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Are animations good for learning dynamic subject matter?

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Instructional animations are now widely used in computer-based educational and learning materials. For dynamic subject matter, they are often preferred by designers. Animations may seem more transparent and more direct than texts, which are composed of a large amount of words, for showing visually complex phenomenon. They are natural and depict realistically the temporal micro-step of processes, procedures, actions, or strategies. They give to the viewer an impression of easiness for understanding and comprehension. In sum animations are "fun", they are more motivating for learners or other users, even museum visitors. A widespread intuition is that animations are better than traditional texts or static pictures. As a result, the design of animations, including their aesthetic aspects, appears to be based in this intuition. However, recent research which investigated experimentally their effectiveness and the perceptual, attentional and cognitive processes involved in the apprehension and understanding of dynamic visualization shows that animations are not always effective. The advantages animations have in showing how things change over time could also have negative downsides for learners. Building an internal representation of the information presented dynamically can be cognitively very demanding. Using transient information instead of the conventional permanent information (found in books) was shown, in recent research, to have cognitive load consequences which could dramatically impair the learning process. However, animations have lots of learning potential. In this presentation, after a brief overview of the recent research on learning from animation processing, we will describe a cognitive model of animation processing, the A.P.M. which was built from experimental research, and eye tracking investigation in learners. Based on this model, but also other recent cognitive theories on multimedia learning, we will develop examples of how different techniques for designing dynamic visualization, tested experimentally in recent research, can improve learning from animation and comprehending complex visualizations. We will focus respectively on (i) the effect of different animation formats; (ii) the effect of segmentation techniques which help the viewer to parse the animation into meaningful micro-steps, easier to learn; (iii) the effect of providing user control and more interactivity; (iv) the effect of methods of cueing dynamic events and relations in the animations; (v) the use of techniques helping learners to build relations between events; (vi) the effect of integrating verbal explanation to the animation delivery, (vii) the use of demonstrations with accompanying gestures to watching the animation.

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Innovative technologies and applications of computer graphics

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This presentation will highlight the current innovative technologies and applications in computer graphics. As we all are well aware that computer graphics has successful applications in all aspects of life. Currently it proves a common proverb "A picture is better than thousand words". Its applications could be found on television, newspapers, and all sorts of advertisements. Its particular applications are in weather forecasting, animations, animated movies, medical care and treatment. A well-constructed graph is a successfully present complex data in such a manner that is simple to understand and interpret even for a common person. In the electronic and paper media, graphics are employed to provide comparison of achievements in all sectors of enterprises to attract new business. Currently, several innovative tools are available in the market to visualize data. This visualization could be categorized into several different types: Two dimensional (2D), three dimensional (3D) which, however, is high processer demanding. Therefore, 2D computer graphics are still acceptable and applicable. Computer graphics emerged as a sub-area of computer science which studies methods for digitally synthesizing and manipulating visual content. Over the past decade, other specialized fields have been developed like information visualization, and scientific visualization more concerned with "the visualization of three dimensional phenomena (architectural, meteorological, medical, biological, etc.), where the emphasis is on realistic renderings of volumes, surfaces, illumination sources, and so forth, perhaps with a dynamic (time) component". The most common applications of computer graphics are 3D projection, Ray tracing, Shading, Texture mapping, Anti-aliasing, Volume rendering, 3D modelling.

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