INFOGRAPHICS AS A PROMISING TOOL FOR TEACHING AND LEARNING

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Abstract: Effectiveness of teaching-learning process relies on various components such as; Teachers' communication, Teachers' planning and preparedness, adopted methods of teaching, teaching-learning resources being used, quality of interactions allowed in the classrooms, etc. And many more other factors may be included in this list. Out of these, teaching-learning resources and tools provide plenty of opportunities to interact the student effectively. There are diversified types of teaching-learning resources are being utilizing in the process of communicating and transacting the content. As an advent of and advancement in ICT its horizon is widening day by day. Infographics is one of the promising teaching-learning tools that are preferred and using so oftenly in teaching-learning process especially in the era of online teaching-learning. Researchers, through this article, tried to provide a conceptual framework of Infographics by presenting comprehensive overview on its concept, components, types, uses & effectiveness, online infographics tools, and criteria for designing an effective infographics tool. This study has the implication for teachers, teacher-educators, students, parents, administrators, curriculum designer and researchers.

Keywords: **Infographics, Tool, Teaching-Learning Process, ICT.**

I. INTRODUCTION

Infographics as an effective tool for data representation and visual communication (Siricharoen, 2015; Afify, 2018; Alyahya, 2019; Basco, 2020), is gaining popularity among the educators. Infographics are promising, powerful and effective tool (Ozdamli et al. 2016; Ibrahim & Maharaj, 2019) for presenting data (Basco, 2020), explaining concepts, simplifying presentations, mapping relationships, displaying trends, and providing basic insights. They follow the multisensory and multimodal approach, i.e. text and visuals (Yarbrough, 2019). They are a medium for turning difficult, complex and abstract information into a visual story that communicates its core points (Madar & Buntat, 2011; Bicen & Beheshti, 2017; Basco, 2020; Fateh & Saeed 2020). By using appealing images, infographics facilitate understanding of abstract ideas that is why they are popular in teaching-learning and other fields too. It helps in quicker communication of the information (Basco, 2020). It gives the enhanced collaboration, comprehension, engagement (MacQuarrie, 2012; Smiciklas, 2012) as well as interaction and involvement of the students in teaching-learning process when used in systematic and planned way. It explains them the complex process in simplified and easier manner (Siricharoen, 2015; Basco, 2020). It also proves helpful in comparing and contrasting the multiple concepts. Further, it helps in presenting the reports (Basco, 2020), data and findings of any project or research in the form of summary. In this way, Infographics can serve as vital mean to facilitate the teaching-learning; research and extension related presentation work (Basco, 2020) by assisting in comprehending and transecting them.

Ideas presented in visual and graphical forms are easier to understand and remember than those presented as words, (Kliegel et al., 1987). It conveys bulky information in concise way, supported by statistics from high-quality sources, without overburdening the reader with verbose explanations. Instead of boring readers with lots of dry information and statistics, marketers can use infographics to send messages compellingly. The greatest strength of infographics is its flow. It can convey an idea that readers and spectators take away. An Infographics

gets more attention and prove more effective if it is made eye-catchy (Bicen & Beheshti, 2017) and attractive by a balanced combination of relevant colours, visuals, graphical designs, concise texts and diagrams (Noh et al. 2014).

1.1 Concept and Definition

Infographics is a term that formed by the two words, Information and Graphics. It was first used in English language publications in 1960. Infographics are graphic visual representations of information, data or knowledge intended to present them quickly and clearly (Newsom & Haynes, 2004; Naparin & Saad, 2017). It is also defined as the delivery of information and ideas, data, text in a visual form to students faster in a manner for easy comprehension than traditional text methods (Smiciklas, 2012). Whereas, Krum (2014) defined infographics as the graphic design that combines data visualizations, illustrations, images, and text. It also referred to a visual representation of information, data or knowledge (Damyanov & Tsankov 2018). It is an information graphic, which conveys data in a visual format that should be understandable at a glance. Thus, an infographics is a collection of pictures, images, diagrams or charts having nominal text which enable the readers to comprehend the subject matter in easier way. An Infographics is a pictorial depiction of information meant to make data intelligible at a glance. People use infographics to swiftly communicate a message (Basco, 2020), to make enormous volumes of data easier to understand, to show data patterns and linkages, and to track changes in variables over time.

1.2 Components of Infographics

Golombisky and Hagen (2013) have suggested five components of infographics; headline, chatter callouts, source line, and by-line. These are referred respectively as the heading, explanation of the entire infographics, labels providing details about included elements, information on the origin of the data and of the infographics designer. Whereas some researchers proposed the three components for it (Siricharoen & Siricharoen, 2015; Basco, 2020), they are:
1) Visual elements (refers to colour, graphics, icons, maps, signs, etc.),
2) Content elements (refers to facts, references, statistics, texts, etc.), and
3) Knowledge elements (refers to conclusions, messages, etc.).

1.3 Types of Infographics

On the basis of its complexity infographics have been classified into six broad categories which are: static, zooming, clickable, animated, video and interactive (Krum, 2014). However, there are different other types of infographics that have been used based upon the needs of the users. The brief descriptions of each are given below:

1. **Animated infographics** use colours, pops, sounds, a smooth transition when user want to present out-of-the-box creative ideas and capture the attention of the audience.
2. **Comparison infographics** are used to make a comparison (both similarities and differences) between two or more events, actions, ideas, processes, product, data, information, individuals or places by means of graphs, visuals, pictures, etc.
3. **Geographic infographics** cover a wide range of data from simple to complex. It helps to grasp the complex data and make it more simple and comprehendible. It may work as a comparison of data sets from a specific location.
4. **Hierarchical infographics** are used to explain different levels of information hierarchically. They are in the form of pyramids, flow charts with visuals.
5. **Informational infographics** are the visual representation of information that aims at making data easily comprehendible at first glance.
6. **Interactive infographics** will show how Snap App combines charts and graphs to allow users to interact with the actual infographics. Interactive infographics can be used if anyone wants to appeal to a specific type of audience. Eye Candy is a type of infographics that is an interactive infographics that consists of graphics and charts but adds dynamic elements such as pop-ups and questions.
7. **List infographics** are effective in attracting the readers and audience attention and increasing engagement, and they are one of the most divisible types of infographics. This type of infographics

allows the users to organize information into lists, making them more compelling than simple lists. List infographics layouts have a wide range of uses, from creating checklists of things to explain how a process works.

8. **Location infographics** use maps, locations to make the geographical-based locations easy.
9. **Mixed chart infographics** make use of different types of charts to explain data.
10. **Photographic infographics** make use of photos and text to explain information or a concept.
11. **Process infographics** were developed to simplify complex ideas, concepts, and visuals. There are many types of process infographics, but here's an overview of the three most effective. This type of infographics is often referred to as a flowchart and takes advantage of the short attention span of modern humans.
12. **Road map infographics** is a work that has a start and endpoint, such as a step in the process or a milestone in the project. The definition of this type of infographics implies that each step is a logical sequence of the preceding one.
13. **Statistical infographics** focuses on data. Layouts and visuals help to describe and understand the data**.**
14. **Timeline infographics** simplify complex information and make it fun and easy to grasp. If a user intends to visualize the history of a particular event or highlight key data then this serve as suitable mean.
15. **Visual infographics** are used when user want to cut down the bulk of information and make it short and precise and increase the sharing potential of the information.

II. EDUCATIONAL USES AND EFFECTIVENESS OF INFOGRAPHICS

Describing the potential of visuals, Visual Systems Division (1997) claim that visual are processed 60,000 times faster in the brain than text and visual aids in the classroom improve learning up to 400 percent. The uses and effectiveness of infographics are well proven. It improves cognitive ability (Damyanov & Tsankov 2018) by utilizing graphics to enhance the students' visual system's ability to see the patterns and trends (Card, 2009). Students learn and remember more efficiently and effectively through the pictures/ visuals as compared to written / oral text (Medina, 2008; Dur 2014; Ozdamli et al. 2016; Alrwele, 2017); and it further increases when combined both text and visuals (Madar & Buntat, 2011; Dunlap & Lowenthal, 2016; Naparin & Saad, 2017; Fateh & Saeed 2020) by allowing them more interactivity and involvement. Involving students through the infographics yields an enormous better output and enhanced academic performance (Madar & Buntat, 2011; Cifci, 2016; Alrwele, 2017; Naparin & Saad, 2017; Ibrahim & Maharaj, 2019; Yarbrough, 2019; Basco, 2020). It helps in motivating the students to read the facts, interpret the data and draw conclusions more easily and comprehensively. Instead of transacting the ideas through chalk and talk method, it encourages the students in taking notes in sequential order. It serves as a promising learning tool in teaching-learning process (Ibrahim & Maharaj, 2019). Its potential advantages can be categorized as (1) enhanced interpretation of information, (2) concepts and ideas, (3) improved ability of comprehending complex information, and (4) enhanced recall and retention of information (IARE, 2003). Infographics help in synthesizing information thus proved an excellent tool for teaching and learning because it helps teachers/ students to:

1. It helps teachers to classify and develop students' graded projects.
2. It helps teachers to increase students' interest and engagement.
3. It helps students to learn important abstract and complex topics of mathematics, sciences, social sciences, languages and literature.
4. It helps teachers to include visual content in their routine for introducing a lesson or topic with examples.
5. It helps teachers/ students to visualize course tasks and use them throughout the course.
6. It helps teachers/ students to understand and learn a topic intensely by means of attractive flowcharts, visual aids.
7. It helps employees to focus on important information and not waste a moment of their time.
8. Using words and arrows, user can design the infographics to group relevant information and show the direction of the arrows in a flowchart.

9. As producers of information, infographics offer us a compelling way to organize and share data with a broader audience via websites and social media.
10. In educational institutions, they can add a variety of text-heavy tasks, online discussion threads, and paper-based tasks, allowing students to express ideas through visual means.
11. As consumers of information design, they help us to filter out key terms from broad tax issues.
12. In the profession of education, infographics have expanded to other areas, such as presentations of business and financial data. If user wants to communicate with the educational stakeholders, visual content as a teaching tool must be used, and infographics are the ideal for it.
13. Infographics are supposed to help students learn how to analyze news and share many media types, and infographics are extremely useful in this scenario.
14. Teachers today not only limit themselves to creating and using infographics but also teach their students how to create and share their infographics to show their learning skills.
15. Infographics are visual representations of information and data that are compiled to explain a particular topic. They are an excellent way to display complex information that is easy to create and keep students on edge.
16. Infographics represent the development of literacy and serve as an essential language for educated readers and writers.
17. Infographics support learning in online learning environments in several ways. The cognitive theory of multimedia learning offers a theoretical explanation.
18. Infographics are ideal for highlighting key events in a historical period to help students understand how events are interconnected and influenced and to rethink the most important events of a particular period.
19. Infographics combine the written, visual, digital, and tactile learning elements, not only because they show students what learning is about, but also because they keep students engaged.
20. Teachers and other educators who use infographics often find that their students are more concerned with the practical elements of creating infographics. It also helps teachers save time by creating their visual aids using infographics templates.
21. With infographics, educators can enhance students' visual skills and visual literacy. According to Donis A. Dondis (1973) visual literacy is the unique structure and practice of communicating and improving information through primarily visual representations. Literate people can derive meaning, communicate with others, and grasp ideas in a variety of ways.

III. ONLINE INFOGRAPHICS TOOLS

There are several infographics tools available online (Tableau, 2013; Wright, 2016) out of these some important and common have been discussed here:

1. **Canva:** It is a free graphic design platform used for making invitation cards, Instagram posts, and business cards. It allows editing photos without editing knowledge and experience**.**
2. **Venngage:** Venngage is an online application for producing infographics, reports, and data visualizations
3. **Piktochart:** it is a tool for an online audience to make slides, presentations, posters, and reports.
4. **easel.ly**. It enable to visualize any kind of information with Easelly's infographic maker. Simple infographic maker EasyLy makes visualizing any kind of information easy.
5. **Visme.** If someone intended to create infographics, videos, or presentations online, then Visme is appropriate tool for this. It's a visual content creation tool that lets the user to create visual content online.
6. **Infogram.** Infogram is a free tool that helps people intuitively visualize content.
7. **Visualize. me.** This web service visualizes the users' LinkedIn profile information as an infographics via a web service.
8. **Snappa.** Many marketers, entrepreneurs, and non-designers use Snappa to create graphics for social media, display ads, blog posts, and more.

IV. POINT TO BE REMEMBERED WHILE DESIGNING INFOGRAPHICS

Yarbrough (2019) suggested four criteria for quality infographics that might help in designing and producing them for teaching learning process. They should be: Meaningful and Relevant, helpful in Summarization, helpful in Quick Recall and helpful in Maximizing the Communication with Minimizing the Space. According to Cifci (2016) the following seven points to be kept in mind while producing and designing the infographics:

1. Determination of Objectives
2. Selection of Topic
3. Balanced Integration of text, figure, graphic and illustrations are to be integrated
4. Attractiveness, Simplicity and Comprehensibility in Presentation
5. Balanced combination of Visuals, Videos, Sounds, Animations
6. Authenticity and Reliability of references cited
7. Appropriateness with the students' level

V. CONCLUSION

This study may prove to be helpful for teachers (Cifci, 2016), teacher-educators (Basco, 2020), students, parents, administrators, curriculum designer and researchers (Alrwele, 2017). Since, the infographics help teachers and students to understand difficult and complex materials. Therefore, there is an emerging need for training courses for the teachers and students on how to create an effective infographics in their fields (Fateh & Saeed 2020). As the infographics yields a significant increase in academic performance of the students (Naparin & Saad, 2017), teachers should be encouraged to use infographics while transacting the content (Madar & Buntat, 2011), at the same time, the students should also be encouraged to develop positive attitude towards the use of infographics in their various courses. Also, parents should provide learning opportunities to their children especially their girls to enable them variety of learning exposure (Hope & Cheta, 2018).

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