Infographics: The New Communication Tools in Digital Age

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Abstract – Infographics were used to support the work of journalism back in 1980s. It may be used to accommodate newsletters, newspapers, magazines, and reports. Now the infographics have been applied for telling the story. Additionally, the changing lifestyle in digital age, data and information need to be quicker and easier processed. People scan for the headlines and graphics (usually in pictures, graphs, charts) that attract their interest. They spend less time to consider whether it is worth further reading. Multimedia infographic can be created in 3D to make it more appreciative than regular illustrative pictures and text, especially for the difficult and complicated contents. For the people who need to communicate quickly; the spoken or printed account is sometimes too difficult for understanding. This paper includes the history, importance, and benefit of infographics in general and introduces the tools for making infographics efficiently. The suggestive guidelines of infographics creation are also addressed.

Keywords- Infographics, HCI, Data Visualization, Information Visualization, InfoVis

I. INTRODUCTION

“A picture is worth a thousand words”, is the familiar phrase. “The human brain is more able to identify and comprehend relationships and patterns if data is encoded into visual forms [1]”. The definition of infographic are: “The use of computer-supported, interactive visual representations of data to amplify cognition [2]”; infographic is graphic visual representation of information, data or knowledge intended to clarify and integrate difficult information quickly and clearly [7, 8]. For education (definition) for infographic: a collection of graphic organizers integrates different media in simple diagrams: text, images, symbols and schemas [18]. In Human and Computer Interaction (HCI), infographics can improve user cognition by utilizing graphics to enhance the human visual system’s ability to see patterns and trends [9, 10].

Infographic is a new way to visualize data. Another word for infographic is information visualization (InfoVis) or data visualization [6]. Visualization is defined as [3] “mechanisms by which humans perceive, interpret, use and communicate visual information [4] in [3]”. The main aim of visualization [5] is to communicate information more clearly and effectively by using graphical means.

For Journalism, there is the importance of information visualization which is adding in reporting the believable and trusted means context. As mentioned in the book title [12] “Infographics: Maximum Information in Minimum Space”, this phase explains the main purpose of infographics design which is produced as helpful as they can in order to give as much detailed information as possible and it can save spaces. Infographics created by Peter Sullivan for The Sunday Times during the 1970s - 1990s were some of the important reasons in encouraging newspapers to use more infographics. Peter Sullivan (1932–1996) was a British graphic designer recognized for his work on information graphics. Sullivan is also one of the few authors who have written about information graphics in newspapers. Similarly, the staff artists at USA Today newspaper, the US newspaper that launched in 1982, their objective is to use graphics to make information easier to understand. USA Today usually gets credit for publishing up-to-date infographics. Colorful charts and graphs remain hallmarks of USA Today’s design for readers. However, people were using graphics to deliver information well before the 1982 origins of USA Today [12]. There are also many excellent infographic was published in New York Journal infographics in 1898 (Fig.1 and Fig.2). It has long history in Journalism and Printed Poster. One of USA Today infographic show by using cartoonesque images to represent data about the quantity of pasta consumed (Fig. 3). The earliest humans on the planet shared information in pictures carved and painted on rocks and caves. NASA’s Voyager interstellar space probes, launched in 1977, carry information-rich diagrams to show the earth existing [13; 14; 15] in Fig.4, Fig. 5.

In the 21st Century, data visualizations have been applied to commonly used computer systems, including desktop publishing, website /blog publishing and Geographic Information Systems (GIS). Recognition and understanding of infographics is a relatively new research field. With today’s overflow of information, infographics help readers understand and process the information quickly. A good infographic will not only tell readers story, but will also create interest and induce people to read the article similar to how good headlines and photos attract readers. Nevertheless, graphics could fast persuade readers to disregard the article.
The WordStream Company believes that with infographics, bloggers and journalists make the context in news easy to access and share. Larry Kim, founder and CTO of WordStream said "The fact that it was illustrated got the press pickups [17]." WordStream's experience points to the new world of public relations, where every picture tells a story. Infographics, videos, slideshow, and various multimedia tools are augmenting or replacing traditional press releases and article placements. In the old day, Public Relation is about telling the story but now it is about showing and telling the story at the same time says Richard Edelman, president and CEO of Edelman. "We've been about the work. Now you have to do the show [17]."

Serenelli et al. used infographic techniques to combine analytical and synthetic schemas to enhance the aesthetic perception; they have reported that infographic help with users’ learning process [18].

II. TYPES OF INFOGRAPHICS

In general, there is the accepted standard in the medium towards exploring with new formats based on web mash-ups and data visualization, but not often do they aim to make up a space for public debate that provide readers more than just only one platform. There are many graphic types for visualizing data, from bar graphics to pie charts, from tables to diagrams. As a matter of fact, most of the graphics used in visualization applications are a part of our lives since many years [5]. Graphs allow us to explore data and observe patterns that no other approach can achieve [6].

As reported in [19], there were 125 newspapers in 1997. They were asked if they publish categories of informational graphics with regularity. The response was: maps 95.9 %; bar charts 62.9 %; line graphs charts 52.4%; pie charts 36.8 %; pictorial 33.3 %; and three-dimensional 14.5 %. Fig. 6. show the simple types of infographics. In the research [20] was about the comparison of question answering performance with and without information from infographics. The result of this can be seen that the original textual information is not sufficient to handle all the factoid questions related to the infographics.

Arabic numerals are preferable in infographics, the heading of table should put underlined and centered above them. Human mind can recognize visual information with more successful and lasting way when compared to with
written or verbal information transfer [5]. Therefore, the design of infographic should be experienced to carry transmission of data visualization. In the newspaper (Fig.1, Fig 2.), design details that reflect the data correctly and an attractive and understandable general design will fulfill the main function of infographics [5].

In the health care informatics research [21], it is found that a rich interactive infographic capable of showing far more digestible information at a glance than conventional, tabular representations [5]. The essential text content has been explained with well designed infographics. Just by reviewing the graphics, we can understand the whole idea of the reports. Moreover, with today’s technology, infographics can also be transformed to animated images for the website version [21]. A graphical symbol or icon is defined as the smallest graphical unit that carries meaningful information [22].

Some major types of infographics base on its usability [24] are as follows:

- **Statistical Based**
  This type of infographic includes diagrams, charts, graphs, tables, and lists. Among the most common devices are horizontal bar charts, vertical column charts, and round or oval pie charts, that can review statistical information. Theses forms show how a system works, lines of authorization of the company, shows sequential association. It can be made in interactive manner as well.

- **TimeLine Based**
  Timeline show the sequence of events according to the time each event had happened. A timeline enables an audience to realize chronological relationships very quickly. Sometimes it shows in tabular, year-by-year paragraphs, etc.

- **Process Based**
  These process based usually can be found in cooking magazines or explain about recipe using infographic. Also this type of infographic can be used to clarify in workspaces of factory or offices. It can make readers to understand about its practices in limited space.

- **Location or Geography Based**
  With widely use of GIS, maps can also consider as the best way to show geography based infographics. They include symbols, icons, diagrams, graphs, tables, arrows and bullets. There are many well known GIS notation that used in maps to identify highways, streets, subways, and facilities. Many familiar icons and symbols designed for places like tourist spots, hospitals, airports etc. Scale is the imperative consideration additionally because all places and landmarks are marked according to the exact scale or ratio.

III. COLLECTION OF FREE TOOLS AND SOFTWARE FOR INFOGRAPHICS

Infographics can be created by hand using simple everyday tools such as paper, pen, pencils, markers, and rulers. However, today they are more often created using computer software, which is both faster and easier and even more beautiful and colorful. They can be created with general illustration software, such as Adobe Illustrator or freewares. There are also a number of specialized websites and tools that can be used to construct infographics. Tools/ software/websites that can be used to produce the infographics are as follows:

- **Icon Archive** search throughout many free icons. (www.iconarchive.com)

- **Pixlr** is a free online photo editor. (www.pixlr.com)

- **Stat Planet** create interactive visualizations, It also help design some map-based visualizations. (http://www.statsilk.com/software/statplanet)

- **Hohli** is an online chart creator. (http://charts.hohli.com)

- **Creately** allow users to make diagrams and flow charts. (www.creately.com)

- **New York Times Visualization Lab** use statistics from recent NYTimes articles to create visualizations in various formats. The Visualization Lab is based on technology from I.B.M. Research called Many Eyes.

- **Many Eyes** is designed specifically for The New York Times. It allows the users to upload their own data or use data already stored on the site for online visualizations. (http://www-958.ibm.com/software/data/cognos/manyeyes/visualizations)

- **Google Public Data** capture public data and transform it into an infographic of the choice.

- **Wordle** create word visualizations “word clouds” using text which users enter.

- **Tableau** is free software(only for Windows) for creating visualizations. (www.google.com/publicdata/directory)
**Gapminder** have current data on major world issues and can create visualizations for the purposes. Data is released with new versions of the application and updated yearly. (www.gapminder.org)

**Inkscape** is free graphic software available for many platforms. Based on the Google Chart API a tool to create charts, lines, bar and pie charts, Venn diagrams, radar charts, and scatter plots. (www.inkscape.org)

**AmCharts** is a set of JavaScript (HTML5) and flash charts for the websites and Web-based products. It is tool to generate charts for interactive infographics. (www.amcharts.com)

**Infogram** produce infographics and interactive online charts. (http://infogr.am)

**Visually** help creating data visualizations and infographics. (http://visual.ly)

These websites: Visua.ly.com; Infographiclabs.com; and dailyinfographic.com distribute a new infographic each day on various themes.

### III. FOR MARKETING AND BUSINESS

“*Businesses that publish infographics raise their website traffic an average of 12% more than those that don’t [29].*”

Normally for most of the people, it is not easy to understand data and statistics. With images, arrows, and flow charts can help people recognize more [32]. Infographics are growing in popularity, giving businesses a rich way to communicate their important messages to clients, customers, suppliers, and investors. An infographic is a visual interpretation of data, for instance, a graph or a chart that is designed to deliver complex information in a simple way. The content of infographic functions is demonstrated in a form of diagrams or illustration themes. These are essential to marketers because the well-designed infographics can be created for specific market in online marketing. It can be used to represent statistics in a linear format, and is associated with underlying principle or a well-built wrapping up. This tool is great for sharing information in a fun and creative way, especially through visual social media websites such as MySpace, Facebook, Twitter, and others.

A multimedia infographic is an interactive way to present the company information, and can introduce the activity and ideas into the business giving the services and products an exceptional demand. Using an infographic to present the company’s systems and procedures, it would be beneficial for new employees. The customer can easily understand of information in a visually colorful format that differs from a regular poster or chart because the story has been concluded and made in sequence.

In the product design process of e-commerce, the use of infographic or the graphical representation on computer screens has become standard practices [24]. Now there are many websites and various social media offering good infographics tools and freewares, and can be posted anywhere. Infographics function well for both the website and for traditional printed document [24].

### IV. CREATING INFOGRAPHICS

The first way to create an infographic is to hire a designer or agency to create it. This is to make sure that the infographic is visually independent of others and representative of the brand. However, it can be expensive.

Another way is to find the suitable websites that offer portfolios or templates of infographic, or information on hiring designers. Nonetheless if we need to build the new infographic for specific purpose, here is the first start. As Krauss suggested a very useful five-step process to create the infographic [25] as follows:

1. **Get the idea:** for example, the task is to create the infographic of tourism information for Bangkok in Rattanakosin Island area.

2. **Sketch it out:** draw the simple prototype in hand or in computer to see the main components should be created in infographic.

3. **Collect the data/information:** find the tourist spots in Bangkok including their area.

![Image](http://example.com/image1.png)

Fig. 7 example of the tourist spots in Rattanakosin Island (a) Wat Pra Kwoa (b) Kao San Road (c) Royal Palace

![Image](http://example.com/image2.png)

Fig. 8. The example of sketch of Bangkok Area with tourists spots (a) Walk Map Sketch (b) Rattanakosin Area Sketch

![Image](http://example.com/image3.png)

Fig. 9. Some of information sources both pictures and statistic data (a) information from website (b) information about tourists
4. **Develop proof of concepts**: place the tourist spot on the correct area.

   ![Fig. 10. Example plot of the possible position and statistic data](a) Rattanakosin Map (b) Comparative graph of tourist’s data)

5. **Lay it out with styles**: start to add everything together.

   ![Fig. 11. the example of map-type infographic of Rattanakosin Island with the position of tourist spot (a) Rattanakosin Map (1) (b) Rattanakosin Map(2)]

Hopkinsons [13] also suggested the nine-step process in his website about the real experience with designing team for creating infographics as follows:

- **Step 1: Determine Timing**
- **Step 2: Provide direction (the same with setting a goals or ideas)**
- **Step 3: Decide on payment (or setting the budget)**
- **Step 4: Organize the data (Collect the data/information)**
- **Step 5: First pass (sketch it out)**
- **Step 6: Getting to the great sudden ideas about something**
- **Step 7: The first “final” candidate is sent**
- **Step 8: Make it better**
- **Step 9: The Final product**
- **Step 10: Spread the word; by post on my personal Facebook account, Tweet to my personal Twitter account, Submit to coolinfographics.com, Submit to reddit, Embed in blog posts.**

At this point, here are some guidelines for designing better infographics, there are many points that good quality infographic should be built as following suggestions [12].

- Before begin to create one, it does seem right to understand the data or information that is attempting to illustrate clearly for making others understand.
- Always cite the data sources and links the detail to a spreadsheet for readers to view if they need.
- Create infographic with one exact size; it should be able to place alone.
- Do not try to add to many details but try to focus only one main point/idea.
- Build the data and explanation right into the infographic.
- Mix visualization styles jointly in one infographic, make it more interesting.
- Illustrations and photos included in the infographic are very attractive and it can make a big difference.
- additions of symbols or trademarks make it faster and easier for the reader to understand.
- Try to guess what the real advantage of infographic is, who the viewer will be and what point can be shared. Make sure that infographic contains these pieces.
- Copyright issue, need to be clearly clarify about any rights and terms of use source data, original image/article address.
- Use whatever tools available to create the infographic.

There is the well designed infographic created for example in Fig. 12.

![Fig. 12. The Sahel nutrition crisis responded by UNICEF](31)

**V. CONCLUSION AND RECOMMENDATION**

Infographics present information in a limited space and an artistic format. They are able to quickly pass on facts and keep the readers reading it. They give important data/information and are enjoyable to read and understand. Infographics become popular in web 2.0, because they are data in graphic illustrative form which makes it easier for readers to look at and digest [26] in [27]. Infographics show how the advertising of data and information can be ordered/arranged and offered to integrate the summarize ideas [28]. For the website, with the advanced technology, infographic can be integrated with multimedia concept by adding together the sound and motion. However, as mentioned in [16] and [12] that infographics are not a substitute when we do not have real information/facts. It means that ethical issue is very important, always use the actual data; they should be done without estimating at or making up data to add the missing information. Animated interactive infographics will happen to common by using HTML5 in websites; it makes infographics much more interesting.

Some designers suggest [12; 31]:

- Using a grid to organize and structure the infographic.
- Choosing a friendly design scheme with the overall design: colors, fonts and other design details.
- Applying the style guide, if there is no style guide, creating a style guide in order to maintain similarity and unity of infographic.

The foundation of infographics is composed of three major parts. They are **Visual, Content and Knowledge**. The tools help integrate these three main components to form nice and well-designed infographics.

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