

# ASSIGNMENT-1

## PAPER PENCIL THEORY IN DATA VISUALIZATION

### INTRODUCTION:

Data visualization involves presenting data in graphical or pictorial form which makes the information easy to understand. It helps to explain facts and determine courses of action. It will benefit any field of study that requires innovative ways of presenting large, complex information.

The paper-and-pencil programming strategy (PPS) is a way of representing an idea logically by any representation that can be created using paper and pencil. It was developed for non-computer majors to improve their understanding and use of computational thinking and increase interest in learning computer science. A total of 110 non-majors in their sophomore year were assigned to either a

Logo or a PPS course with attendance being 2 hours per week for 15 weeks. To measure the effectiveness of PPS, the Group Assessment of Logical Thinking and a self-assessment survey pre- and post-test were used. Findings indicated that PPS not only improved students' overall logical thinking as much as did Logo programming learning, but also increased scores on one more subscale of logical thinking than did the Logo course. In addition, PPS significantly helped students understand the concept of computational thinking and increased their interest in learning computer science.

## KEY STEPS:

### 1. Identifying The Target Audience

The first key principle is for the designer is to know their audience. This is important from the very beginning of the design process. The designer must have a good idea of the message or messages they

want to convey. Designers must also be clear on the target market and their levels of literacy. They should also take into account ethnicity and cultural values.

## 2. Focusing On Focus

Creating a visual hierarchy or focus on key areas is the main point of data visualization. This means that the most important information should be the most prominently displayed.

There are three simple techniques for establishing a visual hierarchy: size, contrasting colors, and position. Designers will also take into account “eye flow”, the way the eye moves from left to right and then down and left to right again. This pattern is the Z path. Obviously, the opposite is in use for designs using Arabic text.

## 3. Keeping It Simple

The third principle is simplification. Breaking data down into digestible bites is essential. Making

information easy for people to understand at a quick glance is a major consideration when designing data visualizations.

#### 4. Balancing Layouts

Next up is layout, meaning the composition or presentation of information. A presentation should be balanced and elegant. This is usually accomplished by using a grid as the underlying skeleton of the design. A common element used are columns to organize information, much like the style of newspapers, magazines, and documents.

#### 5. Organizing Alignment

The fifth principle is grouping related content together and separating unrelated content. Lines, backgrounds, and boxes are usually used to show connections or related content. Separations use spacing and enclosures, such as boxes, color, and backgrounds. Group related elements together and do the opposite for unrelated information.

## 6. Creating Consistency

Unity or consistency is up next. Design elements must all remain the same. This could entail standardizing font usage and point size, the consistent use of color for graphical elements, and keeping an eye out for consistency in the visual hierarchy.

Themes are important too. Every part of the design should stick to a considered design standard. If the client has a corporate identity or brand, the designer would take careful note of this.

## 7. Elevating Engagement

Finally, we have design considerations. Form should follow function. Designers must consider balance, movement, and interactivity. Keeping the target audience interested, engaged, and invested in the message means success. If visualization is not engaging, the intended message will not reach its audience