The rainbow colour map continues to confuse readers through its uncontrolled luminance variation and it is still used in publications often.

Pseudocolouring is a visualization technique for displaying scalar field data. Data values are mapped through a pseudocolour scale –or colour map to determine the colour representing each value. The colour map is widely used and the problem with this wide use is that it is rarely, if ever, the optimal colour map for a given visualization. Gray-scale is an intuitive scale that is understood by most readers from either dark to light or light to dark. Colour mapping on the other hand is not as intuitive since there is no simple scale (Red, orange, yellow, green, blue indigo, violet). This means that the scale should either be remembered or consulted through a legend.

The visual system perceives high spatial frequencies through changes in luminance. So in order to see small changes in a given dataset, a gray-scale is the optimal solution. A rainbow colour map also misleads the viewer by introducing artifacts to the visualization. It appears as if it is separated into bands of almost constant hue and viewers perceive these sharp transitions as sharp transitions in the data, even when this is not the case. When combined with the lack of perceptual ordering, viewers face a daunting task when trying to correctly interpret the data. The goals of visualization is to present data that viewers can quickly and accurately read and learn about the underlying data. THe rainbow color map does a great deal to hinder this learning.

According to Ware, there are four scalar data types; nominal, ordinal, interval and ratio.

* Nominal data

For labelling nominal regions of data whose categories have no implied ordering a selection of distinct colours is optimal.

* High-frequency ordinal data

Ordinal data has specified order but no metric for distance. Research shows that viewers can see details more readily when luminance contrast is present.