EXPLORING THE AESTHETIC VALUES AND COMPONENTS OF DIGITAL GRAPHIC NOVELS: A SYSTEMATIC REVIEW

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ABSTRACT

The Digital Graphic Novel (DGN) is a comic book evolution that tells stories in a range of genres. Due to its benefits, DGN has gained a reputation over the years. This paper explores the theoretical parts of DGNs that make them valuable resources for research and infor-mation, identifies the benefits for designers, researchers, and DGN readers. Nonetheless, this study focuses on the aesthetic values and components in designing appealing DGNs. A systematic literature review has been performed on 128 sources. In general, findings from this review have classified five benefits of DGN that impact the educational areas; DGN can encourage learners to read, able to improve critical thinking, serve as a new dimension of learning, build visual literacy, and able to give positive values in learning. This study sum-marizes the current literature and identified six aesthetic elements and fourteen components that affect the design of DGNs.

This study presented a research outline with several oppor-tunities for researchers and practitioners to explore aesthetic values.

Keywords: Aesthetic values, graphic novels, digital graphic novels, appealingness.

INTRODUCTION

A digital graphic novel (DGN) is a potential way for an educator to support multimodal literacy instruction. Technology has created new modes of teaching and learning techniques such as combining conventions of print with sound, graphics, text, animation, videos, and gestures called digital content. The use of digital content in teaching and learning is increasingly being developed. Many digital contents have been used in teaching and learning whether in schools or homes for teaching children's skills, from social to academic.

Therefore, the term graphic novel will be defined to generalize a definition for the term digital graphic novel. DGN draws a noticeable link between narrative, form, and format (Chute & DeKoven, 2006; Pagliaro, 2014; Alexander, 2017). According to Jamaludin (2015), learning DGN needs to understand the learning narratives operation such as the respondents' real-life experience and the connection between the experiences. DGN can be prepared with interactive techniques and enhanced graphics features that help decrease un-certainty in understanding the subjects learned (Crucifix & Dozo, 2018; Manurung & Mi-hardi, 2016). Cohn (2013, 2014), who developed a visual language concept for the cognition of comics and GN, has claimed that DGN could establish a relationship between students' identified sequential images and how they learn other methods of communication. DGN often challenges the conventional specificity of comics, blurring boundaries with other me-dia through a process of hybridization (Tseng & Bateman, 2018; Ali & Husseinudin, 2018).

DGN is developed without realizing its impact on aesthetic value and user appeal. Ap-pealingness is related to aesthetic values because it is related to the design process (Han et al.,2019; Seifert & Chattaraman, 2020). Design is the method of putting form and content together. DGN is quicker to read than a text novel. The use of pictures, images, and speech bubbles helps readers to better understand the content (Peng, 2018), learn new vocabulary, and support text clarification

(Hughes & Morrison, 2014). The images in DGN enable read-ers to interpret facial expressions (Pantaleo, 2014; El Refaie, 2019) such as the meaning of certain images and poses and metaphors. DGN with its visual representation can help de-crease uncertainty in understanding the content of the related theory that is sometimes difficult to clarify with words (Connors, 2010). Hence, it is important to identify and ex-plore the aesthetic values in designing a DGN.
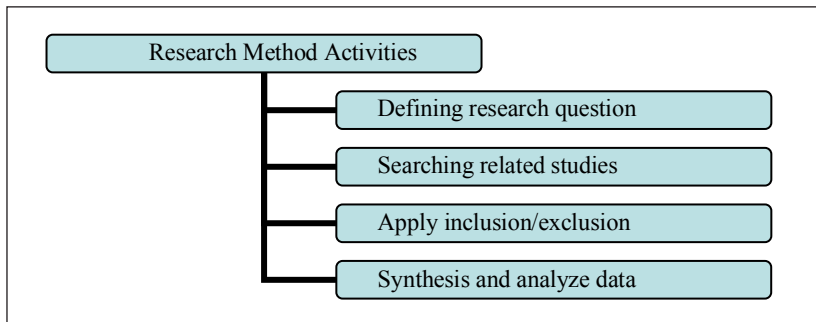
Identifying and exploring the aesthetic values for DGN serve as the aim of this paper. For that purpose, this paper is organized as follows: the next section describes the method of study that includes all the systematic literature review (SLR) activities. The following sec-tions present the results of the review where the results are discussed and future areas are proposed for further investigation.

METHOD OF STUDY

SLR refers to a method that is used to answer specific research questions, examining a particular research topic, or phenomenon of interest (Kitchenham, 2004; Alves et al., 2017; Fischer et al., 2017). The same study by Kitchenham (2004) noted that SLR offers methodological advantages and applications for research issues by systematically identifying, evaluating, and interpreting available relevant research. The protocol follows guidelines from Kitchenham and Charters (2007). Based on the guidelines, this paper adopts the SLR activities as illustrated in Figure 1.

Figure 1

Research method activities based on SLR

Defining Research Questions

To achieve the research objective of identifying the aesthetic values specifically for DGN and exploring its benefits, the following research questions are defined. This paper specified three research questions as guidance for this study. The first two questions are important to get a better understanding of DGN before exploring the aesthetic values as reflected in the third research question. The following are the research questions defined for this study:

RQ1: What is a digital graphic novel (DGN)?
RQ2: What are the benefits of DGN?
RQ3: What are the aesthetic values and components in designing DGN?

Searching Related Studies

To guide the SLR, a protocol was developed to identify the steps to conduct the review process. It consists of the following steps: i) searching using electronic databases; ii) manual search of journals, conferences, books, and theses that are related with keywords in the re-search questions; and iii) analysis of the list of references using Google sheets and Microsoft excel. This software is used to create a database for this study and organize the information based on the research questions. The data collection included the titles of the papers, the year the papers are published, their sources, and the type of studies conducted. The next process is to filter the content related to the objective of this paper. The filtering process is completed based on specific keywords as mentioned in the exclusion and inclusion section. All the gathered papers are filtered by title, abstract, and findings of each of the papers. Pa-pers that are closely related to specific research questions are recorded in a new datasheet. The search on the following databases is recorded: ACM Digital Library, ERIC, IEEE Xplore, Elsevier Scopus, JSTOR, Ohio Link, ResearchGate, Sage Pub, Semantic Scholar, Springer, and Wiley Online Library. The accessibility of many resources through electronic libraries gives a relevant publication. The journals referred to by this study are depicted in Table 1.

Table 1

The List of Journals

	Name of Journal
1	Journal of Curriculum and Supervision
2	Journal of Graphic Novels and Comics
3	Journal of Educational Psychology
4	Journal of Education and Practice
5	ISPRS International Journal of Geo-Information
6	Malaysian Online Journal of Educational Sciences: MOJES
7	International Journal of Advanced Computer Research (IJACR)
8	SANE Journal: Sequential Art Narrative in Education
9	International Journal of Education and Literacy Studies
10	Journal of Media Literacy Education
11	14th IAPR International Conference on Document Analysis and Recognition (ICDAR)
12	Journal of the Art Libraries Society of North America
13	Journal of Language and Literacy Education
14	Jurnal Pendidikan Malaysia
16	Journal of Online Learning and Teaching (JOLT).
17	International Journal of Advanced Computer Research
18	International Journal of Management & Information Systems
19	Eurasia Journal of Mathematics, Science and Technology Education
20	The Central European Journal of Aesthetics

Applying Inclusion or Exclusion Criteria

The criteria chosen for inclusion and exclusion are important to eliminate the influence of certain conflicts such as studies that are not relevant to GN or DGN terminology and not related to digital products such as novels and textbooks. Table 2 illustrates the adopted criteria for inclusion and exclusion of the study. Literature collection was conducted with gen-eral searching from electronic and manual search. There are five papers for aesthetic values and some other references for RQ1 and RQ2 that were published between 2008 to 2012. These papers are included in the study since they presented significant theoretical contribu-tion that has to be taken into consideration for this review. This is supported by Findley et al. (2016) who stated that a researcher can use the past study as a reference if the theoretical contribution was justifiably large and has been tested.

Table 2

The Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
• Paper that mentioned digital graphic novel and graphic novel terminologies. • Papers that analyzed the appealingness of DGN. • Papers that discussed the benefits of DGN. • Conferences or journals between 2015-2020. • For the theoretical part, relevant sources will be accepted.	• Paper that is not related to a graphic novel such as the novel. • Data that discussed the aesthetic values of a non-digital product. • Papers with similar studies but do not lead to a research question. • Not a full article.

Synthesis and Analyze Data

A database has been created to manage and store data from the selected studies. Before selecting a paper for the SLR, it is checked to ensure that there is no duplication for in-stance if the same study is published in different journals or published in many electronic databases using different first author names. If this occurred, the latest study will be select-ed. After eliminating and categorizing the sources, some of the papers have been removed and only 98 sources are selected for the SLR. As shown in Table 3, the final data are sum-marized in the list of tables according to the type of publication.

Table 3

Types of Publication

Types of Studies	Total
Journal	45
Proceedings	5
Conference Article	26
Book	12
Thesis	9
Website (Popular Sources)	1
Total	**98**

To answer RQ1, some keywords are used to search for the terms DGN and GN. The keywords include "graphic novel" and "digital graphic novel" or a combination of keywords such as "definition + digital graphic novel" in the primary studies and summarize the article provided related to the RQ1 and coded in the database. To answer RQ2 and RQ3, the key-words that were used in this searching process are "appealingness of graphic novel", "aes-thetic in designing graphic novel", "benefits of the graphic novel", and "impact of the digi-tal graphic novel".

Based on 128 sources identified based on online database searching, only 98 sources are selected and they can divide into several groups using the screening process as shown in Figure 2. Figure 2 illustrates how the decision is made on the inclusion and exclusion crite-ria. At the end of the screening process, only 16 papers related to aesthetic values and other papers related to DGN theory are selected. However, papers resulting from the search using a combination of keywords are also considered to be included due to the limitation of sources when using a single keyword search.

Figure 2

The Screening Processes
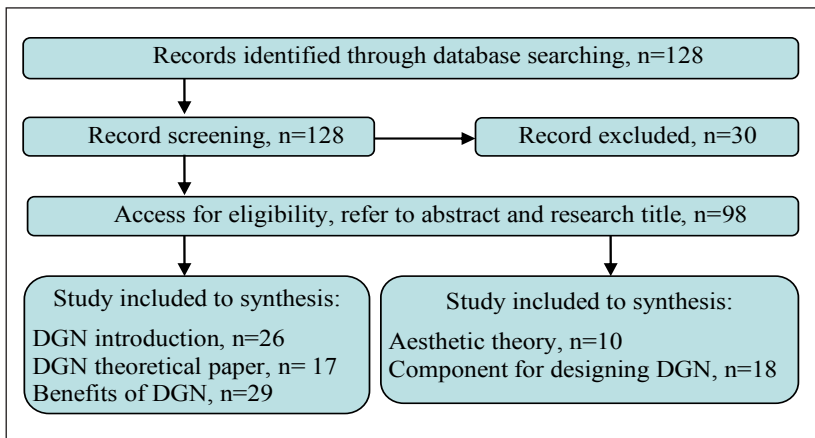
After the screening process is conducted, resulting in a total of 98 articles, SLR is con-tinued with analysis. From the 98 collected literature, articles covering the introduction of and the theoretical

aspects of DGN are 26 and 17 respectively while the articles featuring the benefits of DGN are 29 in total. With respect to aesthetics, 10 articles cover the aesthet-ic theory of DGN, and 18 present the component that are related to each aesthetic element for designing DGN. All articles are reviewed and the analysis is presented and discussed in the next section.

ANALYSIS AND DISCUSSION

To guide the analysis and discussion of the SLR, the research questions are re-visited. This has to be intact to keep the analysis focused and the discussion relevant and very much related to the objectives.

RQ1: What is Digital Graphic Novels (DGN)?

GN is a story told in a comic strip format that is relative to a certain category of graphic narratives (Bateman et al., 2017; Pascoe & Wright, 2018; Jamaludin, 2015). GN is also de-fined as thick comic books which are juxtaposed pictorial and other images in sequence, intended to deliver information and to produce an aesthetic response in the viewer (Yang, 2008; Malov, 2010; Skwarzyński, 2019). Alan Moore defines GN as an expensive comic book and a graphic story serves as a medium to create a continuous present (Bernard & Carter, 2004). GN is termed as DGN (physical or digital) if it is a digital book or when the medium is digitized (Jamaludin, 2017). DGN provides learners the opportunity to learn in a medium that they are comfortable with. DGN combines story in a linear narrative, picture books through text, illustration, and dialog as a medium.

DGN is a visual narrative medium that tells stories by using multiple static images (known as panels) placed consecutively throughout the book (Segel & Heer, 2010; Cohn, 2019; Hefter et al., 2019). The technique of placing the images sequentially in each panel where the overall story progress, is called sequential art (Eisner, 2002; Pantaleo, 2018; Frie-sen et al., 2018). A story told through the use of sequential art is a graphic narrative (Kane, 2013; Moore et al., 2018; Rajendra, 2018). Sequential art (Eisner, 1985) is structured as a series of panels that deliver a story. These panels can remain as a single page or multiple pages. Eisner (1996) also created the term visual narratives, which are referred to as texts that carry stories through images and

words. Therefore, for RQ1, it can be summarized that DGN is a medium that conveys stories through its visual narrative presented in the panels using sequential art.

RQ2: What are the benefits of DGN?

In order to explore the above research questions, 31 studies were identified and presented as follows:

An image can Encourage a Reader/Learner to Read. Images in DGN can encourage read-ers to read the whole thing in the story. DGN makes learning facts easier by triggering the verbal and visual focuses of the mind at the same time. Besides, DGN also can improve and promote vocabulary acquisition (Neuman et al., 2019; Wong & Neuman, 2019). The visual support allows students to rapidly understand new words with their meaning. Putri (2019) states that DGN is not only entertainment but can be beneficial as a medium of instruction to a learner. DGN also is one of the instructional media for students, so the learning process can be more effective, efficient, and fun (Putri, 2019; Begoray & Brown, 2018; Golding & Verrier, 2020). It is believed that the benefits of DGN can serve as an exciting medium in teaching and learning. DGN benefits have been acknowledged by Gardner (2006) and as-serted that three out of seven human bits of intelligence can benefit from the use of GN. The three are linguist, spatial, and interpersonal intelligence.

DGN Improve Critical Thinking. DGN will help readers to sharpen critical thinking, dis-cover visual literacy, and encourage vocabulary acquisition (Newman & Ogle, 2019; Marlatt & Dallacqua, 2019). Most researchers agree on the importance of DGN in engaging kids in reading (Brenner, 2011; Kucirkova & Flewitt, 2020; Ortega, 2020; Cook & Kirchoff, 2017). The summarising text and images in DGN help children access complex stories. The com-bination of attractive design, color, and image offers students at all levels to engage in sus-tained reading (Fenty & Brydon, 2020). DGN is quicker to relay a message across. In fact, it has been claimed to be more attractive, appealing, motivating, and less threatening due to the usage of pictures. The pictures and images given in a solidly built storyline can help children and adults not only to reach an understanding of the content, but learn new vo-cabulary, progress with the narrative, and support text interpretation (Prensky, 2001; Hughes & Morrison, 2014).

DGN as a New Dimension of Learning. Crucifix and Dozo (2018) stated that the use of a digital screen for narrative in DGN becomes a new dimension of learning. Reading DGN, readers must actively decode text and images together to synthesize information. It will guide students to describe what was happening in the images and the evidence that led them to those conclusions (Brugar et al., 2018; Rosenberg, 2018; Barbre, 2019; Felsenthal, 2019). Besides that, this study also has an impact on the development of teaching methods and tools for teachers, parents, and children. They can apply the content in the DGN player where it can be used as a learning tool at home or in the classroom for formal or informal teaching and learning activities.

DGN can Build Visual Literacy. DGN also can build visual literacy. Visual literacy is the ability to interpret, negotiate, and make sense of the information presented in the form of images. Visual literacy is based on the idea of pictures that can be read and the meaning can be communicated through a reading process. Visual literacy involves making judgments of the accuracy, validity, and trustworthiness of visual images (Serafini, 2017; Basal et al., 2016; Grimm & Meeks, 2017; Wallace, 2017). The interaction between images and text in multimedia is an important component in understanding increasingly complex information. The use of colors, lights, shadows, and lines in the images also influence the tone and mood of the story (Lytga & Lyga as cited in Downey, 2009; Smetana et al 2009). DGN has the potential due to its visual nature that can provide a context-rich, high-interest environment for acquiring new vocabulary, contextual support, and clues to the meaning of the written narrative, help clarify the text and increase comprehension (Tibek, 2006; Smetana, Odelson, Burns & Grisham, 2009; Rosly, Rahim, & Halim, 2016; Hammond; 2009).

Give Positive Values in Learning. Gen-Y and Gen-alpha children are exposed to digital gadgets and they were often not motivated by simply seeing texts in textbooks (Linnes & Metcalf, 2017). They preferred graphics before texts. Hence, DGN player in local content is seen to be able to have a positive effect on children's learning. Razak (2013) found that there are five positive values of DGN on digital learning, namely student motivation, creat-ing meaningful learning, improving understanding, achievement, and student creativity. Hargadon (2019) states that DGN can motivate readers to desire to read and attract some of those reluctant readers as well.

RQ3: What are the aesthetic values and components in designing DGN?

Aesthetic values are experiences and features of their capacity to provide aesthetically valuable experiences. Aramugum and Ali (2009) cited that aesthetic value is a very domi-nant element in a work that includes the nature of beauty, whether natural or artistic and the nature of art, whether beautiful or not. Aesthetic value is first and foremost the value of a type of experience of conceptual art (Forsey, 2018; Goffin, 2019). The aesthetic value of experiences is subjective. Experiences have positive aesthetic value only if someone enjoys or finds valuable in themselves for some reason. Aesthetic values in designing DGN focus on an essential design principle that describes a design's pleasing qualities. Good-looking products and user interfaces are observed as more valuable and having more qualities (Jiang, 2016; Bleier et al., 2019). The aesthetics and its dimensions have been considered as per-ceived attractiveness (Leong et al., 2019), visual appeal (Zaibon et al., 2019), visual impact (McClanahan & Nottingham, 2019), and complexity, order, and readability (Abrams et al., 2019).

Aesthetics elements literature was developed by Nikolajeva (2005). The elements consist of aesthetic of author, aesthetic of work, aesthetic of genre, aesthetic of content, aesthetic of composition, aesthetic of scene, aesthetic of character, aesthetic of narration, aesthetic of language, aesthetic of medium, and aesthetic of reader. This paper will focus on the several aesthetic elements in designing DGN and this will be answering RQ3. Aesthetic values re-lated to designing digital content specifically for DGN are shown in Table 4.

Table 4

The Aesthetic Value in Designing DGN (Nikolajeva, 2005)

Aesthetic Value	Explanation	Components in Designing DGN
Aesthetic of Work	Interpreting the signs and their detail	Symbol, Text
Aesthetic of Content	Concept of work (related to the content of visual narrative)	Types of story/ narrative, Theme and motif, Image / Picture

Aesthetic Value	Explanation	Components in Designing DGN
Aesthetic of Composition	The plots of the story, how stories are made, the grammar of the stories	Up and down, Happy ending
Aesthetic of Character	Agents performing actions in a story: Person. Personified animal or object	Image / Picture (Gender of character), Speech Balloon (Internal representation / emotion / speech of character)
Aesthetic of Narration	The way a story is told	Narrative voice (Sound), Narrative Text (Text)
Aesthetic of Medium	Crossroads of different media: film, theatre, television, video, music, computer games, and so on. Three aspects of multimodality: illustration, transmediation, and translation	Text, Image/Picture, Panel layout, Color, Music

Based on the aesthetic approaches by Nikolajeva (2005), six aesthetic values were identi-fied. Each value can be applied in designing digital content specifically DGN. The values are aesthetic of work, aesthetic of content, aesthetic of composition, aesthetic of character, aesthetic of narration, and aesthetic of medium as aforementioned in Table 4. Only aesthet-ic of composition and narration focuses on visual narrative grammar (VNG) while the oth-ers focus on visual design dimension.

Researchers around the world had come out with various components in designing DGN. From several previous studies, most of the researchers stated that color, text, and panel are the most important component in designing DGN. Table 5 shows the resulting of the com-ponents of DGN gathered by this SLR.

Table 5

The Component in Designing DGN

References	Image / Picture	Text	Panel Layout	Color	Image Sequence	Hyperlink	Viewing Tools	Symbol	Sound	Format	Zoom	Speech Balloon	Video	Gutter
Poai (2020)	√	√	√	√					√			√		√
Pentury et al. (2020)	√	√	√		√	√			√					
Aggleton (2019)		√			√		√	√		√				
Putri (2019)	√		√			√			√				√	
Rengur & Sugirin (2019)	√	√	√		√				√			√		
Endarini (2018, November)		√	√	√										
Rajendra (2018)	√	√	√	√	√									
Rigaud & Burie (2018)		√	√					√						
Smith & Pole (2018)	√	√	√	√			√				√			√
Dunst et. al (2017, November)	√	√	√		√							√		√
Hasan (2017)		√	√		√									
Marianthi et. al (2016)	√	√				√	√					√		
Kirchoff & Cook (2015)	√	√	√	√	√		√					√		√
Moorefield-Lang & Gavigan (2012)	√	√	√	√			√							
Cooney (2011)	√	√		√	√									
Shipwright et. al (2010)		√	√						√	√	√			
Kelley (2010)	√	√	√											
Ponsard & Fries (2008)		√	√	√	√	√				√	√	√		

This review identified 18 studies related to aesthetic values in designing DGN as depicted in Table 5. The result suggests 14 components that could be considered in designing aesthetically appealing DGN; image/picture, text, panel layout, color, image sequence, hyperlink, viewing tools, symbols, sound, format, zoom, speech balloon, video, and gutter. Based on the 14 components, the text is the most important component of designing a DGN followed by the image/picture and the panel layout. Text is the easiest way to deliver information and is supported by images/pictures to improve the appealingness of the DGN. For interactive DGN, sound is one of the elements that need to apply to enhance the storytelling method.

CONCLUSION

The digital graphic novel falls under larger terms such as comic books, comic strips, and graphic novels. There are also researchers stating that DGN is a medium that combines images and words in sequential format to tell a story. Researchers around the world have identified various studies related to the benefits of DGN in education, motivation, critical thinking, and many more. There are a large number of the theoretical part of DGN and benefits cited in this study. The graphic novel (GN) can stimulate student interests and can be used in multiliteracies and support to employ multimodality in teaching and learning (Rajendra, 2018; Kirchoff & Cook, 2015). Almost 65% of people are visual learners (Vakos, 2013) and this makes the number of visual learners averages out to two-thirds of the world population. The previous study found that children of the new generation have different meta-cognitive and reflections towards learning and environment. Sabbah, Masood, and Iranmanesh (2013) state that visual representations in graphic novels can help school children who do not understand textual concepts commonly used in conventional education. According to Short and Reeves (2009), DGN can serve as one of the exciting ways that can facilitate learning stimulation for a new generation that revolves around television and the Internet. DGN can be a practical and effective medium for transferring knowledge (Hermann et al., 2012; Rigaud et al., 2015; Putri, 2019). From 98 studies analyzed only 18 sources that closely related to the aesthetic values and components in designing DGN. Researchers agree that aesthetic value is related to the experience and characteristics of conceptual art and in this case, it is considered equal to adding value and quality to DGN. These findings show that 6 aesthetic elements are connected to user experience (UX) and user interface (UI) in design such as aesthetic of work, content, composition, character, narration, and medium. Based on this analysis, there are 14 components identified as aforementioned. These values and components can help DGN designers and researchers to create an appealing design of a DGN. One clear finding of this study is that using text, image, and panel are regarded as the most important components in designing an appealing DGN. Other aesthetic values to be concerned with are the hyperlink, sound, zoom, and video. This study also has an impact on the development of teaching methods or tools for teachers, parents, and children. Practically, in further research, a specific analysis must be done to evaluate each aesthetic element found in this study and

this will reflect the theoretical part in designing an appealing design of DGN.

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