

Software animations – opportunity for self-learning in the workplace

R. Robert GAJEWSKI¹

¹*Warsaw University of Technology, Faculty of Civil Engineering,
Department of Fundamentals of CE, Division of Information Technologies,
Aleja Armii Ludowej 16, 00-637 Warszawa, Poland
Tel: +48 22 825 80 16, Fax: + 48 22 825 88 99, email: r.gajewski@il.pw.edu.pl*

Abstract: The type of content which people are willing to have online is in majority of cases application or software instruction [12]. More and more online learning is related to information technologies. Nearly all organizations need to provide training to software users and the Web is one of the most effective tools to do this. What we are nowadays desperately seeking for are software simulations. The increasing complexity of software requires new media and new technologies for training. Online courses based on paper models still dominate but they should be replaced by software animations. Software simulations soon will be the crucial part of future e-Learning environments. Online simulations and animations are treated as next big wave in training. In the past simulations were extremely expensive. Nowadays tools used to prepare software animations are cheaper so this approach is gaining more interest.

1. Introduction

Streaming can be a very effective component of online delivery [10]. Properly used streaming components can improve the quality of online learning. There are many file formats suitable for streaming [11] and there are many pros and cons for each of them. The choice of it is not only a matter of personal preferences. More important are ease of use, required bandwidth, quality and last but not list costs. The two main ways to view media on the Internet are downloading and streaming [11].

- **Downloading** a file means saving it on a computer. Such a file can be then opened and viewed. This has some advantages like quick access to the chosen part of a file but disadvantages are much bigger. The whole file should be downloaded before opening it which can cause problems in the case of long presentations. In order to give an access to such file it is enough to provide appropriate hyperlink. Distribution of audio and video files in this way is known as HTTP delivery.
- **Streaming** media works differently – the end user can start watching the file as soon as it begins downloading. The obvious advantage is that no additional waiting is required. Streaming media can also broadcast live events – this is called webcast or netcast. Such streaming should be delivered by a specialized streaming server which is the biggest disadvantage.
- **Progressive downloading** is a hybrid method in which clip is downloaded from simple HTTP server but begins playing as soon as a portion of the file has been received. Such approach is only a simulation of true streaming but has majority of its advantages. SWF, FLV and NSV files are excellent examples of progressive downloading and were used by the author in his research.

2. Software animations and simulations

Three major learning use cases of software simulations are **awareness training**, **full training** courses and **performance support** [3]. There are two main objectives of awareness training: presentation of software features and benefits of them. Such training is called know-that training. The role of it is to spark the person's interest [3]. Typical full training course consists of three parts:

- **Animation** – learner watches the task through animated interface. Each step can be additionally commented by text or audio comments
- **Simulation** – in this part the learner sees prompt for each step and is supposed to perform particular action.
- **Test** is in majority of cases a simulation without description of steps.

Performance support tools [3] consist mainly of two elements. The first is similar to the animation in full training course. The second element is a printable job aid.

2.1 Levels of software simulations

Web-based training (WBT) is one of the most popular methods for instructing how to effectively use software applications. One of the main aspects of WBT are simulations. As presented in [5] there are five levels of software simulations (Figure 1)

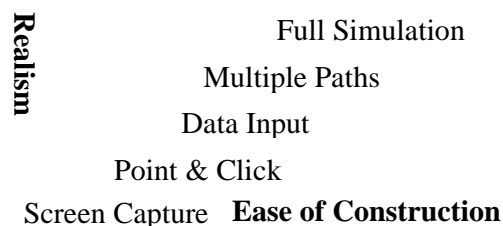


Figure 1: Levels of software simulations

- **Screen capture.** This is the simplest type of simulation. It consists of set of screen captures with text or voice explanations. This form is similar to well know software user guides. It is characterized by low level of interactivity. Such approach is very good for simple demonstrations of applications.
- **Point-and-click.** This kind of software simulations provides basic interactions. Learner can click on predefined interactive regions which are for example input areas. Unfortunately such simulation does not behave like real application. They can be used for applications which are easy and straightforward.
- **Data input.** Such kind of simulation provides additional functionalities like check boxes, radio buttons, drop-down areas. Data input simulations can replicate many application behaviours but their use is limited because of increased cost and complexity.
- **Multiple input paths.** Simulations of this kind offer different options to complete an instructional task. They can be useful in situations, where there are multiple ways to perform specific task.
- **Full simulation.** Such kind of simulation includes all possible interactions. This functionality can be represented by wizards. Full simulation has usually limited number of choices in multiple paths.

2.2 Software training and authoring tools

There are various approaches how to teach someone how to use an application [6]. In the simplest **illustrative approach** training attempts to illustrate each screen and describe each task what is hardly possible in the case of complicated CAD/CAE software. An alternative

is **exploration approach** in which during training user can be asked to look at various functions. In many opinions the most effective way to learn software is **scenario-based approach**.

There are many arguments against scenario-based training. One of them says that it is difficult to find meaningful and realistic activities for some types of software training and develop scenarios that are directly related to specific jobs. Selecting scenarios is a kind of art – they must be relevant, comprehensive and compelling. There are three fundamental interaction models [6] – Show, Teach and Try (Figure 2).

- **Show** modules are passive elements in which simulation level is a screen capture or point-and-click.
- **Teach** modules usually are point-and-click or data input simulations.
- Finally **try** modules require data input, full simulations or multiple paths.

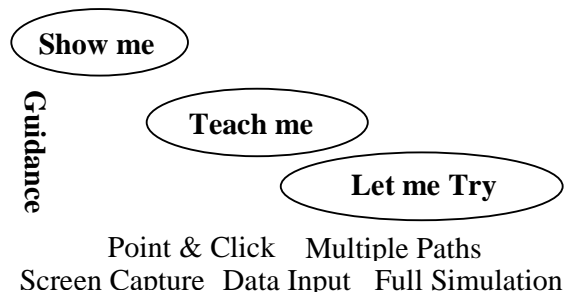


Figure2: Fundamental Interaction Modes

Software simulations are much more than only technology [2]. There are three most important points in design of training simulations.

- **Choose simulations wisely.** In order to properly choose simulations three questions should be answered. Which system functions do the software user absolutely need to know? Which functions are straightforward and which tasks will cause troubles? What do the various functions have in common?
- **Target each task.** Each simulation should be designed in such a way that it is focused on specific job task. Targeting learners to specific features helps them to stay focused on the task.
- **Vary instructional techniques.** Simulations should be combined with other e-Learning activities. Rollover screen tours present screen captures. When learner moves the cursor on specific part of the screen a detailed explanation appears. Animations provide opportunities for learners to watch software in action. Printable job aids enable further training.

3. Learning styles

Learning styles are different ways people can learn. It is believed that most people favor some particular method of interacting and processing information. Over 70 learning style models have been proposed. Each of them consists of at least two different styles. Educators and psychologists are generally critical of the lack of evidence and unsure about theoretical grounds for learning style models. But how can we teach students if we do not know how they learn? There is an urgent request that teachers and course designers should pay closer attention to students' learning styles. It can be done by diagnosing them, by encouraging students to reflect on them and by designing teaching and learning interventions around learning styles. Especially in the case of lifelong learning students will become more motivated to learn by knowing more about their own strengths and weaknesses as learners.

3.1 Kolb learning styles

First papers about learning styles were published by David Kolb in 1970's [8], [9]. In his book on experimental learning he distinguished four major steps of learning process.

Four distinct learning preferences are based on four-stage learning cycle. In the four stage cycle of learning concrete experience (feeling) gives a basis for observations and reflections (watching). Observations are distilled into abstract concepts (thinking) providing new implications for active experimentations (doing).

The four-type definition of learning styles represents the combination of two preferred styles. Kolb's learning styles [7] can also be viewed in the matrix form (Table. 1).

	Active experimentation	Reflective observation
Concrete experience	Accommodation (if?)	Diverging (why?)
Abstract conceptualisation	Converging (how?)	Assimilating (what?)

Table 1: Kolb learning styles

The four learner types are:

- **Converger** (30% of population) is strong in practical application of ideas and can focus on hypo-deductive reasoning on specific problems. Converger is also unemotional and has narrow interests.
- **Diverger** (15-20% of population) is strong in imaginative ability and good at generating ideas and seeing things from different perspectives. Diverger is also interested in people and has broad cultural interests.
- **Assimilator** (35-40% of population) has strong ability to create theoretical models and excels in inductive reasoning. He is also concerned with abstract concepts rather than people.
- **Accommodator** (15-20% of population) greatest strength is doing things. Accommodator is more of a risk taker, performs well when required to react to immediate circumstances and solves problems intuitively.

3.2 Memletics and VAK Learning Styles

Memletics Style [14] uses the seven learning preferences as its basis. These basic seven Memletics learning styles are:

- **Visual** – usage of pictures, images, visualization, and spatial arrangements.
- **Aural** – usage of voice, sounds and music.
- **Verbal** – usage of words and writing.
- **Physical** - usage of body, hands, and sense of touch.
- **Logical** – usage of logic, reasoning and systems.
- **Social** - preference to learn with groups or other people.
- **Solitary** - preference to work alone and use self-study.

The Visual Auditory Kinesthetic (VAK) learning styles model, similar to Memletics, provides a simple way to explain and understand learning styles. The original VAK concepts were first developed in 1920's. This theory belongs now to the most widely used due to its simplicity.

- **Visual** learning style involves the use of seen and observed things like pictures, diagrams, displays, films, etc.
- **Auditory** learning style involves the transfer of information through listening.

- **Kinesthetic** learning style involves physical experience like touching, feeling, holding or practical hands-on experiences.

Visual learners can be divided into two subgroups:

- **Visual & verbal** learners prefer to read information. Such people learn best when information is presented visually in a written form. They prefer visual aids like black board or Power Point presentation. Such learners also benefit from information obtained from textbooks and class notes.
- **Visual & nonverbal** learners learn best when information is presented visually as pictures. They prefer such tools as video, maps and diagrams.

More detailed information about VAK and tests can be found in [1] and [13]. The simplest VAK learning styles test has only 13 points like: shopping... look and imagine (visual), discuss with shop staff (auditory) try on and test (kinesthetic). More sophisticated VAK learning style test has 30 questions like: I first notice how people... look and dress (visual), sound and speak (aural) stand and move (kinesthetic).

3.3 ElaStan Project

ElaStan – The Promotion of Flexible Workplaces and the Protection of Companies’ Intellectual Capital is a project carried out with the aid of funding from the European Community’s EQUAL initiative as a part of the European Social Fund. As a result of the Project activity a system for supporting flexible forms of employment (also tele-work) will be created and introduced with specific attention to innovative IT techniques.

The primary aims of the project activity include promotion of flexible forms of employment, and support for enterprises and employees as regards their adaptation to structural changes and the need to use innovative technologies and IT.

The essence of the project is to deliver: knowledge both in stationary and distance-learning (e-learning) form. Many highly qualified people like for instance designers using CAD software are unemployed because they are unable to travel a long distance to work, whilst employers are unwilling to commission employees to work from home because control over the employee is then limited. E-centers and tele-work increase the degree in which new technologies are used.

The question “How to make e-Learning interesting” raised during CSCWD 2006 in [4] is still open. One of the biggest chances to do this is interactive software simulation and online lectures. The type of content which people are willing to have online is in majority of cases application or software instruction. More and more online learning is related to information technology and also to engineering applications. Nearly all organizations need to provide training to software users and the Web is one of the most effective tools.

In the presented paper simplified and full VAK tests used by the learners in order to discover own learning style. Later they are suggested to use appropriate set of e-Learning materials.

- **Visual & verbal** learners are suggested to start from reading PDF files with manuals and instructions.
- **Visual & nonverbal** learners are directed to software animations [4].
- **Auditory learners** are on the other hand suggested to listen (and watch) to the lecture presentations.
- Finally **kinesthetic learners** are supposed to simply start software and work with it.

Presented procedure has been successfully tested on the group of 240 students taking the course of Information Technology in Civil Engineering. Starting from 2007 presented materials are used for tele-workers self-training within ElaStan Project.

4.Final remarks

The influence of moving pictures or video and the impact of human voice are very powerful. Streamed multimedia can be very communicative and enable us to learn from sensory information. Streaming seems to be a solution of such problems as connection between students and the faculty at the distance. Bandwidth and money resources are not everything because it is possible to use networks with speed 100 kbps and prepare multimedia at home. The paper presents a kind of review of streaming software but its main idea is that streaming does not require high human costs, sophisticated hardware and expensive software - it can be simply home made.

On the other hand there are no good or bad types. We have only different special gifts. Knowing the type learners can help themselves to better understand and develop different functions. Knowing the types tutors should prepare special teaching materials taking into account the mentioned in the paper differences in learning styles.

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