Evaluate of Static Information Visible in Online Newspapers

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Abstract

According to recent online newspapers strategy to increase audience' trust in receiving involved facts and provide the opportunities to lead readers by reaching access at a huge number of points and facilitate browsing.There are many attempts to increase the interest of audience to the online newspapers by offering different static visible styles to interpret information. This research paper aims to introduce a brief consideration of online newspapers and data-driven journalism, also to perceive information static visible styles according to data visualization and information graphics, depending on data volume and regardless type of contents.Employs descriptive and analytically approach to unfold the current trends to Information visible of the globe online newspapers and find that by gathering samples from world online newspapers to explore the processing methods to present information visible.As a result, it has found several styles to use a static visual information of journalism data in the online newspapers, due to the quantity and characteristics of data and information.Concludes with the recommendation that static information visible should take obvious steps to increase the usage of the online newspapers by their intended audience.

Keywords: Information Visible, Online Newspaper, Data Driven, Data Visualizations Tools, Information graphic Styles.

1. Introduction

Aristotle considered that knowledge is difficult without an image (Hummel 1993). From this viewpoint and with improvements in current years, in various areas of technologies and internet possibilities, has made it feasible for data visualization and Information graphics have enhanced deeply used tools by journalists to show information quickly, simply and in a visually attractive way.

The use of Information visible through online newspapers are progressing rapidly, and it is predicted that the published newspapers may be replaced by online newspapers. In the short term (Newman *et al 2015*). As the quantity of news, information, and data in our days continues to increase, information graphic creators must continue to design clarifications that optimally meet readers' demands. Friendly combinations of text and graphics are one way to optimize communication, but doing so challenges designers to be conversant with the appropriate ways in which the pair interact. This technique of news journalism, which containing images, interactive web forms and reading guidance to make the material available, is called data-driven journalism (Baack 2011).

It can be analyzed data-driven journalism as "a workflow, where data is the evidence for the investigation, visualization and – most important – storytelling" (Mirko 2010). Visualization is "the process of interpreting data as a viewed image" (Latham 1995), especially for online newspapers.

1.1. Research Problem

Not only online newspapers, that can be considered as a main source of information at currently time. by other words, there are other resources can be provided the information, such as blogs, social media, advertisements, and information agencies by entertaining styles.

At this moment, in spite of the online newspapers present the information and facts, they need to other styles to present the information to can attract the audiences by using information visible to compete with other online media.

1.2. Research aims

The aim of this research is to recognize the information visible styles, which suits online newspapers, according to their applications in selected range of globe online newspapers, regardless the content type of data.

1.3. Research Methodology

By using descriptive analytical approach to distinguish the types of visualization tools and graphical information styles according to selected samples of globe online newspapers.

2. LITERATURE REVIEW

This part will be focused on main elements, which related to this current study area, as following items.

2.1. Online Newspaper

Several studies have proposed that online newspapers provide readers to get newer and additional information than the printed newspapers (Kerracher *et al. 2014*;Hadlak *et al.2015*). It can be considered as a gateway to investigate following information about all kinds of news (Gilster 1997). Furthermore, supplying a chance to attach information to the web (Kerracher *et al.*2014) and giving extra weight to local news (Massey 1999).

The growth of the online newspapers depended on competition because only by providing desirable materials that will attract the audience (Dutta-Bergman 2004), which are published timely in their reports, reliability, delivered in-depth information, interactivity and breaking news (Singer 2001).

Commonly, online newspaper audiences use some information channels more often and higher extensively (Smith 2005), and still generally cost-free, often renewed during the day, and simply available for everyone with an Internet joint (Nozato 2002). Consequently, online newspaper readers are supported to be more dynamic and selective (DeWaal *et al.* 2004).

From previous points, Online newspapers can be characterized according to two main functions; Firstly, they are more suited to be used as a 'research tool' for more news on points that one is interested in beforehand (Runnet 2004). Secondly, may be one of an alarm mediums, which be useful to reach breaking news at one quick sight throughout the day (d'Haenens *et al.* 2001). On the other hand, online readers may miss out on whole areas of topics if those subjects are neither highest news nor provide for their personal interests (Schoenbach *et al.* 2004), and occurring a negative side effect on the printed publication at all (Jankowski *et al.* 2000).

As a result, it has been aware of the fact that this research paper will be indicating more recent and extensive data visualization tools and information graphic styles, which may be improved the performance of online newspaper media.

2.2. Data Driven journalism

The core purpose of data-driven journalism is to convert the information into visual representations (Viegas *et al. 2007*), whereas Data-driven journalism collects, evaluates, explains and presents large amounts of data (Matzat 2016).

On the other hand, data-driven journalism can be expressed as a workflow, wherever information is the source for analysis, visualization and – most importantly – storytelling (Zwinger 2016).

As a result, readers should be easy with how good visual narrative styles to understand background themes. Consequently, data-driven journalism is not considered as a short fashion, but as a regular art of publishing work (Blickle 2013).

2.3. Data visualization

Data visualization is the graphical presentation of information, with the purpose of giving the audience with a qualitative knowing of the information meanings. Also, convert subjects, ideas, and numbers into the form of a textual description into visual representations to facilitate the understanding and handling of hidden structures from underlying datasets (Tewksbury *et al. 2003;* DeWaal *et al.* 2005), which brought value added of news, data visualization, and increased appearance, thereby have made today's analytical journalism more attractive and easier to understand than ever before (Friendly 2009).

Consequently, data visualization tools are regarded as the data structure within visual analytics. Often, graphs are formulated for describing relationships between items and reflected an important component to present a proper analysis, which allowing the audience to better appreciate this statement. Once the data carried by visualization tools has been gathered, it can then serve as the support for an effective report representation (Archambault *et al.* 2015).

This effective report representation could be used in various styles to facilitate smart analysis. The communications core of the data visualization can be used as the basis for an effective report representation, which conveyed via analysis, thereby providing access to the data content of the visible by smart modality (Robertson *et al.* 2008).

As a result, There are many benefits to displaying data visually rather than as a set of flat statistics. Just data visualization helps the perception of patterns and relationships to deliver a message in a more clearly may give just the information that's needed to correctly explain the data (Tarawneh *et al.* 2011; Dragomir *et al.* 2015).

2.4. Information graphics

An information graphic is a type of image that blends data with design, helping individuals and organizations concisely communicate messages to their audience.

Information graphics (Infographics) mean to link graphics, image, and text to communicate information, and effectively be used as graphic visual representations (Yau 2013).

As a result, Infographics aim to present the readers with new entrances and a quick overview of multiple facts on themes that are difficult to follow just using text-based information and need to communicate

with hidden issues efficiently and draw the attention of readers to them (Bateman *et al.* 2010).

3. Materials and Methods

3.1. Selection of online newspapers samples

According to list with the URLs of online newspapers of different countries around the globe, which was available in alexa rank (website http://www.alexa.com/topsites/category/Top/News), that sub-categories to 22 items, one of them was according to newspapers, which included 2,984 online sites, which subdivided into six categories as following items; directories (34 sites), Military Bases (26 sites), Regional (2,842 sites), International (6 sites), Publishers (58 sites), and Student (26 sites).

Regarding to the top 500 sites on the web, it had been selected the first five top rank of globe online newspapers, as shown in table (1).

Table 1. Selected online newspapers

N.	Online Newspaper	Web Site Address	Founding Year	Alexa Rank
1	New York Times	https://www.nytimes.com/	1851	94
2	The Guardian	https://www.theguardian.com/international	1821	114
3	The Washington post	https://www.washingtonpost.com/	1877	192
4	The Huffington Post	http://www.huffingtonpost.com/	2005	200
5	USA Today	https://www.usatoday.com/	1980	499

3.2. Methods

Samples had collected for several data visualization tools and information graphic styles from all decided online newspapers during period time of implemented this research. After that, selected one sample from them to present in this research paper, which was proper for specifying the nature of each case, according to quantity of data regardless content, and evaluating their why, how, and when could be used them?, in order to distinguish which data visualization tool and information graphic style could be more suitable to apply in online newspaper.
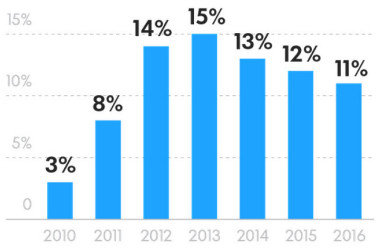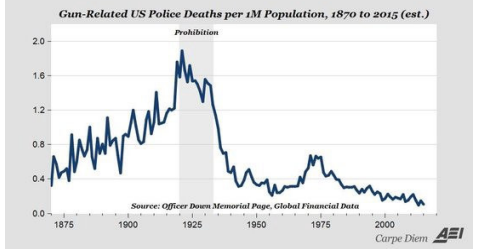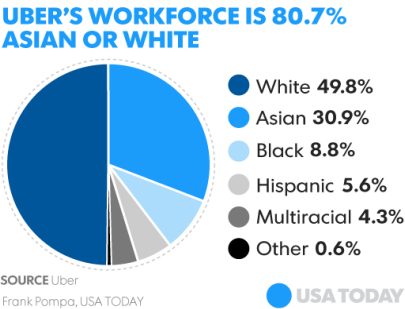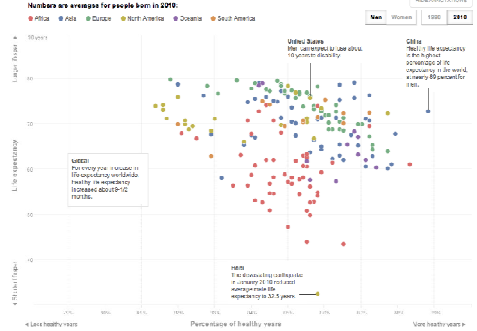
4. Results and Discuss

This section had divided into two main parts. Firstly; data visualization tools & Secondly; information graphic styles, as follow.
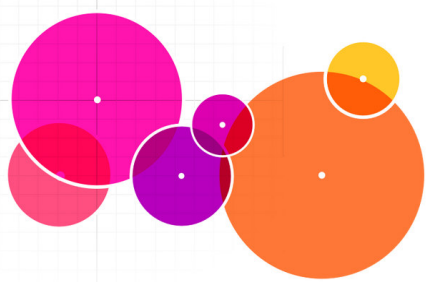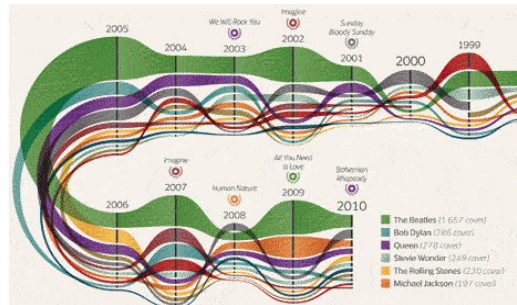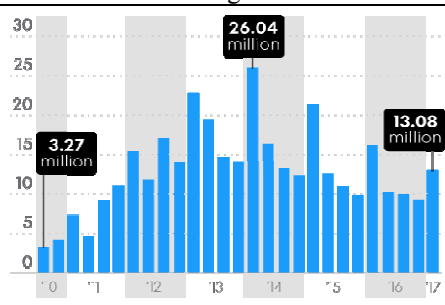
4.1. Data Visualization Tools Applications

The purpose of this section is to relate kinds of tool forms that can be used by journalism designers of charts according to character and volume of data, which help them to select the proper tool, all of the tools will be evaluated that appears as points under each screenshot sample, as shown in table 2.

Table 2. Data Visualization Tools

Bar Chart	Line Chart
Source: https://www.usatoday.com/pages/interactives/ipad-charts/	Source: http://www.huffingtonpost.com/entry/police-plan-fun-filled-weekend-of-terrorism-re-enactments_us_57cf1cfae4b0f831f705e41e
a) There are two convenient bar chart types, which utilized in the online newspapers, one as toward bars, which can be designed into vertical and horizontal character, and other which can be assigned to two- and three-dimensional kind. b) The numerical axis (often the Y axis) should start at zero. c) The both axis data is carried out by employing black color. d) Most of the samples have been used only one solid or tinted color to represent the bar for two-dimensional,	a) Line charts are valuable for visualizing connected temporal duration to follow changes over short and long periods of time, including the individual place for both x- and y-axis, which can be carried out for individual series to show detail changes of data. b) The line graph is generated by connecting each individual data or small groups of points to show limited changes, in this way, the local change from point to point can be seen. This is done

and one color for the bar surface and shaded color of the same color for side surfaces of three-dimensional type.

e) Background as non-color (White or Black) or by lowering wavelength color.

f) Perception based on the variable of bars height.

g) It can be achieved to two or three of different data groups, but for the same type of numerical Y axis.

h) Volume of data should be limited and clear, without any complicated detail.

when it is important to be able to see the restricted change between the group of points, which called slope charts.

c) When smaller changes are, line charts remain useful to handle than bar charts.

d) Line graphs can also be applied to compare changes over the same duration of time for more than one series.

e) According to a searching survey, It can be recommended that line charts have not more than 4 lines on a single graph; any more than that and it becomes difficult to interpret.

Pie Chart	Scatter Plot

Pie Chart column:

Source: https://www.usatoday.com/story/tech/news/2017/03/28/uber-diversity-reports-shows-familiar-tech-deficiencies/99726318/

a) The meaning of pie charts is to decide how the size of value in a group equals to the total items and can be considered as a good indicator of something being wrong is when the percentages do not sum up to 100%.

b) It can be viewed as the smart data visualization tool that conveys one fact above all others with a minimum of visual signs, which it can be performed by a powerful display, easy to read, casual, and comfortable to look at.

c) The circle (the "pie") draws some kind of whole, which is made up of the slices. Add up all the slices and you get the complete pie, which represents the size relationship between the slice and the whole body.

d) Slices have to be commonly closed; by meaning, they cannot overlap. The data, therefore, must not only sum up to an essential whole, but the values need to be categorized in such a way that they are not included multiple times.

e) To increase the readability of pie chart, numbers usually need to be explained as well, and the number of slices needs to be limited to allow the viewer to get an overview without having to try to read the chart in displayed part data.

Scatter Plot column:

Source: http://www.washingtonpost.com/wp-srv/special/health/healthy-life-expectancy/

a) Scatter plots are used to determine correlations between numeric values in many data series.

b) Scatter plots are related to line graphs in that they use horizontal and vertical axes to plot data points. However, they have a smart purpose.

c) Scatter plots expose how much one variable is changed by another.

d) Scatter plots commonly consist of a huge arrangement of data. The closer the data points come when plotted to make a straight path, the greater correlation between the changeable value to indicate strongly the relationship between theirs.

e) It can be represented scatter plot series as the same size dots and distinguished each series by using the individual solid color.

Bubble Chart	Sankey Diagram
Source: http://www.huffingtonpost.com/entry/introducing-the-flipside_us_58deca19e4b0b3918c838ecf a) Bubble charts are commonly used on maps, and x/y-axis plots or no plot at all, they demonstrate the raw count, frequency, or proportion of some variable where the circumference of the bubble reflects the amount of numeric data. b) Color-coding bubbles can represent a further categorization of the variable being graphed. c) Easily to their interpretation by readers, which giving a quick comparison of data values. d) The more important factors, that each bubble of the chart means color, circumference, and suitability fits on the scale.	Source: https://www.theguardian.com/news/datablog/2012/oct/05/beatles-charts-infographics a) Summary of the flow graph, which assists by quantitative flow drawing across the flow graph. b) Illustrations at various levels of detail facilitate for the perception of complex flow positions concerning by relationships and change their. c) Also, can be used as a planning medium for the investigation of option situations by running different parameters in the flow interface.

Histogram
Source: https://www.usatoday.com/pages/interactives/ipad-charts/ a) Histograms are a specific form of the vertically or sometimes horizontally bar charts in which the bars usually see each other since histograms regularly show data gathered into 'groups' forward with a regular measure. b) It has tended to be applied when it's difficult to see patterns in data. c) It can be used when there are only a several changeable items, or the present results are spread over a wide range. d) By grouping your data along a connected scale calculating size, it can be seen immediately whether the volume is near to the goal. e) Most of them can be applied by only mono color, which described the one group of data.

3.2. Information Graphics Applications
According to this study to distinguish types of Information graphics (Natalija 2014; Aaron 2015 & Niebaum *et al.* 2015), they can be evaluated in eight basic types, which used ordinarily in online newspapers, as following;
3.2.1.   The Visualized article
The visualized article uses a moreover lengthy part of journalism and presents it visually. This creates the simplified way to read, supporting it to become received, which needs a powerful title and works well with lots of content.

Figure 1. Screenshot of visualized article sample
Source: https://www.nytimes.com/interactive/2017/03/24/us/politics/the-health-care-blame-game.html

According to figure (1), the visualized article can be analyzed as following items;

a) It can be supported by personality photo.
b) It can be connected between all elements by illustrated form.
c) In more cases, they employ the white color as a background, any neutral color, or by using the graphically processed photo to can be concentrated only on the foreground image.
d) They concentrate only on the highlight events.
e) It summarized the main highlighted content of the article, which readers can understand a subject without following reading the narrative text.
f) The design can be considered as a simplified way to present the core of theme.
g) Do not need any pre-prepared from photographers, just select the suitable photo to create the design.
h) All photos should be in the suitable size and resolution to can viewed it.
i) Used clear colors to represent the illustration, which depended on the expression philosophy by color.

3.2.2 Flowcharts

By using flowchart styles, it can be interpret the query of any theme, which probably answered a particular subject by presenting variable decisions for readers to can reach the suitable result according to their selections, this type of information graphics can be used rarely in online newspapers, Through this search, it can be found that it used only in special themes, also with special character readers who they are aware how can be understanding and analyzing them.

Figure (2): Screenshots of Washington Post
Source: https://www.washingtonpost.com/lifestyle/travel/2015/10/09/9958076e-6ea2-11e5-b31c-d80d62b53e28_graphic.html?utm_term=.ba44ad6d3089

According to collect samples and indicate the figure (2), it can be analyzed the flowcharts as following items;

a) Flowcharts design should be simple and obvious.
b) It should be designed by information and humorous character.
c) Included text summary. In addition, highlight the major addresses
d) Besides geometric patterns, it can be included some of the representation drawings.
e) The background should be applied to white color, shades or tints, to focus only on the flow chart.
f) It can be reflected as well done on special themes, such as scientific, education, economic, and social.

3.2.3.   The timeline

A timeline is graphical representations a list of major events in regular order, which allowing the readers to explore how subject has changed over the past years or as forecast of the future, through displaying the order of actual issues, can be simple or complex to inform users of subject's timelines and has to be interesting or proper enough for readers to care about the topic.
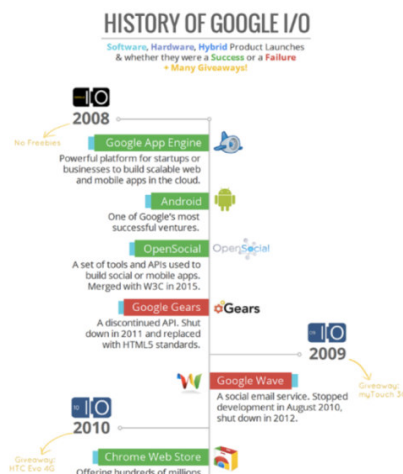

Figure 3. Sample of timeline Infographics
Source: http://images.huffingtonpost.com/2016-08-25-1472161032-9106605-googleIO.png

According to collect samples and the sample which was obvious in figure (3), it can be analyzed the timeline as following items;

a) Made up of sequential dates that are visualized to make the graphic entertaining and shareable.
b) Takes the user on a journey.
c) Can be simple or complex.
d) Has to be interesting or appropriate enough for the audience to attention about the journey.
e) Timeline slider appears above or under the dates on the horizontal or vertical axis, letting the readers see how these forecasts change under different issues hypotheses.
f) These design strategies help determine the viewer early on (setting shot, checklist, harmonious visual platform) and allow the reader to follow his progress through the timeline visualization.
g) Highlighting refers to visual mechanisms that help direct the reader's attention to selective elements in the display.
h) This can be performed through the application of color, framing, and size, which increase the variety of a component relative to its surroundings.
i) Transition guidance regards methods for running inside or between visual displays without disorienting the readers.

3.2.4.   Useful Bait

Useful baits also named Instructional steps can be defined as a special Infographics style, which observed as a simple design to present useful information to an audience to help guide decisions. On the other hand, it can be considered as a way to explain something or answer a question by visually showing, as shown in figure (4).
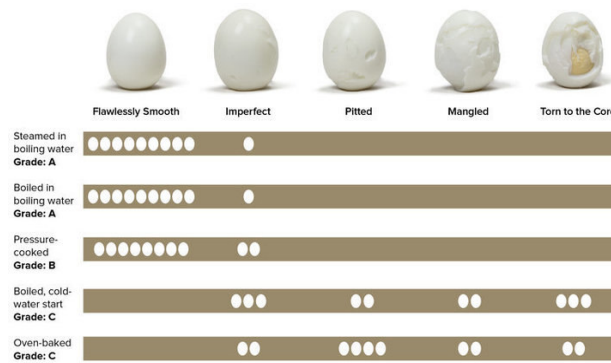
Figure 4. Screen shot of Useful bait sample

Source : http://www.huffingtonpost.com/entry/cooking-hard-boiled-eggs_us_56b4b38de4b01d80b245e481

It can be analyzing the useful baits as following items;

a) It does not necessarily communicate anything new.
b) It can be considered as a perfect reference medium.
c) It should be the advantage with an honest design.
d) Usability over design.
e) It does not have time-sensitive news.
f) The content should be surely relevant to the topic.
g) Can be prepared as hard copy to be referenced over and over.
h) It is ideal form for classically object, which wanted to be shared.
i) It depends on clear all design elements, without any shared form.
j) Used the harmonic colors, to can be focused only on the subject.
k) Used photos or drawings are very important to can penetrating the core of content and shortened a lot of information.
l) It should be used white or lighter secondary color as a background to do not disorient the readers.

3.2.5. Number porn

No-one requires to read at a spreadsheet, but other than that 'Numerical characters' is accurate to exhibit if a few simple. Number porn can be represented as an Infographics style, which goes out important numbers and linked by interesting design, and is loaded with data and statistics to visualize, which include lots of numbers with a little visualization to support comprehension.
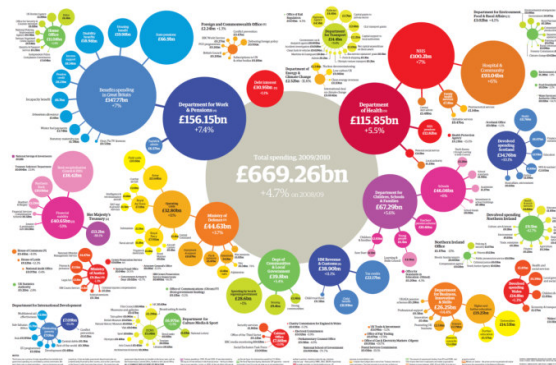

Figure 5. screenshot of number porn Infographics from the Guardian, showing UK government spending

As an analysis of number porn Infographics, it can summarize the following notes.

a) Works well with a lot of content.
b) Made up of charts and numbers.
c) The good design needed to support the data.
d) The figures themselves need to be effective.
e) The design need be appealing.
f) It depends on the numerical character, which could be a bigger point and clearly font.
g) Sometimes, the background can be divided the area into the geometric shapes, which filled with clear color to discriminate between every subject and other.
h) The text should be smaller points than numerical characters to can attract readers towards the number porn.
i) Can be interpreted the picture as an illustration drawing or icons.
j) Can be achieved as one color and also as a multi-colors for the whole design.

k) Can be used pie and bar charts to deeply comprehension of the theme.

3.2.6. Photo Infographics

This type uses mono-color or color photos to visualize the content or communicate the narrative. it offers an innovative design and can helpful to visually demonstrate something by using real life photos, which can be answered a topic or guide the reader, it can also be used to illustrate and interpret the theme, normally it can be viewed as simple design, as shown in figure (6).
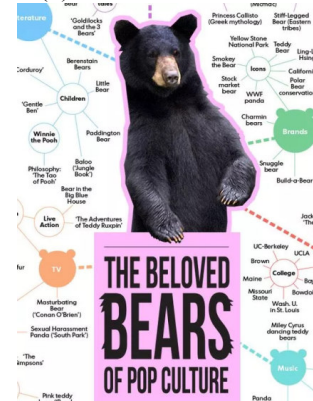

Figure 6. Screenshots of photo Infographics

Source: https://www.usatoday.com/story/news/nation-now/2014/07/18/pop-culture-bears-chart/12823889/

It is obvious that the design can be distinguished as following;

a) It depended on the life photo.
b) It has the need to prepare the photo by a professional photographer.
c) before created photo, it should be decided the scenario through the journalism designer after prepare which data or information should be edited.
d) In spite of simplified design, but it has need time and more skills to can prepare it.
e) The background should be a neutral case to display both of photo and text.

3.2.7. Versus Infographics

Versus Infographics assist in making a comparison two elements and placing them in a head-to-head, therefore it can visually see their differences.

The design should be considered to represent the visualized comparisons between only two elements and performed well with quantities of data. Taking into account the relevant enough for readers to care about the comparison, as shown in figure (7).
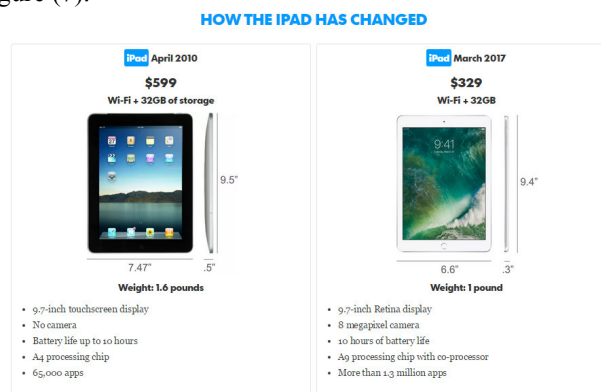

Figure 7. Screen Shot of Comparison type

Source: http://www.usatoday.com/pages/interactives/ipad-charts/

According to the collected samples, it can be regarded the following items.

a) Depends on two same sizes of photos or drawings, which place parallelly in the center of the form.
b) Place the information on opposite sides
c) Important data should be as a bold text.
d) Sub-data may be used the same font but smaller point.
e) Background of the area is regarded as a non-colored, colored tint or shade, to can be contrasted with information color, and not interesting to the readers, but to help to information content display without any noise.
f) Constructed data and information depend on the same parameters, to can probability easily compare them.
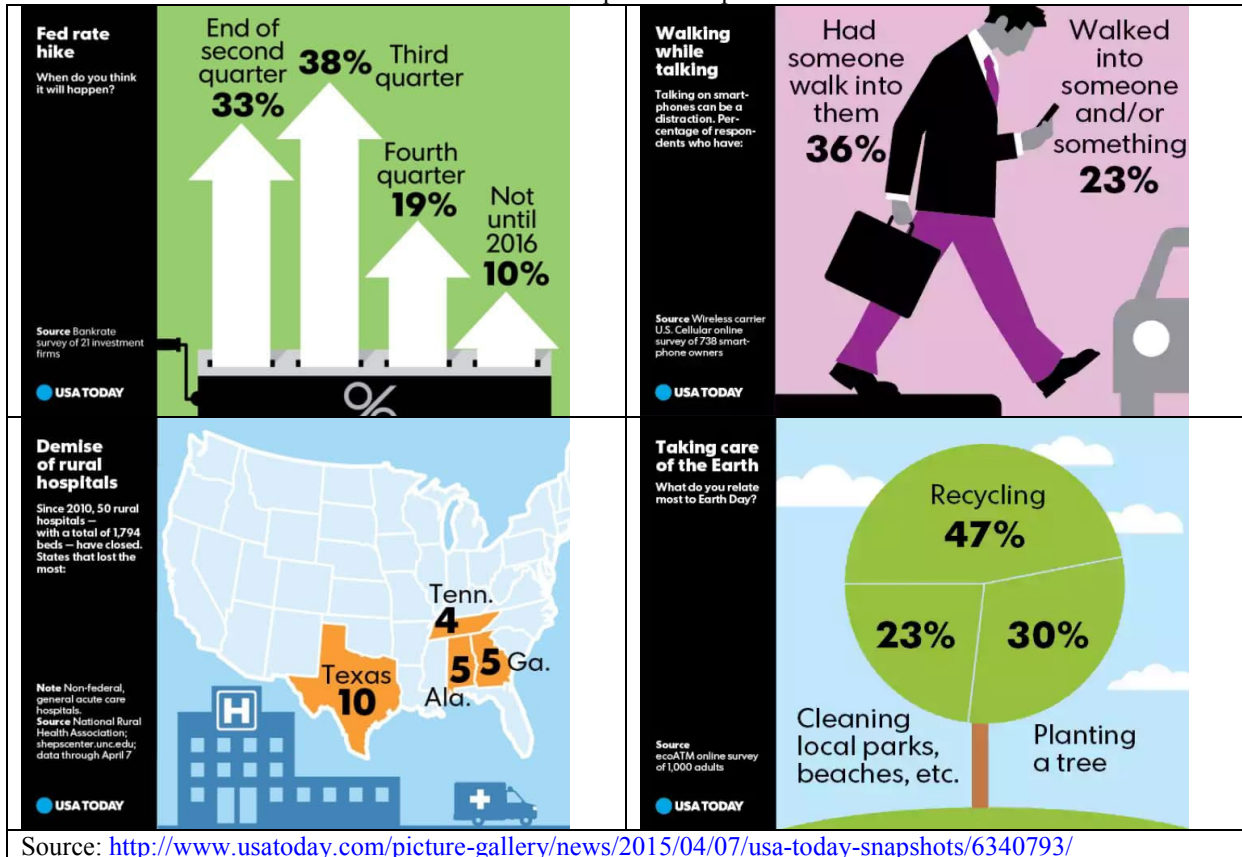
g) It should be displayed in the entertaining form, due to attracting the readers.

3.2.8.   Snapshots

The Snapshot's style does not indicate the whole of the data, which the image is simplified reflecting the theme, not the data, this style could be created firstly by USA Today, which can be considered as a leader online newspaper in this style used.

This style had launched on the 80th, as a new character to distinguish this online newspaper from other. Table (3) shows some samples of snapshots.

Table 3. Samples of Snapshots

Source: http://www.usatoday.com/picture-gallery/news/2015/04/07/usa-today-snapshots/6340793/

As an investigation of the table (2), it can be described of most snapshots samples as following matters.

a) Used one or two solid colors and sometimes used their tints to distinguish the information as a highlighted message, which can impact on the readers.

b) Sometimes, it can be applied the data visualization tools to interpret the information, such as the bar, pie charts, or map style.

c) Used short text.

d) Do not work by continuous-tone photos, but used the outline drawing to represent the situation.

e) It has one column on the left of the image, which occupies 25% of the whole size, which colored by black and writes a text by negative mode (the contrast between the area and the text).

4. Conclusion

Through evaluating of the data visualization tools and information graphic styles on online newspaper through the current trends, the conclusions are followed;

In a data-driven world, new trends in journalism depend on a powerful bond between journalism designers and data analysts who have expertise in detecting patterns, trends, and relationships between them.

Online newspapers can be achieved potential competitive advantages and may be interested for the differences in readers need.

Explorative actions of this paper are carried out to assess current visualization tools and information graphic styles.

This classification and evaluations will present visual analytics, regardless the characteristics of the content.

For journalism designers, this paper provides an orienting, introduction to the static information visible attention at strong visual analysis.

The evaluation can function as a checklist of items to consider when applying the data visualization tools.

Of course, by analyzing types of data visualization tools. In all cases, it was categorized characters that are closely related. Selection shapes and colors are also central to effective charts.

This evaluation is also slightly saving in its discussion of the current limit of visual information. For example, which the suitable style is the incorporate quantity of information within a visualization graphic design.

References

Aaron (2015), "6 Types of Infographics and How to Get Started", January 5, 2015, retrieved from http://piktochart.com/6-types-of-infographics-and-how-to-get-started/, accessed 11 September 2015.

Archambault S. G., Helouvry J., Strohl B. and Williams G. (2015), Library Hi Tech News, Emerald Group Publishing Limited, V. 32 N. 2 March.

Baack, S. (2011): A new style of news reporting: Wikileaks and data-driven journalism. In: Cyborg Subjects. 10 pages. URN: http://nbn-resolving.de/urn:nbn:de:0168-ssoar-400253

Bateman S., Mandryk R., Gutwin C., Genest A., McDine D., Brooks C.(2010), Useful Junk? The Effects of Visual Embellishment on Comprehension and Memo ability of Charts. In ACM Conference on Human Factors in Computing Systems, pp 2573- 2582.

Blickle P.(2013), Data Driven Journalism at Zeit Online, Parsons Journal for Information Mapping, Parsons Institute for Information Mapping.

d'Haenens, L., Heuvelman, A., & Jankowski, N. with Kokhuis, M., & Summeren V.C.(2001). News in Online and Print Newspapers: Differences in ReaderConsumption and Recal,. paper presented at the Etmaal van de Communicatiewetenschap, Vrije Universiteit Amsterdam, 22-23 February.

DeWaal E., Schönbach K., Lauf E. (2004), Online Newspapers: A Substitute for Print Newspapers and Other Information Channels?, 6th World Media Economics Conference, Centre d'études sur les médias and Journal of Media Economics, HEC Montréal, Montréal, Canada, May 12-15.

DeWaal E., Schönbach K. and Lauf E. (2005), Online newspapers: A substitute or complement for print newspapers and other information channels?, Walter de Gruyter, Communications 30, pp. 55-72.

Dragomir M. and Thompson M. (2014), Mapping Digital Media Global Findings, A Report by the Open Society Foundations, USA.

Friendly, M. (2009). Milestones in the history of thematic cartography, statistical graphics, and data visualization. http://www.math.yorku.ca/SCS/Gallery/milestone/milestone.pdf.

Gilster, P. (1997). Digital Literacy. New York: John Wiley & Sons, Inc.

Hadlak, S., Schumann, H., Schulz, H.J. (2015), A survey of multi-faceted graph visualization. In Borgo, R., Ganovelli, F., Viola, I., eds.: Proceedings of the Eurographics Conference on Visualization - State of The Art Report, EuroVis STAR. 1-20.

Hummel C. (1993), the quarterly review of comparative education (Paris, UNESCO: International Bureau of Education), vol. 23, no. 1/2, p. 39-51.

Jankowski, N. W. and Van S. M. (2000). Traditional news media online: An examination of added values. Communications: The European Journal of Communication Research, 25(1).

Kerracher, N., Kennedy, J., Chalmers, K. (2014), The design space of temporal graph visualisation. In Elmqvist, N., Hlawitschka, M., Kennedy, J., eds.: EuroVis'14 Short Paper Proceedings, Eurographics 7-11.

Massey, B. L. (1999). Interactivity, Online Journalism, and English-Language Web Newspapers in Asia. Journalism & Mass Communication Quarterly, 76, 138-151.).

Mirko L. (2010): Status and Outlook for data-driven journalism. In: European Journalism Center: Data-driven journalism: What is there to learn? A paper on the datadriven journalism roundtable held in Amsterdam on 24 August 2010, P. 8-17. http://mediapusher.eu/datadrivenjournalism/pdf/ddj_paper_final.pdf (last accessed 22.03.2011).

Natalija S. (2014), "8 types of infographics: which is right for you?", February 20, 2014, retrieved from http://piktochart.com/8-types-of-infographics-which-right-for-you/, accessed 31 August 2015.

Newman N., David A. L., Nielsen R. K. (2015), Reuters Institute Digital News Report 2015, Reuters Institute for the Study of Journalism, University of Oxford.

Niebaum K., Cunningham-Sabo L., Carroll J., Bellows L. (2015), Infographics: An Innovative Tool to Capture Consumers Attention, Journal of Extension, Volume 53, Number 6, Article 6.

Nozato, Y. (2002), Credibility of Online Newspapers, Communication Technology & Policy Division, Miami Beach Convention.

Robertson G., Fernandez R., Fisher D., Lee B., and Stasko J. (2008), Effectiveness of animation in trend visualization," IEEE Transactions on Visualization and Computer Graphics, vol. 14, no. 6, pp. 1325–1332.

Runnet, B. (2004). Reaching out: newspaper sites add audience (News Paper Association of America).

Singer, J. B. (2001). The Metro Wide Web: Changes in Newspapers' Gatekeeping Role Online. Journalism & Mass Communication Quarterly, 78, 65-80.

Smith, J. E. (2005)., "Content differences between print and online newspapers" Graduate Theses and Dissertations. http://scholarcommons.usf.edu/etd/868

Schönbach, K. and Lauf, E. (2004). Another look at the 'trap' effect of television and beyond. International Journal of Public Opinion Research, 16(2), pp. 169 -182.

Tarawneh R. M., Keller P., and Ebert A. (2011), A General Introduction To Graph Visualization Techniques, Creative Commons License ND Proceedings of IRTG 1131, Christoph Garth, Ariane Middel, Hans Hagen; pp. 151–164.

Tewksbury, D. (2003).What do Americans really want to know? Tracking the behavior of news readers on the Internet. Journal of Communication, 53(4).

Viegas F. and Wattenberg M. (2007), Artistic data visualization: Beyond visual analytics. In Proceedings of HCII.

Matzat L., (2016), Datenjournalismus: Methode einer digitalen Welt, UVK Verlagsgesellschaft.

Yau N. (2013), Data Points: Visualization That Means Something. John Wiley & Sons.

Zwinger S., Zeiller M.(2016), Interactive Infographics in German Online Newspapers, Proceedings of the 9th Forum Media Technology, St. Pölten, Austria, published at http://ceur-ws.org

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