# Analysis of Memory Usage for Graphic Design Applications on Windows and Linux Operating Systems

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| A R T I C L E I N F O | A B S T R A C T |
|---|---|
| | The operating system is the most important software on a computer, currently there are several operating systems that are very commonly used in the world of work including Windows, Linux. With these various options, users need to know the characteristics of the OS in running graphic design applications with efficient memory consumption. One of the papers that will be used as a reference in analyzing the OS is a paper with experimental quantitative methods. Referring to the paper, this research will use a quantitative approach with experimental methods, the testing phase is by running a graphic design application on the same hardware but different operating systems, from the experiment a value will be obtained in the form of memory usage numbers when running the application then calculations are carried out using a table. comparison to see which one is more efficient in memory usage, from these results it will be concluded that the characteristics of each OS have their respective advantages and disadvantages. |

## 1. Introduction

The operating system is the main software in a computer, with the operating system the user can interact with the computer and process data according to the desired purpose, with the needs of these users, several operating systems appear with their respective advantages and disadvantages. Among the computer systems that are often used by users are Windows, Linux. With some of these options, the user must choose the operating system that best suits his needs, especially in the world of work/office.

One of the problems that exist in the office world is that workers get PCs with low hardware specifications, while having to run several applications simultaneously to support work, related to this it is very important to analyze the effectiveness and efficiency of an operating system on memory usage in processing applications that are often used for office purposes. By analyzing the memory usage on each OS it will be known the characteristics of each OS in running a program.

The method that will be used in this paper is a quantitative with experimental method. These operating systems (Windows, and Linux) will be experimented with processing the same application and the memory consumption consumption for each OS will be measured and compared with the Quantitative method. After knowing the consumption of all OS in processing applications, it will be known which OS uses the lowest memory, the characteristics and advantages and disadvantages of each OS, all of which will be very useful in selecting the most suitable OS for use in the world of work/office.

## 2. Method

The method that will be used in this research is experimental quantitative. This method is very effective for data collection in order to measure the influence or effectiveness of a tool, media under certain conditions (Bungin, 2005:148). This method will perform a series of experiments on all OS in processing several

applications that have been determined in relatively the same treatment

## 2.1 Research variable

Research variables are everything that will be the object of research observation. The understanding that can be taken from this definition is that in research there is something that is targeted, namely variables. So that the variable is a phenomenon that is the center of research attention to be observed or measured. In this study the variables used are

## 2.2 Inkscape

Inkscape is a vector image editor software that is free software under the GNU GPL license. The main goal of Inkscape is to be a state-of-the-art graphics tool that complies with XML, SVG, and CSS standards. Inkscape is multilingual, especially for its interface and complex scripts, something that is often overlooked in most commercial vector graphics editors.

## 2.3 Krita

Krita is a free and open source software for raster graphics editor, designed primarily for drawing, painting, and animation. Krita has a simple interface, advanced OpenGL canvas acceleration, color management, advanced brushes, non-destructive layers and masks, layer group management, vector support and switchable profile customization. Krita can run on Linux, Microsoft Windows, and macOS.

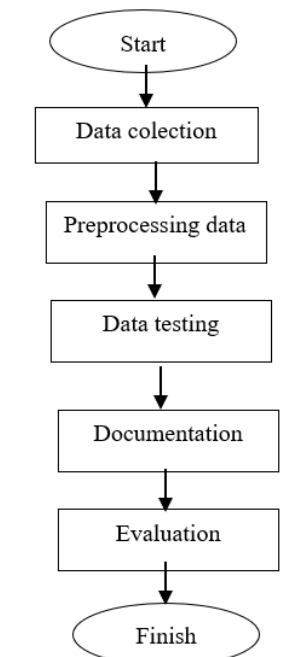## 2.4 Stages of the experimental quantitative method



**Fig 1.** Stages of the Experimental Quantitative Method

## 2.5 Data Preprocessing

Due to the difficulty in installing different OS in one hardware, the experimental stage of each OS is run on different hardware, with the following specifications

a. Windows OS
   Processor: Core i7-5600U 2.6 GHz, Ram: 8 GB, HDD: 500 GB
b. Linux
   Processor: Core i7-5600U 2.6 GHz, Ram: 8 GB, HDD: 500 GB

The graphic design applications used were selected based on the level of compatibility on Windows and Linux OS, namely Inkscape and Krita. In the Experimental Quantitative method using calculations with the following formula:

Sigma Notation (Summation)

$$\sum_{i=1}^{n} x_i = x_1 + x_2 + \cdots + x_n$$

i = index of summation

n = upper limit of summation

All OS will be tested by processing the specified application, the results will be summed with the Sigma Notation above.

## 3.    Result and Alalysis

After all the tests (experiments) of processing the predetermined program are carried out on two operating systems, the data processing stages will be carried out as follows:

a.    Collect all data on memory usage processing programs running on two operating systems.

b.    Placing all data in a table that can represent the memory usage of the program being tested.

c.    Summing up the total memory usage of all programs according to each operating system and averaged to see the overall results.

d.    The results of the data processing will describe the average consumption of the operating system in processing the two programs.

The results of testing the two programs on all operating systems and data processing by adding up and finding the average are stated in the table below.

**Table 1**
Comparison results

|  | Windows | Linux |
|---|---|---|
| Inkscipe | 118.2 | 69.6 |
| Krita | 605.4 | 632.1 |
| **Sum** | 723.6 | 701.7 |
| **Adv** | 361.8 | 350.85 |

Note: RAM consumption uses units of MB

From the data above, we get several results and the average consumption of the tested applications, based on the order of smallest - largest as follows:

a.    Linux: Total 701.7 MB, Average 350.85 MB

b.    Windows: Total 723.6 MB, Average 361.8 MB

From the above data that has been processed describes the characteristics of each of the operating systems, in addition to obtaining the overall average of memory consumption on the operating system.

On Linux, it can be seen that the use of inkscippe applications processes the lowest memory consumption, while on Windows it has a lower memory consumption consumption for critical applications, it also illustrates that the Windows GUI in running applications is greater than Linux.

## 4.    Conclusion

Based on the results of tests carried out on two programs by considering the compatibility of the two operating systems, a set of data is obtained that describes the memory usage in processing. Linux has an average memory usage of 350.85 MB, for Windows the average memory usage is 361.8 MB. Based on the data above, it can also more or less describe the characteristics of each operating system, such as Linux with a GUI that is lighter than Windows. Based on all that, it can be a reference for using the operating system as needed in processing a graphic design program.

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