

Infographic Design as Visualization of Geography Learning Media

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Abstract. Infographics is an integration visualization technique that combines text with images into an illustration. Info graphic designs were used to convey a complex message or material, into an interesting visual data. Geography as a subject that plays a role in introducing natural phenomena, it is considered very important to choose the right media in visualizing the material well. So this research literature study done with purpose can introduce info graphic design to educational world, as visualization of interesting media of learning. Especially for schools that have a diversity learner in certain classes. With the media-based design of this info graphic will facilitate teachers in teaching and motivating students in learning.

1. Introduction

Learning is a teaching and learning process. Gagne and Briggs mean learning is a system that aims to assist student learning process which contains a series of events designed, arranged in such a way as to influence and support the occurrence of internal learning processes [1]. Meanwhile, learning is a conscious effort from teachers to make students learn, namely the occurrence of behavioural changes in self-learning students. The change is obtained from new capabilities that apply in a relatively long time and because of the process of interaction of learners with teachers and learning resources in a learning environment [2]. In fact, during this interaction between educators and learners still look one way. The learning process that takes place in the classroom is dominated by lectures from teachers. While students just come, sit and listen to lectures from teachers without understanding how each character of the students. This situation is bad for students, one of which is that students can only hear and record the material given, without fully understanding what the teacher is saying. It indicates the existence of the substance of influence, either from learners who have diversity or the influence of a teacher in choosing learning media that are less good and inappropriate. Visualization of instructional media based on infographic design is expected to attract attention and motivate learners in learning and can solve the problem of student diversity. Visualization of instructional media based on infographic design is basically instructional media designed in a collection of information designed and combined with graphic form images into a poster, or a book filled with many illustrations of images. In the case of the delivery of information or the delivery of the subject matter, this infographic design will be able to



support visualizing complex data in an easy, interesting and simple way. Thus, from the description above, then conducted a study of this literature with the aim to introduce and design the infographic design as a visualization of geography learning media.

2. Methods

Data was collected through literature study. In order to know the understanding of infographics, history of infographic development, infographic functions in various fields, important role of infographics in geography learning, and steps to design visual infographics as a medium of geography learning. Data was obtained from books, scientific journals and articles, and other sources form internet.

3. Results and discussion

3.1 *The understanding of info graphics*

The word “infographic” consists of the words “info” and “graphic” and is shortened from the expression “information graphic.” Generally, infographics are visual presentations of data, information, and knowledge and by using them information, numbers, points, law and knowledge can be presented with visual method and in form of charts, symbols, images and maps [3].

Infographic (short for information graphic) is a type of picture that blends data with design, helping individuals and organizations concisely communicate messages to their audience. More formally, an infographic is defined as a visualization of data or ideas that tries to convey complex information to an audience in a manner that can be quickly consumed and easily understood. The process of developing and publishing infographics is called data visualization, visualization media, information design, or information architecture [4].

Infographics are an effective means for telling stories about data, as they capture a reader’s attention by structuring these data stories with principles of graphic design. Information graphics, or infographics, combine elements of data visualization with design and have become an increasingly popular means for disseminating data. While several studies have suggested that aesthetics in visualization and infographics relate to desirable outcomes such as engagement and memorability, it remains unknown how quickly aesthetic impressions are formed, and what it is that makes an infographic appealing [5].

Not only that, infographics are a specialized form of visualization that combine words and pictures to communicate a particular message—or at least it ought to be. That message is crafted to achieve a particular outcome—or at least it ought to be. Infographics may use to achieve several goals. For instance, they may be used to inform, to persuade, to teach, or to move people to action. To qualify as an infographic, however, by definition they must inform [6].

Thus, the term infographic learning can be interpreted as a form of presentation of data or learning materials with visual concepts, illustrations or images equipped with information or text, resulting in a clear and interesting graphic images.

3.2 *History of infographic development*

Starting from history, basically this infographic concept is a design concept that is old and has been used since the first. Early humans, for example, made maps and other visual representations of their lives visible today. Even since the time of 30,000 before century (BC), humans are familiar and can make infographics manually with traditional tools and materials.

Today, infographics can be used by a wide variety of individuals or organizations. Infographics published in various media. From traditional media such as newspapers and magazines and across digital channels, where social media has helped fuel an explosion in their popularity. The casual observer, it would appear that infographics are a recent phenomenon that has been growing in conjunction with the growth of the Internet. The reality is that we have been using icons, graphics, and pictures throughout history to tell stories, share information, and build knowledge [4]. Some illustrations of infographic relics of earlier figures, can be seen in the figure 1 and 2.

**Figure 1.** Infographics date back to the Late Stone Age [4]**Figure 2.** Egyptian Hieroglyphics [4]

In figure 1 shows one of the first examples of infographics date back to the Late Stone Age when our ancestors began painting animal portraits on cave walls in the south of France. Apart figure 2, in 3,000 before century, good examples of early infographics are Egyptian Hieroglyphics which formed language through the use of graphic symbols and icons.

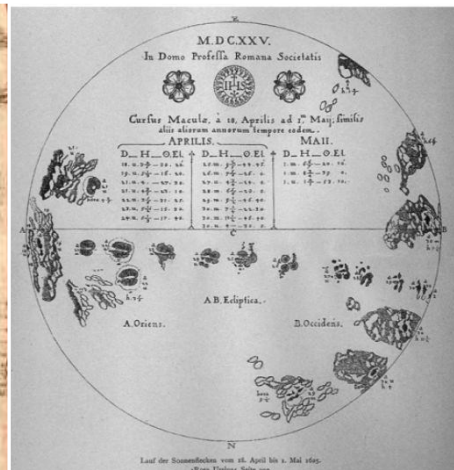
**Figure 3.** Illustration of Medieval France Philosopher**Figure 4.** Illustration of human anatomy**Figure 5.** Illustration of solar rotation [7]

Figure 3, in 1350, medieval French philosopher Nicole d'Orseme created one of the first graphs in order to help explain how to measure a moving object. Figure 4, in 1510 year, Leonardo da Vinci blended written instruction with illustrations to create a comprehensive guide on human anatomy.

In 1626, Christoph Scheiner also published the comprehensive *Rosa Ursina Sol*, a book that reveals his research on solar rotation; Infographics appear in the form of illustrations showing the Sun's rotational pattern.

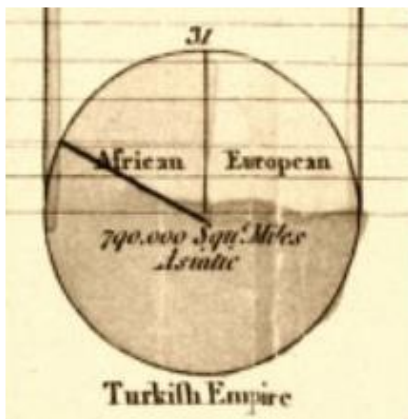


Figure 6. Linear graphs of numeric data

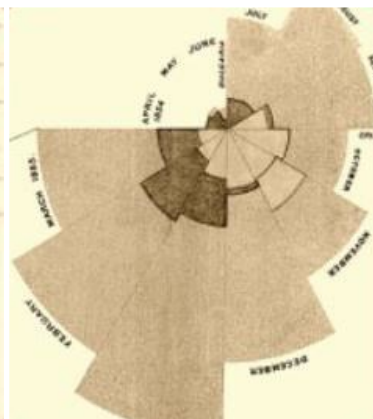


Figure 7. Illustration number of casualties and causes of death



Figure 8. Flow charts of geographical statistics

In 1786, Scottish engineer William Playfair pioneered data visualization. His book “The Commercial and Political Breviary” was the first to explain numeric data through the use of linear graphs, pie charts and bar graphs.

In 1857, English nurse Florence Nightingale combined stacked bar / pie charts (Coxcomb chart) to illustrate the monthly number of casualties and causes of death explain during the Crimean War. She used these infographics to help convince Queen Victoria to improve conditions in military hospitals.

1850-1870 Charles Joseph Minard, a Civil Engineer from France, began combining maps with flow charts in order to explain geographical statistics. One of his most famous data visualization illustrated the causes of Napoleon’s failed attempt to invade Russia. He captured a complex data set for the period (map location, direction travelled, decline in troops and temperature a single infographic).



Figure 9. A visual communication model



Figure 10. The infographic design of magazines USA

In 1930-1940, the modern era ushered in Isotype, a visual communication model developed by Otto Neurath to teach ideas and concept through the use of icons and pictures. Then in the 1970-1990, infographics continues to grow became more popular as mainstream news publication like The Sunday Times (UK), Time Magazine and USA Today began using them to simplify information and enhance comprehension of complicated issues and news stories.

3.3 Infographic functions in various fields

The submission of data or material in this infographic form will make people more interested because it can convey information or messages using visible visuals quickly in an instant. There is a wide range of modern uses for infographics, from subway system maps to slides in presentations given at conferences [7].

In addition, the use of infographics can be applied in the delivery of materials, annual reports, research content, blogs, and newsletters. As a reader we want numbers and statistics to support the information we read, but consumers want the numbers and statistics to be visually appealing and not always text-based. With this infographic that can then make it easy for the reader. Using infographics causes the audiences notice a considerable amount of data and information that their written form may make a long article, in the form of image and keep them in mind for a long time.

Infographics can be beneficial in different fields. Using infographics as a tool for tracking, resume or backgrounds of people, reports or worksheets, news and information, advertisements, introductions and presentations, learning and teaching are only parts of their usages. A news or research results published through print and electronic mass media require infographics not only as news exposure, but also as a media attraction. The use of color, composition and other visual elements take into account the uniqueness and uniqueness of a medium. Through the infographics made, then print and electronic mass media will be more easily recognizable.

Infographics are a creative way to communicate information with graphics clearly and quickly. Not only graphics, some interesting infographics also use diagrams, symbols, and illustrations. Infographics at the same time serve to give pause. Once filled with a series of words, the reader is expected to be relieved for a moment when all that can be represented by the image. Infographics are very popular because they help people to deliver a message. Illustrated with creative and compelling images, infographics prove to be more attention-grabbing and easily understood by readers. In a very busy era, fast and effective communication is of course very useful. From a business perspective, one of the infographic definitions resonates above all [4].

The British graphic designer, author, and information theory designer Nigel Holmes simply referred to them as "explanatory graphics". It is important to understand that Infographics are not used solely for communication. But Infographics is a good medium for delivering marketing messages or insights to consumers and prospects, but they are equally effective when used to improve internal communication. In this case the visual representation (illustration / photography) has the power of attracting the attention of the target audience directly and has a big role in the visual persuasion of an advertisement.

Infographics are basically designed to communicate on a plot that is subjective, the information displayed is also very focused on certain themes to the audience. On the other hand, visualization data takes a more objective approach, the approach of graphics created must have strict precision. The purpose of visualization data is to prehang much information of quantity and type and present it in one place, the focus on visualization data is the accuracy of the data source context that only computer programs can produce using algorithms, it is difficult for humans to do because of their complexity density.

3.4 Important and objectives role of infographics in geography learning

Studies show that people pay more attention to images rather than texts. Since 90% of sent information are visual and after reading every passage only 20% of it can be recalled and our brain tends to analyses and store information visually, it's better to make images out of geography object and results. Sometimes explaining subjects is uninteresting and also boring, but by showing them in the form of proper infographics, the process of understanding information will be appealing and simplified and the attention of audiences can be attracted. Teacher can also design an infographic of your information in order to explain them easily in meetings and conferences [3].

3.5 Visualization infographic design as learning media

Educational technology and media used in this period are different from the past. Today students are born in the auditory, visual and kinesthetic world, so teaching them with the use of past methods and instructional media will be ineffective or it won't have a considerable outcome. Teachers need to have enough information about educational technology and new educational media and also deal with them with a positive attitude. In recent years, great attention paid to the use of new media in education. New media help the education system considerably to improve it by providing good opportunities for recognizing individual talents and interests of learners. Studies show that the utilization of modern technologies in classrooms gives learners the opportunity to learn faster with better function and with more satisfaction from their class attendance. Colz et al reports in their studies that using media for teaching audiences is very beneficial. Moreover, Hyden and Fife find it valuable and efficient to use media in teaching students [3]. Results of much research have shown that different senses don't have equal roles in human's learning. Also much research show that visualization learning media has an important and facilitating role in memorizing and remembering received information, such as visual and verbal information.

3.6 Steps to design visual infographics as a media of geography learning

In making a graphic work that can be enjoyed by everyone not only with strong desire. But also the correct design pattern of work. The following are the steps in making the infographics. In general, there are several steps in designing infographic, among others; 1) selecting the topic, 2) surveying & researching, 3) gathering data, 4) analyze data, 5) finding the narrative, 6) create a visual / wireframe sketch data, 7) edit the format and compose the display data to be loaded into visualization, 8) designing, (9) validate data in visualization from testing, (10) Completion and improvement based on trial [8].

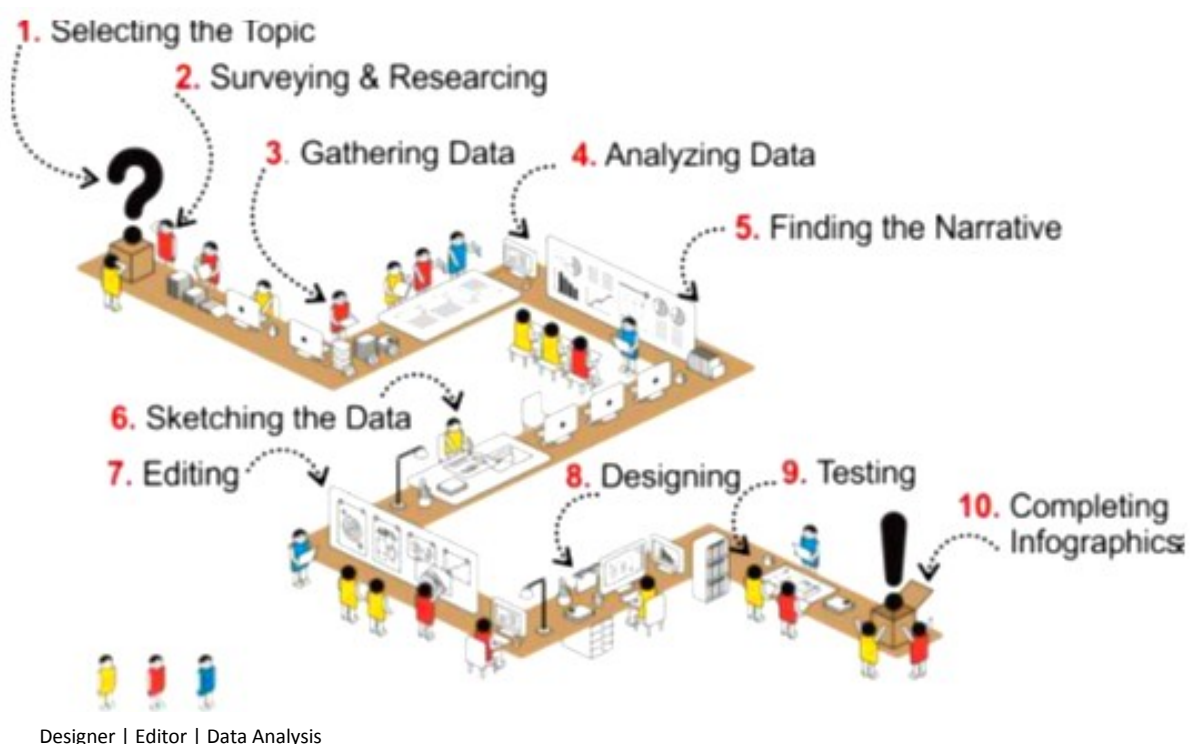


Figure 11. Infographic Design Process

One example of learning media in the form of posters of hydrological cycle material as shown on the figure 12.

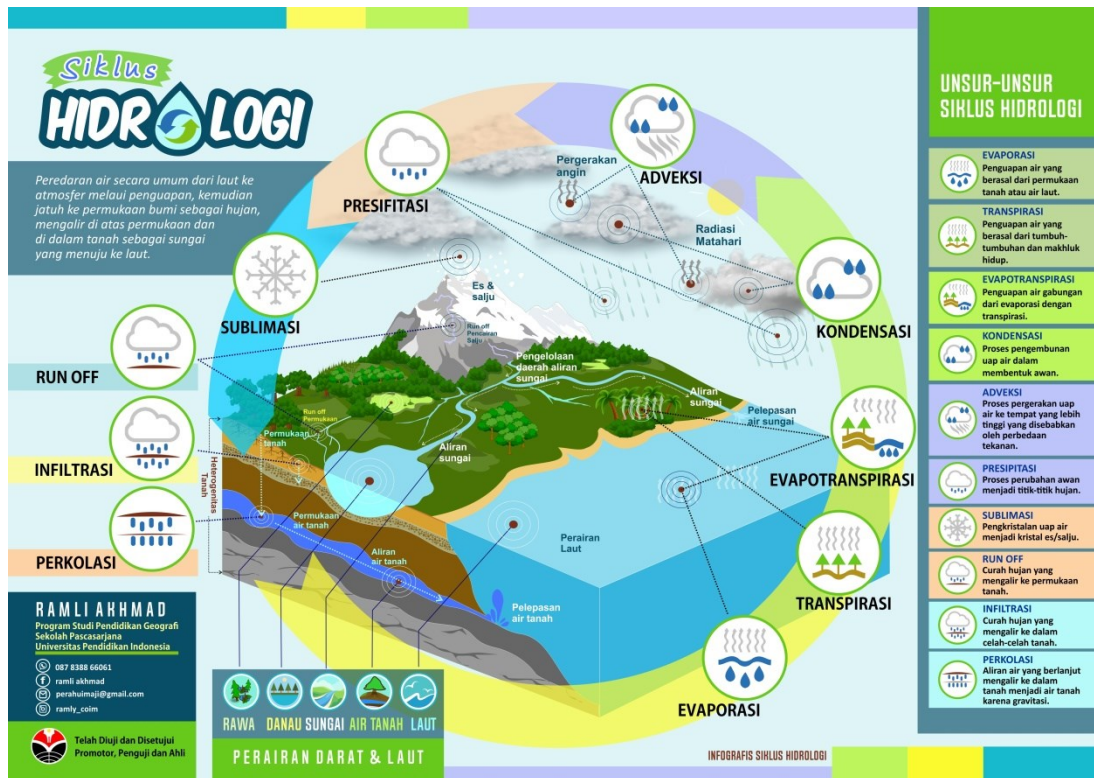


Figure 12. Infographic Poster Hydrological Cycle [9]

4. Conclusion

From the results of this study, it can be concluded that the design of good infographics serves as a visualization of learning media. As the result of literature review, visualization of geography learning media can make it easier for students to digest the lesson well. With the concept of interesting and complex illustrations, this infographic design will be able to attract the attention of readers. Especially for students and teachers. Visual infographics is both used by teachers in teaching and facilitate students in learning.

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