

Infographic (information graphic); a tool for increasing the efficiency of teaching and learning processes

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Abstract

The world is proceeding toward using new technologies in the teaching process. As a teacher in a classroom, you may not be aware of infographics' advantages in teaching. Humans are mainly visual; half of the brain is allocated to visual functions; moreover, 65% of people are visual learners. The more important point is that when images are being processed simultaneously, we comprehend them 60,000 times faster than reading a text. As a result, using infographics in classrooms can facilitate the process of learning, memorizing and retrieving data. This article tries to show that how students' learning can be improved by using infographics.

Keywords: Infographic, Teaching, Learning, visual representation.

Introduction:

Development of information and communication technologies has made new challenges on digital knowledge such as a crying need for visual communication skills (Osterman, 2013). In some cases appearance of visualized culture is considered as images, photos, and videos and it's being changed to some kind of social currency that should be shared and supported (Verma et al., 2013). Meanwhile, the attention to visual communication tools has a special importance. According to Robert Sylwester, author of *How to Explain a Brain*, 'it seems our brain was designed to pay attention to sudden, dramatic changes and to simply ignore or monitor subtle differences, steady states or gradual changes'.

Classroom teachers are in a constant battle for attention, but we believe that's because they are using the wrong tools and methods. Dr. Judy Willis, neuroscientist and middle school science teacher, suggests that

‘stories and the use of images, pictures and visual tools‘ get students to pay attention consciously. Fortunately, we might have a solution. Enter infographics (Sylwester , 2005).

Research methodology

The present study is a review study prepared by examining available books and articles in the field of new technologies and educational technologies and also results of studying teachers in regard to the use of infographics in teaching.

What is an infographic?

You may have heard this phrase so many times “A picture is worth more than 100 words”. Basically, this phrase indicates the value and efficiency of visual communication. The truth is that most of our perception from our surrounding environment are acquired by the sight and our brain has a great tendency to analyze data in a visual way; thus, if notifying and message transferring is accomplished visually, the impression and durability in mind will be increased. Therefore, the importance of infographics will be touched.

Infographics are visual representers of information and data. Their objective is rapidly presenting complex information with ease.

In simple terms infographics attempt to visualize a set of data and complex information by utilizing visual elements such as images, graphs, maps, and diagrams so that messages will be presented in a fast and understandable way.

The meaning of infographic

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 (Kavoosi,2015).

Data visualization is one of other terms used besides infographics.

In fact, data visualization is visualizing data and numbered measures collected by maps, networks, hierarchies, and different kinds of charts.

Importance and objective of infographics

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 analyze and store information visually, it’s better to make images out of subjects 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. You can also design an infographic of your information in order to explain them easily in meetings and conferences (Kavoosi,2015).

The history of infographics

30,000 years before Christ: the first infographic samples appeared back in late stone age in Chauvet cave in southern France where our ancestors had painted portraits of animals on its walls

3000 years BC: Egyptian hieroglyph, appeared from graphical samples and icons for expressing different purposes, is a good example of primary infographics.

1350 AD: Nicole Oresme was an important Middle ages philosopher who drew one of the graphs to explain how to measure the motion of objects.

1510 AD: Leonardo Da Vinci, renaissance genius, was considered as an innovator of scientific illustration for training inscriptions and pictures admixture especially in the field of human anatomy and description of his invention and engineering structures.

1786 AD: William Playfair, the Scottish engineer, was one of the visual data pioneers. For the first time, by using linear, pie and bar charts he explained the numerical data in his book “Political Business Atlas” (Funkhouser , 1937) , (Playfair , 2005) , (Tufte, 1983) .

1850-1870 AD: Charles Joseph Minard, French civil engineer used a combination of maps with flow charts for geographical statistics description. The failure of Napoleon’s invasion of Russia was one of the most famous data visualizations. He represented a period’s set of complex data in an infographic. (situation, path, soldiers’ failure, climate conditions) (Biggs,1999) .

James Joseph Sylvester introduced the term “chart” in the scientific Nature journal in 1878 and presented the relationship between chemical bonds and mathematical properties by a set of charts.

1875 AD: Florence Nightingale, the British nurse, explained the soldiers’ death and its causes in the Crimean war by using a combination of a stock chart and pie chart.

By this infographic, she was able to convince Queen Victoria to improve the military hospitals conditions.

1930-1940 AD: Isotype visual language was the forerunner of the modern era. It was a method of visual communication developed by Austrian philosopher, Otto Neurath, that used images and icons for teaching ideas and concepts (Neurath,1991).

1970-1990 AD: Infographics were changed to a main and popular stream among the newspapers.

Literature like The USA Today, Time Magazine, Sunday Times, used infographics for simplifying data and enhancing the comprehension of complicated issues.

1975 AD: Edward Tufte, the American statistician, and sculptor is the father of visual data with contemporary style.

By holding some seminars and publishing some books about information design, he is a pioneer of infographics and visual data (Tufte, 1990) , (Tufte, 1997) , (Tufte, 2001) .

2000 up to now: by continuous development of the internet and virtual media, infographics are widely used in web space. Using computer software caused more quickly designing of infographics and using a variety of techniques.

Types of infographics

Based on how implementations can be used, infographics can be categorized into four main classes: static, dynamic, interactive and physical

In physical infographics, data are shown in the form of three-dimensional volume or maquette. In interactive infographics, information usually is shown web-based and according to user’s choice. In

dynamic infographics, information is presented in a linear sequence as animations. In static infographics, all of the information are shown as a single image at one glance (Mortensen , 2015)

Infographics usage

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.

How to create an infographic?

All good stories have an introduction, a middle, and end and conclusion. In infographics, you are going to tell a story.

It's a skill to provide infographics. Infographic designers should define the story in a way that viewers realize them in the shortest time possible. Information should be displayed visually with creativity, a presentation that in addition to simplicity, should have an attraction engraved in audiences' mind. Try to decorate and beautify data and information as the same as simplicity. Don't talk too much, present the story with images, symbols, shapes, histograms, and charts. Note that a part of your infographic must have visual rhythm and present the most important information larger and more specific with a particular color so that it can be kept in audiences' mind (Kavooosi , 2015)

Use of infographics in educational process

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 (Asadzadeh , 2009)

Results of much research have shown that different senses don't have equal roles in human's learning. 75% of learning is done through sight, 13% through hearing, 6% through touch, 3% through olfaction and 3% through taste (Ahadiyan , 2001) . Also much research show that mental visualization has an important and facilitating role in memorizing and remembering received information, such as visual and verbal information (Asadzadeh , 2009)

According to the amount of learning through sight, noticing visual learning and mental visualization of educational subjects has a special importance.

In fact, our brain has a great tendency to analyze data in a visual way and even saves the relation between things and information in a visual configuration not in a literal one.

For instance, think about these three words: pencil, telephone, and television. What is the first thing that comes to your mind? Do you think about the letters of these words or their physical shapes? So, as you can see it's much easier for our brain to understand and learn the physical and visual forms of data and information than their written forms.

Using infographics causes learners to simply notice a considerable amount of data and information that their written form may make a long article, in the form of an image with a glimpse and even keep them in mind (Persian Infographic Festival , 2013)

Therefore, an infographic can be a proper layout in order to enhance teaching process.

Simple ideas about the usage of infographics in classrooms

I) The Basic: Giving infographics as research material.

This is the simplest method, yet is surprisingly effective. You need to teach a specific topic to your group of students. You assign some reading on the textbook. However, the classroom material isn't enough so in addition, you give students an infographic.

These are the steps:

1. Create your own infographic. Using someone else's material is also fine, as long as you attribute ownership.
2. Create some context on why the graphic is an important piece of information. Start with exciting information on what the design is about and use other materials to complete the lesson (videos, news links).
3. Have students analyze the graphics on their own.
4. Debrief as a class. Students should be able to draw conclusions or insights from the material.

II) Explaining Rules or Clarifying Processes

Presenting explanation and information related to obvious processes and fixed rules is one of the most important usages of infographics .

III) The Endless Debate: Making Comparisons

As human beings, we are constantly comparing and contrasting opposing subjects.

Infographics as proper tools are able to play a vital role in order to facilitate this comparison and to present its results

IV) The Scientist: Sharing Data or Showing Trends

Data and numbers are tricky. They contain massive amounts of useful information, but they need to be presented in an orderly, visually clarifying manner. Most students despise math but thankfully, infographics allow teachers a great crossover between numbers and language arts.

V) Visualizing a Timeline

As a teacher in high school or junior school, history is one the main subjects you need to teach. Historical awareness is key to understand the context we live in. The problem is students don't get this, so they have trouble memorizing dates, names and historical events.

Let's say you need to explain the historical evolution of the wedding. The solution might be turning the information into a visual story, or an illustrated timeline, students can engage with and as a consequence, improve learning and data retention.

Research Findings

By using graphical presentation and visual data, users will be able to put across a message widely to their audiences. By aiming to the climax of verbal and non-verbal systems and by paying attention to the importance of dominance over information and creative expression of digital, infographics encourage students to improve visual knowledge skills and new visualized digital eligibilities; consequently, they will have the opportunity to participate in creating, using and criticizing the arrangements of our contemporary culture actively. Using infographics causes learners to simply notice a considerable amount of information that their written form may make a long article, in the form of an image with a glimpse and even keep them in mind. Therefore, the usage of them can shorten teaching time and improve students' learning, as a result teaching-learning process will be enhanced

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An infographic creates a quick reference guide for learners by keeping some of the most important numbers close to hand. Creating visualizations for your numbers is even more helpful. Whether it be a pie chart, a graph, or a map, your learners will have an easier time absorbing complex information when it is presented as a thoughtful visual aid. 7. Process or "How-To" guides. Need to show someone how to do something? You can't go wrong with a "how-to" graphic. A variety of infographics will help learners retain information. Don't feel you have to restrict yourself to just one kind of infographic. In fact, most courses can benefit from a broad variety—including ones not mentioned here.

for the teaching and learning of an educational technology course? Methodology of the Research. General Background. By employing the qualitative methodology, the researcher attempted to illuminate how incorporating a learning efforts. They generally expressed positive feelings towards the infographic assignment even though all. graphic-maker of their choice. For instance, one of the pre-service teachers explained that she tried using Canva. and Piktochart to compare both tools and decided to use Canva as it was user-friendly and had many choices of. free templates. Student 4, on the other hand, admitted that he learned how to use Canva by viewing YouTube tuto The information technology has played an important role in English language teaching and it has offered a better tool to explore the new teaching method. Graphic and Functional Algorithms of Sequence of Tenses in English Grammar for the Effective Education and Automated Systems of Text Synthesis and Editing. 2015 / Ludmila Kozlova, Nadejda Trubochkina. As English is one of difficult lessons, teacher must create interactive teaching and learning to make students interest. Improving the efficiency of a modern lesson involves the use of multimedia technologies, which have the unique ability to increase information density lessons, but require an understanding of didactic specifics of the new media learning material.

The Increasing Demand for E-Education. This infographic provides information about the growing online college community. It provides statistical data to show that online school enrollment has increased significantly. Program Evaluation steps-valuable information about the process and a tutorial about logic model. We teach, learn, lead and serve, connecting people with the University of Wisconsin, and engaging with them in transforming lives and communities. Steps in Program Evaluation. See more. How to Chunk Content for eLearning Infographic. This is an information graphic poster illustrating the underlying lifecycle, methods, principles and techniques in a user centred design process where the visual part is only the tip of the iceberg.