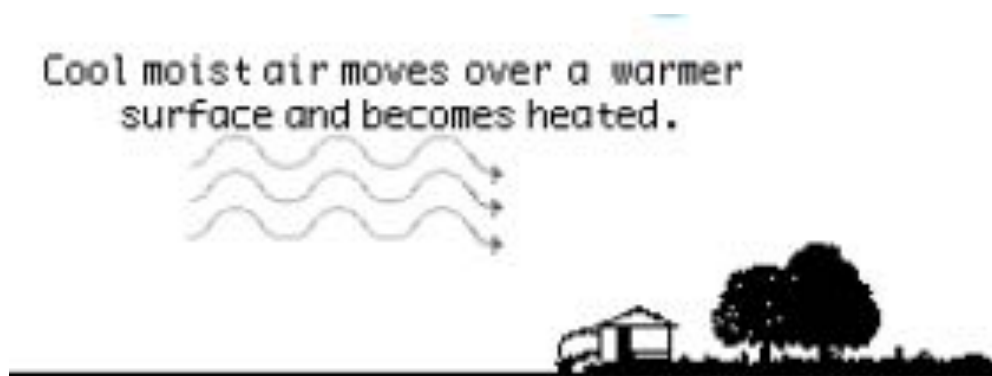
Continue

Stages of Image Understanding

- Pre-attentive processing
 - Overall impression
 - Scanning of the image (saccades)
 - Figure-ground perception (Gestalt factors)
- Attentive processing
 - Detail inspection (voluntary eye movements)
 - Parallel linguistic processes
- Elaborative processing
 - Connection to previous knowledge, interpretation

Types of Images

- Depictions
 - Representing parts of reality
 - Possible: Subjective viewpoint
- Diagrams
 - Charts, Tables, visual languages
- Abstract representations
 - Symbols and metaphors



Didactic Questions on Images

- Which previous knowledge exists when image is perceived?
- What is the instructional function of the image?
- Are the facts represented in a spatially correct way?
- Is the complexity level right?
- How can we control mental evaluation of the image?
- Which visual organization is suitable?
- Do text and images correspond to each other?
- Is the spatial correlation of text and images adequate?

Example: Confusing Graphical Content

The screenshot shows a web browser window titled "Creating a Web Site Using Dreamweaver 1 - Microsoft Internet Explorer". The browser displays a page from "elementk" titled "What is a URL?". The page content includes a "Definition" section explaining that a URL (Uniform Resource Locator) is a global address used for linking and retrieving documents on the World Wide Web. Below the definition is a diagram illustrating the components of a URL. The diagram is a large box with a callout bubble pointing to it. The callout bubble contains the text: "Move the cursor over the components of a URL to display its corresponding place in the list of typical URLs." The diagram itself lists three components: "PROTOCOL", "DOMAIN", and "PATH", each with a corresponding example URL. The "DOMAIN" component is highlighted with a mouse cursor.

Definition

Underneath each link there is an address pathway specifying how to retrieve that document. A URL (Uniform Resource Locator) is a global address used for linking and retrieving documents on the World Wide Web. A valid URL has a precise syntax which must include a protocol and domain name, and may include directory and file names.

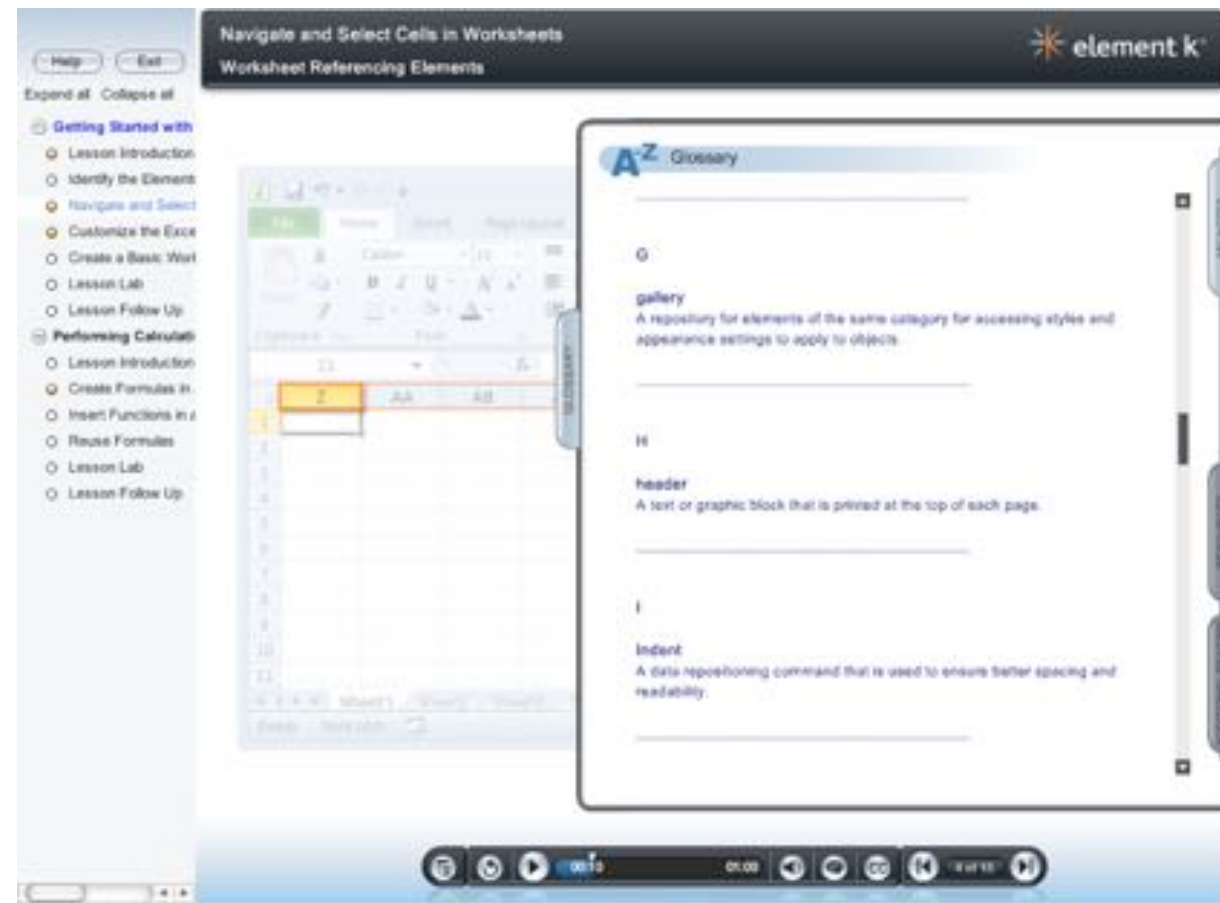
Move the cursor over the components of a URL to display its corresponding place in the list of typical URLs.

PROTOCOL	<code>http://www.macromedia.com/showcase/</code>
DOMAIN	<code>http://www.usatoday.com/life/health/diet/1hdie186.htm</code>
PATH	<code>ftp://getrichquick.com/findajob</code>
	<code>http://www.DemocratandChronicle.com/cgi-bin/feedback</code>

Clarification
of object
boundaries in
complex picture

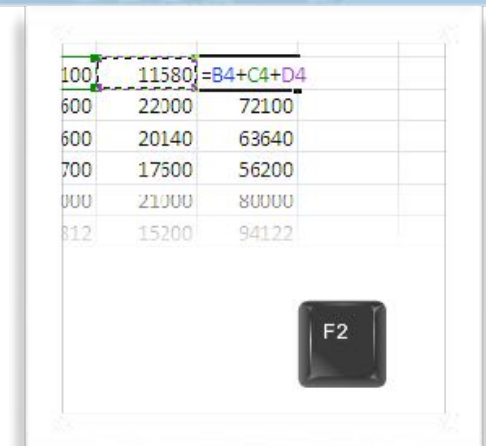
Roles of Graphical Elements

- Topic organizer
 - Graphical table of contents
- Relationship visualization
 - In particular in simulations
 - Show side effects of action (e.g. by measurement and visualization of dependent simulation variables)



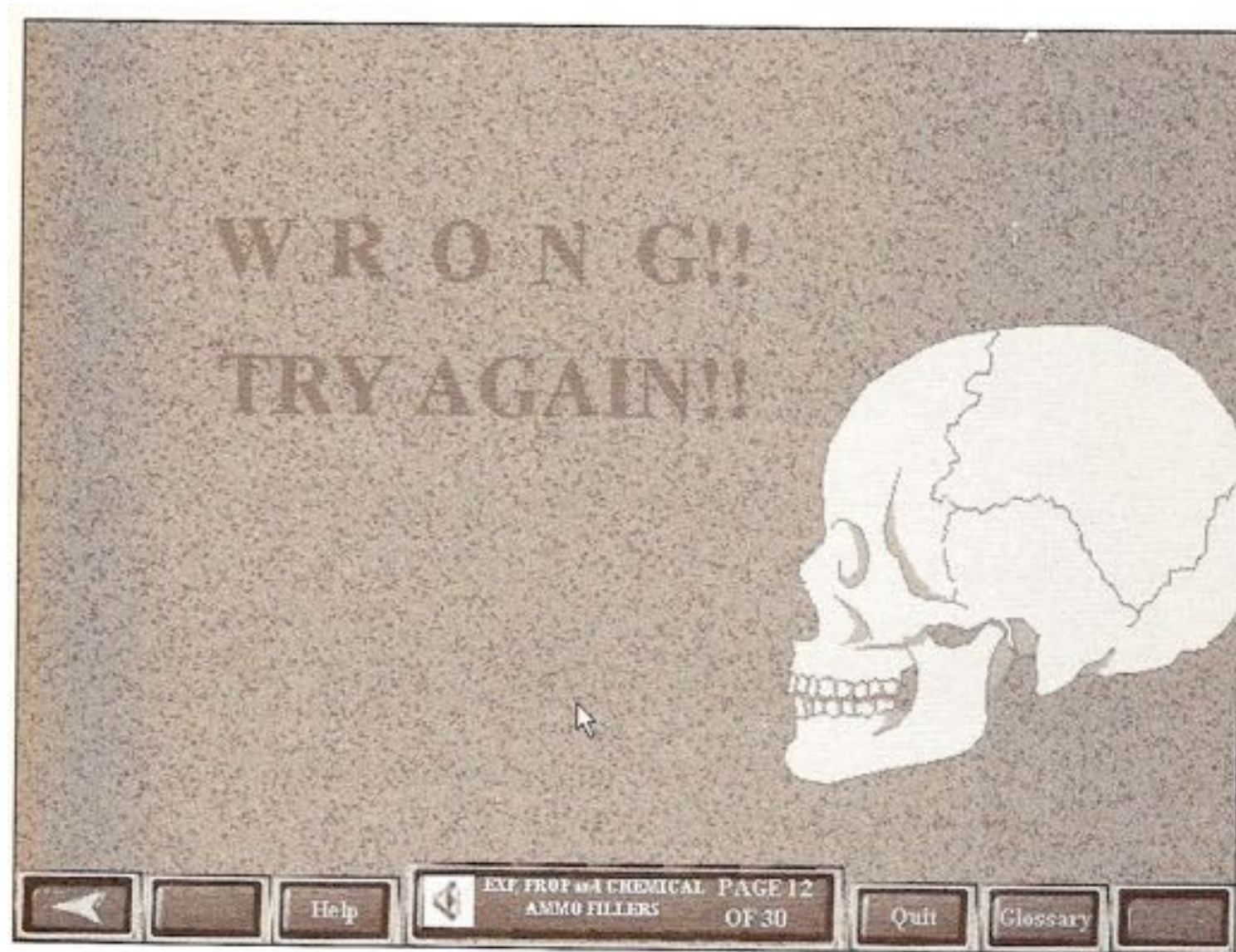
- Lesson interface
 - In particular in microworlds & simulations

R. Hewitt,
learnnc



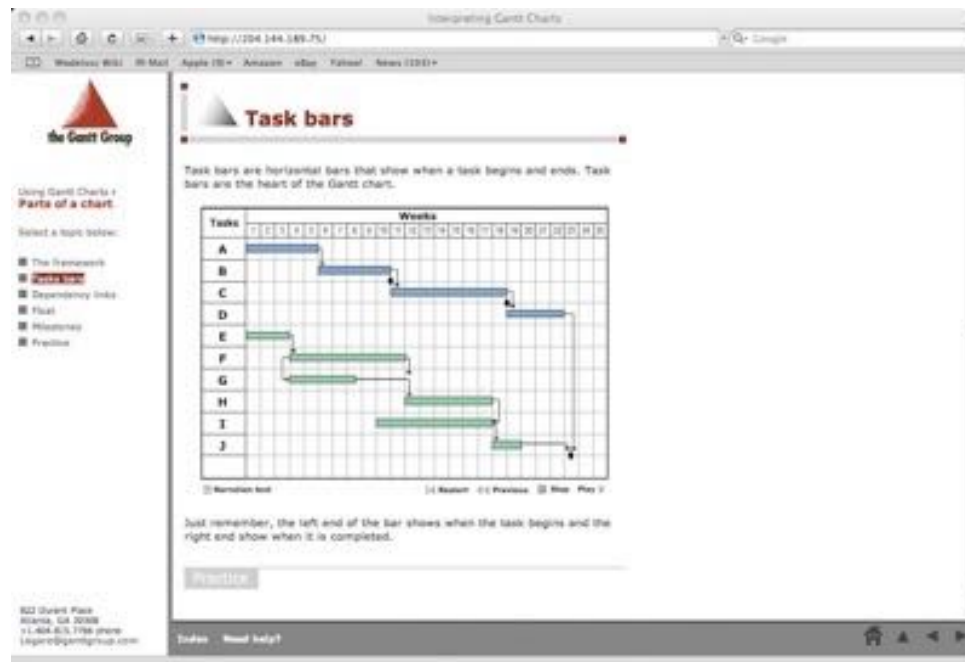
elementk.com

Bad Example...



Unity Principle

- Consistent design elements
 - Page construction
 - Color palette
 - Fonts and their usage
 - Logos, icons
 - Image types, image usage



8 Multimedia Didactics

8.1 Didactic Design of Text and Images

8.2 Media Didactics for Audio 

8.3 Media Didactics for Animations

8.4 Media Didactics for Video

8.5 Learner Control

References:

Clark/Mayer Chapter 5

Niegemann et al. Kap. 8

Types of Audio Elements

- Speech
 - "Reading aloud" (text also available as visual element)
 - Spoken explanations
 - Narration, dialog, audio play
- Sound effects
 - Confirmation sounds for user interactions
 - Acoustic warnings (e.g. when reaching a time threshold)
 - Acoustic indication of modus (e.g. when displaying results)
- Music
 - Background music
 - Music related to content
 - Music with formal function (e.g. for structuring)
- Note: Pure audio perception without visual support is cognitively quite demanding

Examples for Acoustic Establishment of Context

- Marsellaise
- "Peer Gynt" suite, Edvard Grieg
- Flamenco
- Syrtaki
- Didgeridoo
- Beatles song
- Renaissance dance music
- Themes from movies and TV series
- Note: Cultural and educational dependencies

Spoken Explanations

The screenshot shows a presentation slide titled "Inheritance" from William Horton Consulting, Inc. The slide content includes:

- Class A:** A circle containing "Property W" (with an empty input box), "Method N", and "Method Q".
- Object 1:** A rectangle containing "Property W" (with the value "12" in a yellow box), "Method N", and "Method Q".
- Object 2:** A rectangle containing "Property W" (with an empty input box), "Method N", and "Method Q".
- Object 3:** A rectangle containing "Property W" (with an empty input box), "Method N", and "Method Q".

Text on the right side of the slide: "The methods are the same for all objects created from a single class. However, the properties for each object may contain difference values."

The interface includes a sidebar with a navigation menu, a user profile for Katherine Horton, and a footer with "articulate POWERED PRESENTATION", "SLIDE 4 OF 27", "PAUSED", and a timer "00:03 / 00:09".

Ideal in combination with animations

Learner control (start/stop) advisable

<http://horton.com/consulting/portfolio/OOPs/index.html>

Audio+Text or Just Audio?

Skillsft
Sorting Data in Excel 2013

Nationwide Sales - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DESIGN

Get External Data Refresh All Connections Properties Edit Links Connections

Sort Filter Clear Reapply Advanced Sort & Filter

Flash Fill Remove Duplicates Text to Columns Data Validation Relationships Data Tools

Consolidate What-If Analysis Group Ungroup Subtotal Outline

C4 New York

	A	B	C	D	E	F	G	H
		Salesperson	Office	Date of employer	Sales \$			
1								
2		Hecht, Ralph	Los Angeles	03/04/2010	\$90,016			
3		Suares, Antonia	Los Angeles	03/04/2010	\$98,466			
4		Ginelli, Mario	New York	01/03/2012	\$54,455			
5		Johannsen, Karen	New York	08/01/2008	\$156,895			
6		Gold, Jonathan	San Francisco	11/07/2011	\$70,543			
7		Chavis, Tonya	Seattle	07/01/2006	\$145,451			
8		Denfield, Heather	Seattle	08/01/2008	\$130,466			
9		Oprisan, Bruce	Seattle	02/05/2007	\$107,025			
10		Powell, Chadrick	Seattle	07/01/2006	\$123,651			

1:03

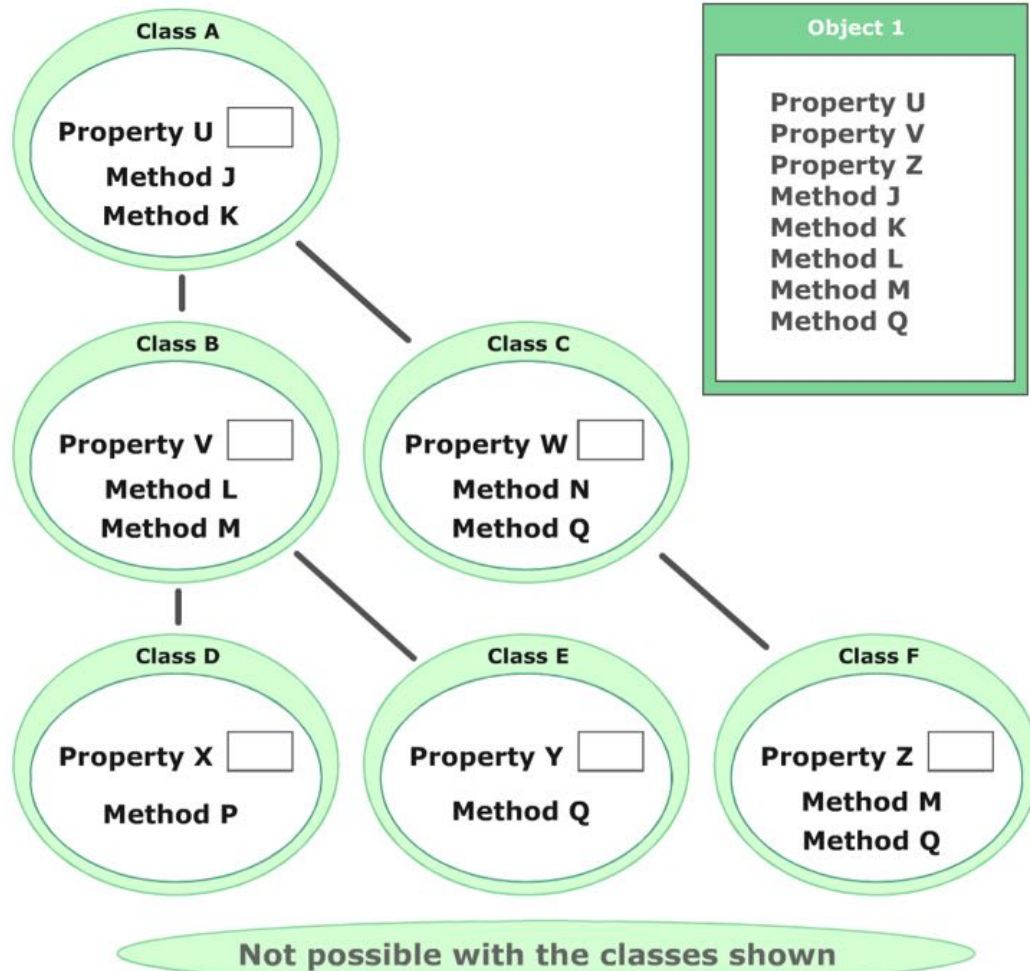
6/8

CC

skillsft.com/
coursedemo

Audio in Tests

Problem 4: The Class-I-fication Game



Click on the class from which this object was created.

You have 10 seconds.

No sound in practice units and tests - why?

8 Multimedia Didactics

8.1 Didactic Design of Text and Images

8.2 Media Didactics for Audio

8.3 Media Didactics for Animations 

8.4 Media Didactics for Video

8.5 Learner Control

References:

Niegemann et al. Kap. 9

Functions of Animations

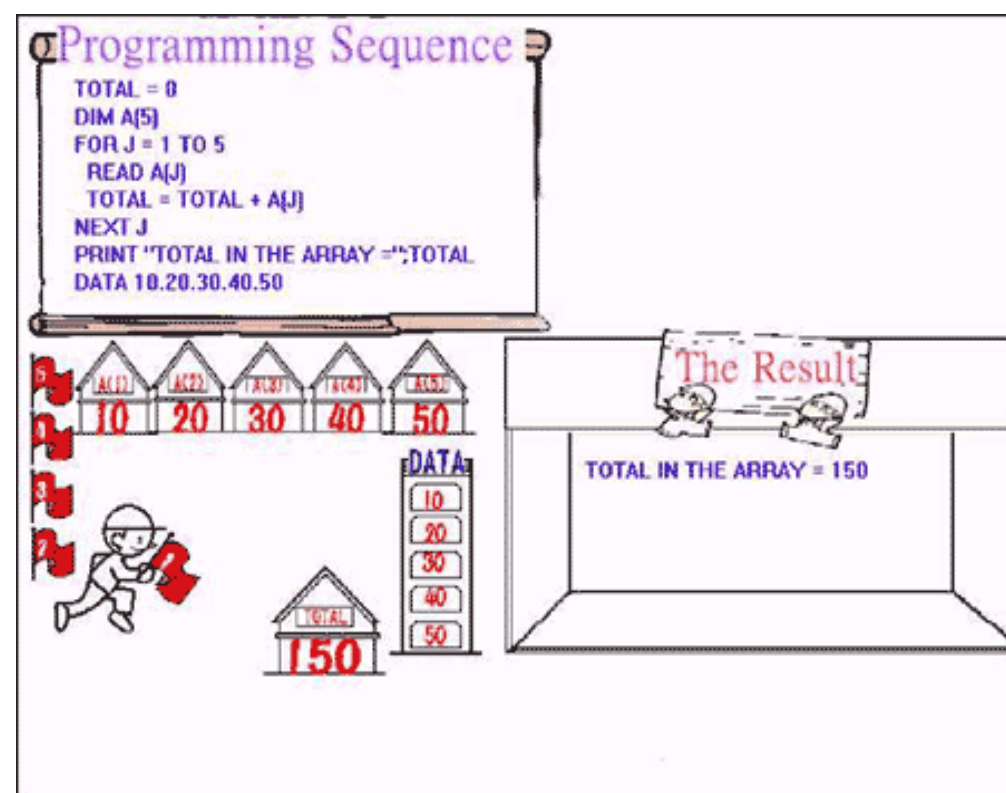
- Decoration
 - General assumption of higher attractiveness for learners
- Attention control
 - Does the ARCS model support the usage of animation?
 - Sustaining attention: Do "pedagogical agents" help?
- Content presentation
 - for sequential processes
 - for cause-effect relationships
- Practice
 - with high learner involvement

Recommendations for Usage of Animations

- Prefer simple animations over complex ones
- Learner control
 - Speed control, stop, rewind, fast forward, restart
- Keep animations related to current course content
- Give time for reflection
- Use dynamic, interactive graphics
- Avoid stereotypes and prejudices
- Consider technological requirements

Empirical Results

- Spotts&Dwyer 1996:
 - 63 learners, three groups
 - » Text + image
 - » Text + dynamic visualization
 - » Text + interactive animation
 - Visualization and animation lead to better learning success
- Lai 2001:
 - Simple animations better for learners with low cognitive skills and low previous knowledge
- Niegemann: No evidence for improvement of learning success through "fun factor" alone



8 Multimedia Didactics

8.1 Didactic Design of Text and Images

8.2 Media Didactics for Audio

8.3 Media Didactics for Animations

8.4 Media Didactics for Video 

8.5 Learner Control

References:

Niegemann et al. Kap. 10

Video and Movie: Old or New Media?

- First "educational movie" probably 1902
- Video presentations used in schools since many years
- Video in multimedia learning
 - Integration with other forms of training and learning
 - Interactivity
 - Digital transmission and storage (e.g. streaming)

Functions of Video

- Information density
- Representation of time relationships (even real time)
- Authenticity, relevance
- Making use of learned skills
 - "language of film"
 - Acquired patterns of understanding for complex relationships
- Multicodality
 - Dual coding, multimedia principle
- Emotion control
- Interactivity
- Note: Avoid extremely short video sequences

Interactive Video – Overlay of Menus

The screenshot shows a laptop displaying the California Health Insurance Marketplace website. The website header reads "Health Insurance Marketplace: California". The user is logged in as "Jane Smith". The main content area shows a table of insurance plans with columns for "Type of Plan", "Cost", "Features", and "Details". The table includes plans like "Gold", "Silver", and "Bronze".

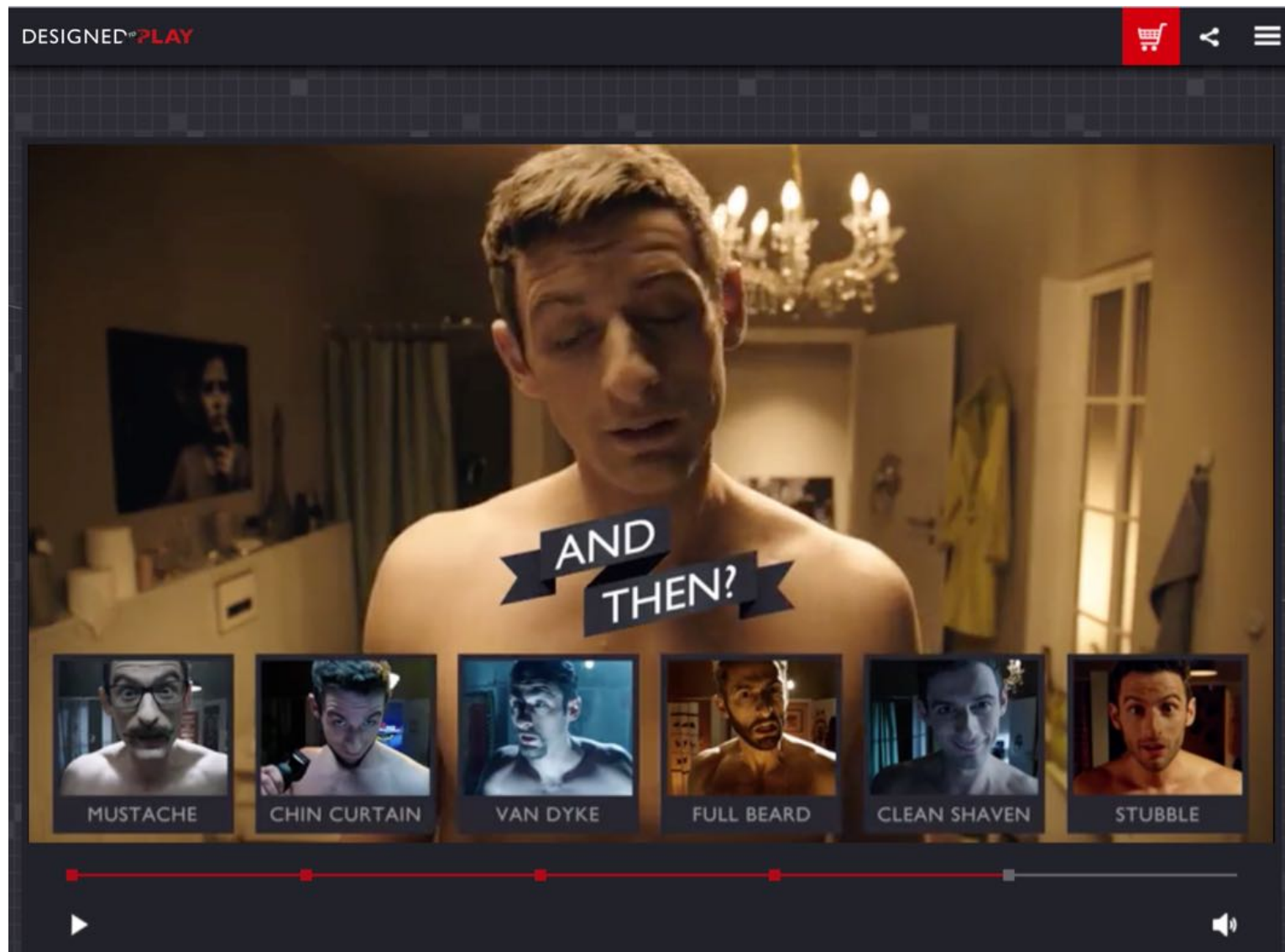
Overlaid on the video are two text boxes with blue circular icons containing an ampersand (&):

- Left box: **How Much Will the Exchange Plans Cost?** with the subtext *Click for more info*.
- Right box: **Find Your State's Exchange** with the subtext *Click for more info*.

At the bottom of the video player, there are three menu items: "What Happens to the Uninsured?", "Is My Employer Affected?", and "What's Covered?".

<https://watch.zentrack.com/UBOVJn/>

Interactive Video - Switching the Storyline



<http://www.play.philips.com>

Interactive Video - Parallel Stories

Honda:
The Other Side



<http://digitalsynopsis.com/advertising/honda-civic-type-r-the-other-side/>

Didactic Recommendations

- Separate video from other material
 - Full screen
 - Clearly recognizable frame
- Adequate structure
 - Linear (easy to understand)
 - Parallel (fascinating)
 - Branching (complex, may be confusing)
- Deal with waiting time for interaction input
 - Still image, possibly with text
 - Video loop
 - Continuing video

Practice of Video Learning: Streaming Clips

The screenshot shows a web browser window displaying the Vascular Disease Foundation's interactive learning videos page. The browser's address bar shows the URL <http://www.vdf.org/interactive/videos.php>. The page features a navigation menu on the left with items like Home, Disease Information, and Donate. The main content area is titled "Interactive Learning : Videos" and includes a search bar, a "Go" button, and a list of video categories. A prominent video player is embedded, showing a 3D anatomical diagram of blood vessels with a label for "Pulmonary Embolism (P.E.)". The video player interface includes a play button, a progress bar at 0:08 / 3:56, and a volume control icon. Below the video player, there is a caption: "How Blood Clots Form - This short 4 minute video describes how blood clots form in the body. [Deep vein](#)".

8 Multimedia Didactics

8.1 Didactic Design of Text and Images

8.2 Media Didactics for Audio

8.3 Media Didactics for Animations

8.4 Media Didactics for Video

8.5 Learner Control 

References:

Clark/Mayer Chapter 12:

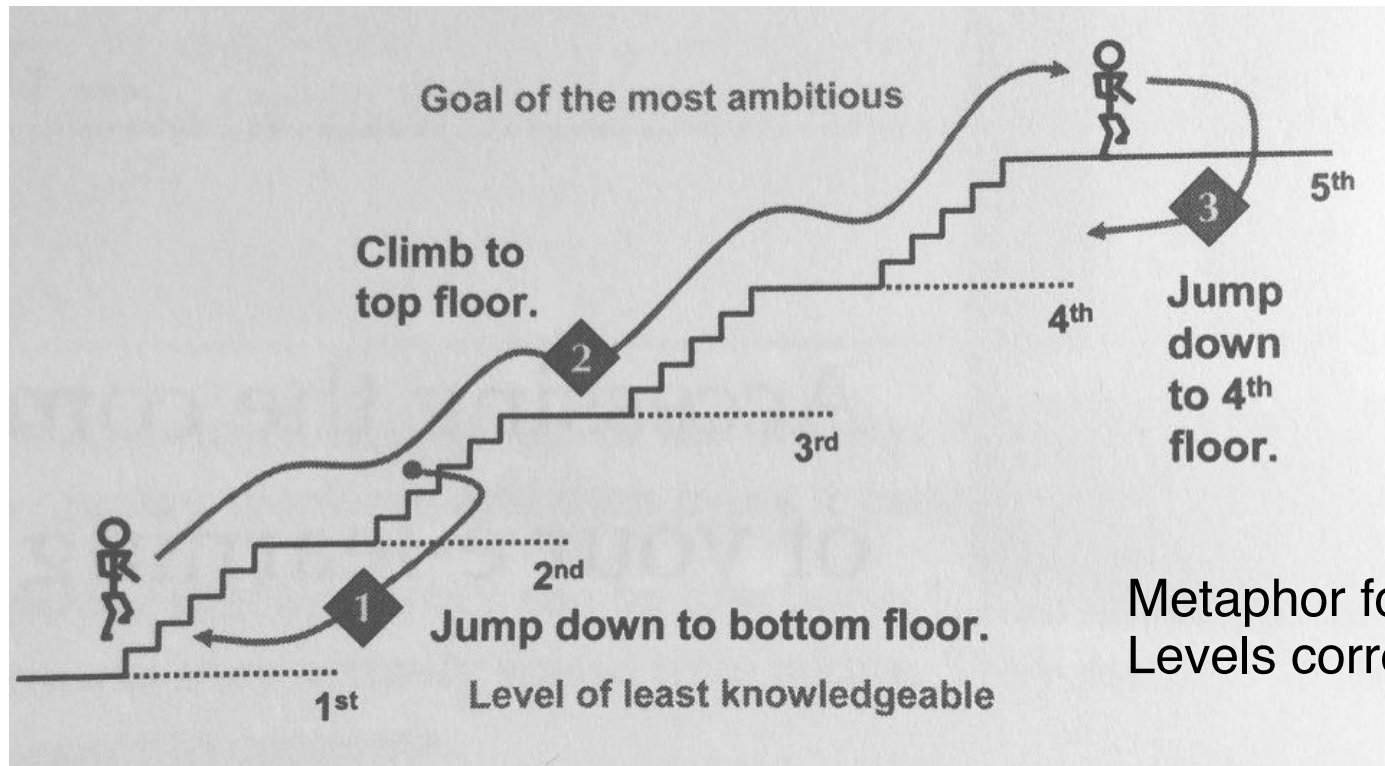
"Do Surfing and Learning Mix? - The Effectiveness of Learner Control in E-Learning"

Horton Ch. 11

Learner Control vs. Program Control

- Learner control
 - One of the main advantages of e-learning
 - Learners control their learning pace, decide to bypass elements, select teaching techniques
- Program control
 - Traditional model of classroom training
 - Identical pace, linear sequence, same teaching techniques for all
- Detailed classification of control options:
 - Content sequencing
 - Pacing
 - Access to learning support

One-Path-for-All Syndrome (Horton)



- Does everybody have to take the same path?
- Design for varying skill levels and learning goals

Navigation Mechanisms

- Paging mechanism
 - “Next”and “previous” buttons
- Menu
- Index
- Map
- Search
- Hypertext links
- Auto-scan mode
 - Automatic switch to “next” page
- Location indicator
- Bookmark

Menus

- Menu may be combined with
 - Table of contents
 - Progress indicators (checkmark completed lessons)
- Constantly displayed menu vs. menu-on-demand
 - Menu-on-demand saves space, but requires additional navigation
- Multi-level vs. expanding menu
 - Keep structure always clear
- Breadth vs. depth tradeoff
 - Never require more than 3 decisions (maximum depth 3)
 - Wide menus are generally better than deep ones
 - Ideally, breadth is limited to a maximum of 7
 - » Giving a maximum of 343 different topics
- Understandable menu titles
 - Speaking the language of learners, full title as “tooltip”

Navigational Guidelines (Clark/Mayer)

- Use hypertext links sparingly
 - Links are optional, often bypassed
 - Not suitable for path to essential skill building elements
 - » Empirical evidence exists (Neiderhauser et al 2000)
- Allow learners to control pacing
 - Affirmed by empirical study (Mayer, Chandler 2001)
- Use course maps
 - To provide an overview and orient learners
- Provide basic navigation on all screens
 - Next, previous, up (accessible also when scrolled down)
 - "fuel indicator" (e.g. "Slide 54 of 57")

Default Navigation Options

- Two navigational versions of the same lesson (Schnackenberg, Sullivan 2000)
 - Pressing "continue" *bypasses* practice section
 - Pressing "continue" *leads into* practice section
- Results:
 - "More practice" version:
 - » Nearly twice as many screens viewed (compared to "low practice")
 - » Significantly higher scores on final test

Individual Differences in Learner Control

- Lai 2001:
 - Three types of learner control:
 - » Automatic (*program control*)
 - » Step-by-step (*linear control*)
 - » Free navigation (*learner control*)
 - Test subjects with high mathematical skills:
 - » better in all conditions
 - Test subjects with low mathematical skills:
 - » performing worst under free navigation condition

Do Learners Make Good Instructional Decisions?

- Calibration
 - What one thinks about own knowledge vs. actual knowledge
 - BTW: What is the capital of Australia?
 - Calibration accuracy in general is poor
- Learning vs. learner ratings (Dixon 1990):
 - 1,400 employees taking part in classroom training
 - End-of-course rating: Amount learnt, enjoyment, instructor skill
 - Post test on actual learning
 - **No** correlation between ratings and actual learning!
- Learner preferences and practice level (Schnackenberg et al. 1998)
 - Learners had a choice between more or less practice
 - Some were taught according to preferences, some in mismatch
 - **Regardless** of preferences, high-practice groups perform better

Metacognition

- Metacognition: Awareness of how one's mind works
- High metacognition skills lead to high learning management skills.
- Poor metacognition skills:
 - High learner control leads to poor decisions!
- Adapt learner control to audience!

Test scores (Young, 1996)	Learner Controlled	Program Controlled
Low metacognitive skill	20%	79%
High metacognitive skill	60%	82%