Computer-based art in folklore illustration: Development of mixed media digital painting in education context

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Abstract. Computer-based art has recently played a pivotal role in the artistic process of producing digital versions of visual illustration. One of them is the digital painting trends which becomes a new phenomenon in art practice in Indonesia, a transformation between engineering, aesthetics, and culture. This study aims to develop the creative process in mixed media digital painting in the project of folklore visualization as a computer-based art practice. This study employed a research and development design which was carried out by following steps: (a) defining, (b) designing, (c) developing and (d) validating. Trial of development results (mixed media of digital painting) were carried out to art students in the visual arts department of the Faculty of Languages and Arts, Semarang State University who were working on art projects within the scope of folklore illustration. The results of the study showed that the development of mix media digital painting was conducted by using software that is applicable to combine graphic design of bitmap and vector graphics, namely Corel Draw X7 and Adobe Photoshop CS6. The combination between bitmap and vector graphics in folklore illustration project can improve shape variation and artistic effect in digital painting.

1. Introduction

As we already know that art and technology are two entities that cannot be separated in the development of art practice in Indonesia even in the world since several centuries [1]. In the development of contemporary art recently, the existence of computer graphics as part of digital technology has increasingly given support to the improvement of fine arts media [2]. Many art researchers call it as the "new media of art", which is a transformation of art media from manual to digital [3,4].

One branch of arts that has made the most use of the digital technology improvement in the art practice is "illustration". Due to the rapid development of digital art, this paper wants to explain the use of digital painting with mixed media method. This study has not been widely explained in other articles, especially in the development of digital illustration. This paper aims to develop a mixed digital painting media by combining various graphics software to produce a more complete artistic effect. While the digital painting content is Indonesian folklore.

The development of mixed media in digital painting with a combination of various graphic software is rarely conducted and published. Whereas, the advantages of creating digital art will be more complex when using mixed digital media [5]. The interesting thing of creating the digital illustration works is to conserve the local wisdom content in the form of Indonesian folklore and the
use of digital painting techniques which is an application of act locally think globally. This is also the answer of various worries about the future of local wisdom and local art that are faced with disruption of computer and information technology. This phenomenon shows the existence of media transformation in fine arts, from old media to new media [6].

Digital painting technique in the development of digital painting is an adaptation of conventional painting techniques by using acrylic paint, ink, oil paint, and other tools. This technique refers to a variety of graphic software with a wealth of tools in the form of painting tools but in digital form [7]. The advantages of this technique make the painting much simpler. The digital painting has succeeded in making the work process faster and simpler. The media that are commonly used are Adobe Photoshop, Corel Draw, or Adobe Illustrator software, but they are still partial, it is not combined yet to obtain the optimal shapes variation and artistic effect.

An important discussion in this paper is how is the process of developing mixed media digital painting in the folklore visualization project as a computer-based art practice? The importance of this issue is because it must be explained interdisciplinary, namely from the art and technology perspective. The information media and graphics computer technology that are developing very progressively can be used as media of art education to support the success of work of art [8]. In the previous study, it has been proven that the use of virtual technology can improve the competence of fine arts because it can provide media access to work more widely and openly [9]. In addition, the access of information and computer technology in the form of digital painting software is proven to produce works more quickly, effectively, and efficiently [10].

2. Research methods
This study uses Research and Development design to produce formulas from a combination of bitmaps and vectors based two graphics software. The development of Mixed Media Digital Painting is used to produce folklore illustration works that have an artistic impression if it is compared to one graphic design media only. The product developed is a combination techniques of various graphic design media. The development procedure refers to the stages of defining, designing, developing, and validating digital art media experts [11]. The first stage was conducted through the study of features of bitmap and vector-based graphic design software. The second stage was the design of bitmaps and vectors merging through a combination of Adobe Photoshop and Corel Draw software. The third stage was the implementation of a combination of Adobe Photoshop and Corel Draw software in making digital painting. The development of mixed media digital painting was evaluated by experts. The evaluation becomes the basis for the implementation of mixed media digital painting in the educational context [12,13]. The results of the development were applied to the research subjects, namely five students majoring in art, Languages and Arts Faculty, Universitas Negeri Semarang who were working on an art project within the scope of folklore illustrations [14].

3. Results and discussion
The development of mixed media digital painting was conducted by using applicable software for graphic design, namely Corel Draw X7 and Adobe Photoshop CS6. Both of graphics software has different properties, namely using vector characters and bitmap characters. Based on the observation of the process, the combination of them got the desired artistic effect.

3.1. Results
3.1.1. Defining characteristics of vector and bitmap processing. Digital painting is used as a media to make folklore illustrations in the form of computer-based visual narratives. The combined graphics software provides a more free virtual space in painting. The creative process in creating folklore illustrations is integrated in the digital painting process. Vector graphics in digital painting uses a combination of points and lines to create a curve and uses a mathematical formula. The collection of points with line will then becomes a picture. Images that
use vector formats have good quality, even when zooming in or zooming out. The image will not break or blur, because vector graphics are images from a combination of points and sharp lines.

Bitmap graphics in digital painting are produced from a collection of dots or it is called pixels, each of which has a different color. After that, it is combined until the image formed. In general, bitmap images are often also called as raster. The value of each point of the image that uses the bitmap format begins with 1 bit of data or in black and white. The digital painting with a bitmap processing will have a greater value when colored.

3.1.2. Designing mixed media digital painting for folklore illustration. The mixed media digital painting design starts from mapping the main features between bitmap and vector-based graphics software. Tools in Corel Draw X-7 used in digital painting including: (a) pick tool, (b) shape edit tool, (c) crop tool, (d) zoom tool, (e) freehand tool, (f) smart fill tool, (g) rectangle tool, (h) color box, and (i) ellipse tool. Tools in Adobe Photoshop CS6 which are grouped including: (a) lasso tool, (b) move tool, (c) crop & slice tool, (d) healing brush & patch tool, (e) marquee tool, (f) quick selection, (g) magic wand tool, (h) eyedropper, (i) color, (j) brush and (k) pencil tool. See the Figure 1 for the use design of combination of vector and bitmap-based graphics tools.

![Visual Illustration:](image)

**Figure 1.** The use design of tools combination.

Mixed media digital painting engineering is designed by combining the advantages of each digital software tools. The excellent vector-based tools in Corel Draw X-7 software are used to engineered outlines and verbal text inclusion for narrative content. While bitmap-based tools that are used from Adobe Photoshop CS6 software are used to process images, coloring, shadowing, and sharpening of folklore illustration character. In addition to combining bitmap tools and vector tools, mixed media engineering can also be done by changing the bitmap format to vector format by: (a) selecting images / image bitmaps (b) editing images in Photoshop, (b) saving photos in JPG format, and (c) importing images to Corel Draw to convert images to vectors.

3.1.3. Developing folklore illustration by using mixed media digital painting. Folklore illustration was developed through several stages. The development begins with the making of folklore characters, story content, and visual illustrations. Illustration folklore tries to transform verbal narration into visual narration, from the content of heritage folklore of the archipelago (Indonesia). The creative process is very important in artworks [15]. The creative process of creating a digital illustration begins with the determination of the characters taken from folklore figures. In this process, the storyboard is closely controlled. The creative process is related to the expression of inspiration, artistic exploration through the use of graphic tool effects, and fantasies to add artistic impression [16,17]. Thus, it can be emphasized that the creative process in digital illustration can develop if it is supported by a virtual
environment with the availability of media facilities (tools, materials, techniques) in the form of computer graphics and tools that can be used for painting. The creative process can also develop if we have the competence or skills to operate graphic design software.

An example of a visual illustration process by using mixed media digital between vector graphics and bitmap graphics is done according to the following steps (see Figure 2):

1. The rough outline stage uses vector graphics in Corel Draw X7.
2. Import file vector to bitmap in Adobe Photoshop CS6.
3. The basic coloring stage uses bitmap graphics in Adobe Photoshop CS6.
4. The stage of giving dark-light and detail in Adobe Photoshop CS6.
5. Finishing touch stage.
6. The stage of giving verbal text and layout in Corel Draw X7.

Figure 2. The process of visual illustration uses mixed media digital.

The process of making sketch digitally in Corel Draw X7 software with A3 canvas size. After sketching is complete, then export the file to the JPEG version to proceed to the digital coloring.
process by using Adobe Photoshop CS6 software. Before coloring, separate the line art layer first with the background layer. Setting the art line for vector-based sketching, it is shown in Figure 3 below.

![Figure 3. Art line settings for vector-based sketching in Corel Draw X7.](image)

The images that have become digital files are then colored by using a computer. After the sketch of the characters and background is completed, then the coloring process is done. Coloring can also be strengthened by using a computer with the help of the Paint Tool SAI with a tablet pen tool. The coloring starts by giving a basic color. Then give details of the dark light colors on each object. The coloring is done by setting the backup layer, activating the Brush tool, then scratching the layer to give color to the illustration image. We can also combine brush sizes as needed.

3.1.4 Expert evaluation of digital painting with mixed vectors and bitmaps. The evaluation of the results of digital art experts is used to improve the quality of work development. The comments or suggestions from digital art media experts are very precious for the development of digital art works. According to media experts, the work of digital illustrations produced has outperformed the ability to achieve manual techniques that uses brushes, canvases, and paints. Artistic effects caused by a mixture of bitmap graphics and vector graphics can improve the work. The evaluation results show the quality of content, artistic effects, and display works that are very good.

3.1.5 The trial of mixed media digital painting in visual illustration. The results of the mixed media digital painting method development were conducted to 5 students of the Fine Arts Department who were working on an art project with the concept of folklore illustration. The results of implementing this method show that mixed media digital painting by combining bitmap graphics and vector graphics is considered in good category by students. The effectiveness of using mixed media digital is known by improving variations in the forms and artistic effects of student work reaching 10% rather than using only one type of software. So, mixed media digital painting is good to be used in digital painting.

3.2. Discussion

3.2.1. Mixed media digital painting in illustration folklore. Folklore and technology are two contradictory entities [18]. Folklore has classic characteristic and it is oriented to the preservation of the past, while technology is progressive and future-oriented. Research and development of visual illustrations for Indonesian folklore has the idea to conserve local folklore to be published globally, the
digital technology and information as the media. The digital art creation gives artists broader access to be able to develop smoothly in concepts, processes, and exhibitions through the exploration of computer media to show its maximum potential [19]. A folklore entitled Aji Saka which tells about a strong young man who lived in the village of Medang Kawit. He has two very loyal helpers named Dora and Sembada.

3.2.2. Creative process by using digital painting. In creating illustrations with digital painting media, the best software to be used is a combination of bitmap graphics and vector graphics. Its implementation can be applied by using a combination of Adobe Photoshop and Corel Draw software. Adobe Photoshop is preferred to be chosen because this software is bitmaps based, so it is well for making illustration images. Bitmap images are composed of many picture elements in 2D form. Many or few picture elements usually affect the quality of an image. While the use of Corel Draw can sharpen the effects of outline, object fields, and placement of verbal text as part of folklore.

3.2.3. Digital medium in visual arts and educational context. The field of arts and education nowadays is not only limited to painting, sculpture, design and craft, but also extends to technology and visual communication [20]. Thus, the arts and art education cannot avoid in confronting digital-based computers and information technology. The question is, should young artists be able to accommodate the development of digital technology in art production?

The arts and education field must have an open mindset towards the development of civilization [21]. Art and education in the era of digital technology must not be limited to manual or conventional art media, namely brushes, oil paints, watercolors, pencils, and pastels. Art education must be open to the novelty of digital visual culture. For example, expanding the technique with computer graphics software programs that combine bitmap graphics and vector graphics.

4. Conclusion
The development of digital painting should not be limited to the use of one media, but must be mixed digital media. A combination of artistic effects from bitmap graphics and vector graphics is recommended. In bitmap engineering, images in the form of photos taken from digital scans have the format Tiff or Jpeg. While vector graphics process images of lines, curves, fields, fill mathematically. The change of the vector images components (lines, fields, etc.) to either enlarge or reduce the size, rotate or flip can help to improve image quality. Combining bitmap images with vectors correctly and precisely will produce a good design work. Digital painting mixed media as a technique that is carried out from the process of making rough sketches, clean ups, solid colors, dark colors, detailing, then finishing which is done on a computer by using the help of software/ applications. Of course the making of illustrations of folklore figure Aji Saka uses a variety of relevant references so that it is expected to not be separated from the characteristics of this figure. The implementation of mixed media digital painting is quite effective in improving the variety of shapes and artistic effects in the process of creating digital paintings for folklore illustrations. I think this is worthy to be recommended in the arts and education field in the industrial era 4.0.

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