全像立體影像輔助三維視覺化能力圖像表現之研究

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摘　要

三維視覺化(Three-dimensional visualization)是空間能力之中相當重要的一種能力，這是一種能將平面的圖形表徵轉換為立體圖形的能力，而這樣的空間推演能力對於不同學科的學習上扮演著重要的角色。在環境的限制下，三維視覺化圖像表現以二維度平面的表現方式為主，在二維度平面範圍的空間結構表現，對初學者而言並不容易了解其空間向度中的 x 軸、Y 軸與 Z 軸之關係。因此本研究將延續過去的研究，來探討立體影像與三維視覺化學習能力的關係。並藉由實驗的過程探討出全像立體影像在三維視覺化能力圖像表現上的特色，藉以輔助學生在二維的平面範圍中去了解三維的空間概念。

研究目的：

本研究探討全像立體影像，在三維視覺化圖像表現上必須需面對的「空間關係」及「心智旋轉」問題的輔助績效。

研究結果：

（1）受測者在空間關係複雜的情形之下，不易由平面的圖像中去了解實體物體之間的空間關係。

（2）當空間關係越複雜之下，受測者對空間關係解讀的正確率會下降。

（3）在空間關係的圖像表現上，全像立體影像輔助受測者在空間關係解讀的正確率優於使用平面圖像。

（4）當空間關係越複雜時，全像立體影像輔助受測者在空間關係解讀的績效越明顯。

（5）以全像立體影像作為「心智旋轉」的圖像表現媒材時，受測者解讀的正確率優於平面圖像。

（6）以全像立體影像作為「心智旋轉」的圖像表現媒材時，有助於受測者縮短對 y 軸及 x 軸解讀時間

關鍵字：全像立體影像；心智旋轉；空間關係；三維視覺化能力

Research on the three-dimensional visualization though the Stereo-image of holographic

Abstract

Three-dimensional visualization is an extremely important capacity of space, which is able to convert flat image into stereo image and its inference acts an important character among learning different subjects.　Because of the limitation of environment, two-dimensional visualization is the main presentation of three-dimensional visualization; therefore, basic learners have hard time to realize the relationships among x-axis, y-axis and z-axis in space dimension under flat range of two-dimensional visualization.

Hence this is the extended research of past one, His research start to study the relationship between 3D image and three-dimensional visualization. Through the experiment process, I concluded the feature of stereo image at three-dimensional visualization image to assist learners to understand the concepts of three-dimensional

visualization through two-dimension range.

The objective of this research makes out researches into full view of stereo

image ;nevertheless, the presentation of three-dimensional visualization has to confront the assistance of 「space relationship」 and 「mental rotation」

（1）Participants the conclusion of this research as below don't easily realize the space relationships of materials through flat image under the complicated circumstance

at space.

（2）The more complicated of space relationship is, the less is the accurate rate of testers in reading it.

（3）Upon the visual aid of space relationship, the full view of cube image assists participant in reading space relationship priors to they reading with flat image.

（4）The more complicated the space relationship is, the higher accurate rate are the participant in assistance of completed vision of stereo image.

（5）When full view of stereo image presents as mental rotation image, the accurate rate for testers priors to using flat image.

（6）When full view of stereo image presents as mental rotation image, it benefits participant in shortening the reading of x-axis and y-axis.