Utilization of Computer Aided Design Software as a Visual Simulation

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Abstract – Software is known as one of the components found on a computer. As a software, computer-aided design can be used as a tool to realize ideas. In the process, to be able to realize the idea, it is necessary to have a visual simulation as an aid to be able to see conditions that are able to represent the results of the ideas made. By using qualitative descriptive methods. this research will be useful to be able to provide information to users of computer-aided design software as a basis for using software to produce visual simulations. Computer-aided design software in its development can help users to be able to see the condition of a design in a form that represents the original shape. and also can minimize the use of real prototypes to deliver design results.

Keywords: devices; software; computer-aided design; simulation; visual;

INTRODUCTION

Today's computer devices have progressed in terms of improving technology in them. Because at this time, its existence has touched on the design process in terms of images. At present, drawing techniques using conventional methods (manual) which are included in the 2-dimensional drawing technique have been largely abandoned due to the shift in the making of a model in 3-dimensional form. Also known, 3-dimensional form modeling has provided benefits such as the existence of real visualization of design and objects designed such as design errors (design) can be known and prevented from the beginning.

Software known is "an integral part in hardware or hardware". In general, software interpreted "as a set of electronic data stored and regulated by a computer in the form of program or instructions to execute and execute the command". Software is "a collection of several commands executed by a computer machine in carrying out its work. And can be used as a note for computer machines to store orders, as well as documents and other archives."

Based on the meaning of the word, Computer Aided Design can be interpreted as "computer-aided design". Computer Aided Design or what is known as CAD is "technology related to the use of computer systems to assist in the creation, modification, analysis, and optimization of design (design)". And interpreted as "everything related to the design (design) whose process is assisted with a computer". If talking about design as an activity. There are several processes that need to be known such as starting from collection idea, make a sketch (concept), make model, make picture detail, analyze the design, make simulation and animation. And in its development, these activities can be helped by a computer.

Simulation is known as "one of the numerical techniques for conducting experiments on a digital computer, which in it contains a number of mathematical and logical relationships needed to describe the structure and behaviour of complex real-world systems in a relatively long period." (Watson, 1981: 10). And it is also known that simulations can help humans to be able to know the initial process to the end of a condition. Because not all experiments or observations made by someone can be directly carried out. So, it is necessary for the use of artificial models of experimental object designs.

In the development of technology that is increasing (modern) as it is today. Simulation techniques have often been carried out so that humans can act like people who are in the desired state. Simulation is intended for someone to be able to apply like a thing that is intended with the aim that someone can feel and be able to do something. Because Humans are known to be "visual creatures" which in the sense "can easily get information by seeing something that moves and looks and feels.

The visual simulation consists of two words that have their own meaning if separated. Simulation is interpreted as "a way to duplicate/describe the characteristics, appearance, and characteristics of a real system. The initial idea of simulation is to mimic real-world situations mathematically, then study the nature and operational character, and finally make conclusions and make results-based decisions". While visual originates from the Latin word " evidence" which is interpreted as the word "see" and then adopted into English " visual ". The visual word is defined as "everything that can be seen and responded to by the human sense of the eye." And visual simulation is defined as "media to convey ideas and concepts in digital form that are portrayed so that they can be seen and can be representative of a real condition.

Humans as creatures who need information, need to exchange or share information with other parties as their needs. One form of sharing or exchanging information is communicating ideas or concepts. So, it is necessary to use technology that is developing at this time. And one of them is by utilizing software that is able to provide visual simulations to humans who see it.

One form of advancement in computer technology in terms of simulation is the presence of computer-aided design software. Along with its development, the software has created a simulation of real life but with some adjustments available. As there is assistance to the designer of the design object that is able to create an atmosphere in the form of digital or virtual so that it can help minimize errors that will occur in the object of the design.

LITERATURE REVIEW
In its application, the drafters and drafters have weaknesses in their ability to communicate ideas. Not a few designers who are not able to communicate the design properly because many of these parties do not ignore their ability to communicate. At first, to know a condition, one can only realize it through the capture of the sense of sight through a film in the form of a moving image. So it is necessary to have a condition that is able to present an atmosphere so that it can be known.

Simulation is "a condition when mathematical solutions are inadequate then an analytical solution is needed from a system that is used to solve problems in life that are uncertain, using a particular model or method and emphasizing the use of computers to get a solution." (Ibid: 11) So that there is a need to be able to communicate an idea or idea better and can present a situation. In its current development, communicating ideas or concepts has very broad goals because of the various kinds of goals implied and often hiding behind the main purpose. In addition, by utilizing computer-aided design software can be an option to be able to develop and communicate ideas.

The simulation method is one of the methods used in delivering ideas. The process of delivering ideas by utilizing simulations now tends to object that are not in the form of objects or actual activities, but activities that are training. In current developments, simulations can be done by anyone. Because in its implementation, simulations tend to provide knowledge in the form of skills to determine the actual conditions. So that there is a need for expenditure that is not small to be able to present a condition that is appropriate and appropriate as happened. Because it needs to be emphasized that visual simulation should have a condition that is spontaneous, and easy to make and can accommodate designer ideas with available and affordable equipment.

From the existing problems, the formulation of the problem in this study is:
- How to use computer-aided design software in design
- How can computer-aided design software be used as a visual simulation

METHODS

This study uses a qualitative descriptive research method because this study aims to "uncover facts, circumstances, phenomena, variables, and circumstances that occur when the study goes and presents as is".

It is known that qualitative descriptive research is used to "interpret and tell the data concerned with the current situation, attitudes and views that occur in the community, contradictions 2 conditions / more, relationships between variables, differences between facts, effects on a condition, and others - other. the problems examined and investigated by qualitative descriptive research refer to quantitative studies, comparative studies, and can also be a one-element correlational study with other elements. "This research activity includes collecting data, analyzing data, interpreting data, and ending with a conclusion that refers to the results of the data analysis.

Variable

Research variable which is an attribute or nature or value of people, or activities that have certain variations determined by researchers to be studied and drawn conclusions (Sugiyono, 2012) In this study, measurement of the existence of a variable by using research instruments to look for the influence of a variable with another variable. The research instrument used is to use observations in conducting usage studies that include interviews with individual or group software users, and literature studies to find limits on using the software, so it is possible to determine the research topics

RESULTS and DISCUSSION
Computer Aided Design Software

Computer Aided Design (CAD) or can also be interpreted as "Computer-aided Design" is one method in the use of computer technology to help make a design, especially designs that are technical or like technical drawing. Can be in the form of parts or the whole. Both in the visual context (images) are included symbols with communication-based methods that are included as "special conventions" for the technical field.

It is known that software is "electronic data that is stored in such a way by a computer that can be a program or instruction that will be executed by a command or a record which is needed by the computer to execute the command run it. "In its application, to achieve these desires it is necessary to design a logic arrangement that is arranged to be processed through software, which is also called the program along with the processed data.

Processing software involves several things, including the need for operating systems, programs, and data. It should be known, that the software provides settings in such a way that the logic that exists can be understood by computer machines.

Figure 1. Computer Aided Design and Design

Moment this, function of Computer Aided Design (CAD) is considered "vital". Because of CAD felt very helpful in making a design an object faster compared with manufacture the design is done manually. Computer Aided Design (CAD) as computer software used for drawing something object or the part is in the form picture 2   d immense and picture 3-dimensions. An object that wants to be portrayed as stemming from a design that has no can be represented by mean certain.

Computer Aided Design (CAD) is known to be a development that originated from as a table image as a way to make a design (manually) and now the function has evolved soft computer aided design that integrated with computer devices.   With integration that, it is possible to visualize

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component and part of the design that made in a manner "Realistically s" and is included with some supporting elements of a draft like period, volume and centre gravity, large surface. By using computer hardware, it is believed that with CAD software errors in the design process can be minimized, which is means work results can be optimized.

Computer Aided Design as application software

Computers as a unit in the form of a device cannot be separated from the parts contained in it there is a software and hardware as a component to form it. The existence of these two devices is because it is an important part of the computer itself. Because of the absence of these two devices, the computer can't be used even cannot be said to be k computer. The computer is known as "Electronic systems" early y g has a function as a tool used to " Manipulate data " quickly, and accurate and designed and in organizing automatically to be members ma or store data in the form of inputs, which is then processed to produce output in an oversight of some steps or the instruction program y an g stored in the memory.

The software is one of the devices contained in a unit k computer that presence to help users to perform a specific task such as creating documents or reports, manipulate photos and even designing an object. The use of software commonly used by anyone to help her work for the unit k computer can run the device for computer is able to run the software. This is because, in its development, the software has minimum specifications that must be contained in the unit k computer as a place to use it.
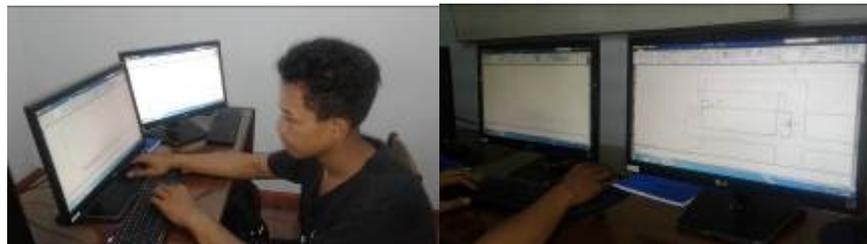

Figure 2. CAD devices and computer devices

Application software cannot be separated from several types of builders and functions such as software intended for entertainment, education, business or special software and work productivity. Although the software contained in computer units will tend to be used for supporting work productivity which provides a very beneficial role for "optimization of work quality".

Computer Aided Design (CAD) is software that is directly made by a group of programmers tailored to one's needs or for groups usually using the help of a programming language to be able to use it. Computer-aided software design aims to perform specific human activities such as designing.

The design that refers to the concept of software computer-aided design is software that is specific in nature to help work such as drawing a design so that it can be communicated to certain parties to be realized into a scale model object and even a prototype. Computer-aided design software can not only be a producer of an image if it is used more. But it can also be a communication suggestion from the designer to the maker because there are several "languages" used in various jobs so that it can be a medium to convey messages about an object of design.

Genuine soft computer-aided design as an application for supporting work

A software application is currently considered very important for those working in the field of design. From the software that functions to design that begins with the determination of ideas and brainstorming and development, the process of determining images, initial and final briefings, is greatly helped by the software.

Application software places more emphasis on functions and "practical benefits". Because its use tends to lead to practical practices carried out by humans to support their work so that it can be better in terms of the results that have been made.

Figure 3. Computer Aided Design as supporting work

As one of the supporting insides Be working, software computer-aided design can provide benefits for "work quality optimization". Because by mastering an application device immediately it can be considered lighten the work, even by mastering software in the form of the application can also develop the abilities and skills if trained in stages. In addition, assuming computer-aided design software can indirectly create an opportunity as follows:

- More flexible design results.
With computer-aided design software, the design process that is carried out will obtain the flexibility of the design results and lower production costs per unit as in mass production. With the software contained on a computer, it can be used to handle various kinds of complexity that are a problem, because computer devices will store in a database that was originally created so that these results can be used automatically and can be produced. In addition, the existence of software can also be made files that have been developed again from the existing ones.

- Speed in responding
Computer-aided design software can be used to speed up the design process in a "Manufacturing cycle". This is usually found in the response speed in the design that comes from drawing, testing and prototyping change in design object.

- Quality improvement and lower production costs
It is known that by utilizing a computer-aided design software, m utu will be improved by the use of computer-aided design software because various kinds of errors can be known earlier so that it affects the decreasing costs incurred if something goes wrong.

- Minimize the making of a physical prototype
It is known that often in the design, an object needs to their prototype pe in physical form in the process. In addition, often in its application, the prototype is tested to find out its strengths and weaknesses. So it is necessary to have time and costs to find out.

- The emergence of new experts
In its use, experts are needed to be able to minimize various kinds of errors that occur in a design process. With the use of experts, it can indirectly become the development of knowledge that is owned by someone because it is obligatory to be able to use software so that it can assist in completing work.

Computer Aided Design Visual Simulation
Computer-aided design software is known to have been used on computer devices that can help various parties engaged in the design field or in other words people who have designing activities. The design in question is the activity of making a design in a flat two-dimensional form and developing into a three-dimensional design.

Not only as a tool for designing, but the functional computer also aided design software can be a place to store design data which is then developed. As one tool that can be used to make a design. Computer-aided design software is not only limited to one particular size so that users of the software have a large enough area to develop their ideas. Even with several methods used, the software can store not only one unit of design but also can store various components that are part of the design.

Figure 4. Computer Aided Design and Design Simulation

Nowadays, the use of computer-aided design software is more emphasized on its use to redraw the results of ideas that have been refined. Even used to make a design that has a definite size. But by not closing the possibility as the development of several features, the software can be another option in the design process. Because nowadays, computer-aided design software has been used to be able to help with a "technical process" and conceptual design and layout, through engineering phases accompanied by component analysis in a manufacturing process.

In the process of engineering-based production. Computer-aided design software is aimed at the use of computers to be able to convert the "initial idea" design into a detailed design. Changes contained in detailed designs, usually include the making of "geometric models" of designs that are analyzed and developed (manipulation) and even refined. So that it can be an opportunity to need to be made a simulation before the design object is realized. Because computer-aided design software, the visual form of the design used requires visualization of the design that can represent so that it can communicate the information that is in the design.

The interface between users and software

The utilization of computer-aided design software is found in the phase of refinement of ideas carried out by the designer. The results of this phase are an analysis of the form obtained by adjusting the shape to a predetermined size. The use of the software is done by using a computer device to produce "geometric models" that can be used as databases. The model is used as input to make details of the design.

From its application, it is known that the use of computer-aided design software is the development of the technical drawing phase, which is intended to draw apart "geometrically" to find out the form obtained. In addition, computer-aided design software can also be directly used to store some parts that have been drawn to be used or developed as basic capital in designing.

The interface that occurs in software computer-aided design is the relationship between software users with their own software that is included with computer devices as a medium to do their work. The work done with the software is indeed tailored to the desires of the designer. Although at this time it is still limited to minimizing errors in work drawings. But with the features provided, it is possible that there will be the development that can be done by users of computer-aided design software.

Figure 5. Relationship between the designer and the design

The relationship that occurs between humans as designers with computer-aided design software is the relationship between the designer and the design. Which is intended to provide information to software users regarding the form to be obtained or produced in accordance with the wishes that are limited by size adjustments. In addition, with the existence of this information, users and designers can find out further needs before the desired form can be realized. Because with this relationship, in its application, the shortcomings that will occur at the prototype stage can be minimized.

Visual simulation interface

Computer-aided design software is known to require technological devices in the form of computer devices that can be represented by digital terms. Which currently functions as a medium or media for designing and producing. The involvement of the software functioned as one of the stages in designing activities by utilizing humans as users. So, there is a need for a language that can be understood by both parties, namely users and tools.

Visual simulation is known as one of the alternative media giving information to enable the delivery of an idea or concept even an object that was originally abstract in order to become more real. Real, in this case, needs to be explained as a clear and visible form. Therefore, in the context of visual simulation, the strength is in the results that can be represented by clear visuals.
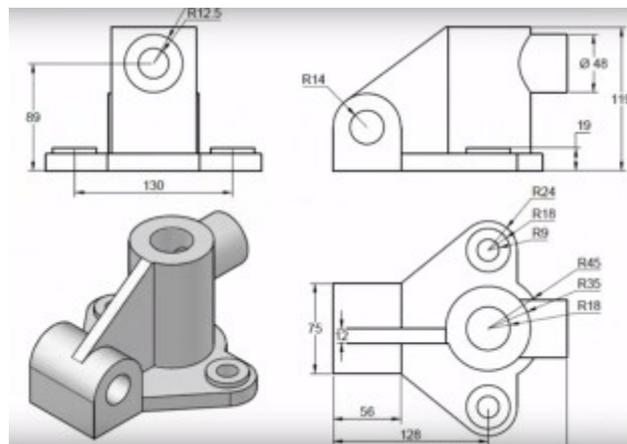

Figure 6. Computer Aided Design and modeling

The use of computer-aided design software is intended to answer the needs found in the case of 3-dimensional modelling, one of which is to discuss construction. This is because the designer cannot know exactly the obstacles that will occur in the case. Because besides the need for a 3-dimensional model that can represent it in real terms. So, with computer-aided design software can help to provide the information needed by the designer.

With these considerations, it does not mean that the software can fully represent the 3-dimensional model of the object designed. Therefore, the software still has deficiencies such as the results of the depiction that will look complicated because of the line of objects that overlap each other

and the need for human resources who can understand and have a good imagination to be able to imagine a 3-dimensional object as a whole even though in the form of vision 2 dimensions.

Drafting and simulation

Drafting is known as one way for communication in technical principles or often as a technical drawing as a design process in its context as an effort in technical terms. In its implementation, drafting can be done in a 2-dimensional form and developed into 3-dimensional forms. In 2-dimensional form, shapes that are made in a flat shape and can only be seen from one side. While for 3-dimensional shapes, it can be projected from various sides. But by referring to several rules that have been applied in the technical field as represented by projections seen in the right corner.

Computer-aided design software is known to help the design process because in this case the design of an object is assisted by using computer assistance. With the help of computer design, drafting a design can be made by applying several commands and can also be attached to some of the necessary needs such as resilience and needs (use) of materials, as well as other information related to the object design being made.
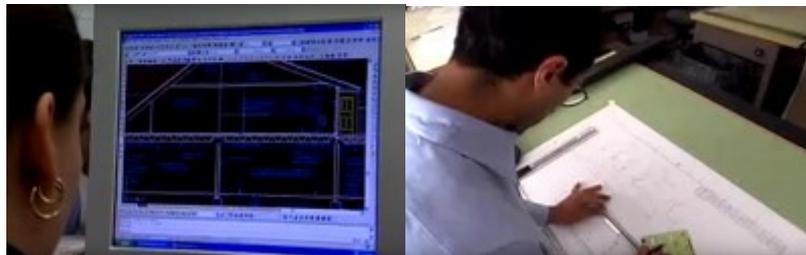

Figure 7. Relationship between drafting and Computer Aided Design

In applying drafting techniques using computer-aided design software, it is necessary to have 2 components needed, namely the design drawings that have been selected and computer devices that already have computer-aided design software. By using these two components, the drafting process can be developed into a number of processes such as developing design drawings, regulating, and controlling machine work (tools) in the production process flow.

In addition, with computer-aided techniques as the use of information technology to support tasks in the technical field. The use of computer-aided design software has a constant image quality because it does not depend on a person's ability to draw it like manual drawing. And it is known that it can be relatively faster and more accurate if the user knows the technical specifications of the object designed. In addition, finished objects can be developed or changed (added to less) objects without having to start (repeat) from the beginning.

As a process, visual simulation in the drafting stage requires communication by the party (user), therefore in the process of the stage there needs to be a storage area for various information made by the "drafter" so that it can be used repeatedly and can be developed quickly by the parties who have the authority and knowledge of the object of design. So that it can be more practical to document and be understood by parties related to technical production.

Computer Aided Design Software as a Visual Simulation

Computer-aided design software is closely related as one of the devices used for the design field. The presence of the software dates back to 1960, which was a development of computer software called " sketchpad " which was used to create images. Sketchpad software is software created by an engineer at the time named Ivan Sutherland. The presence of sketchpad software caused by the desire of the character to be able to display images or sketches on a computer screen. And based on its existence, today there are not a few industries that use software that is able to present images on a computer screen. And one of them is to use computer-aided design software. introducing a computer program that can be used to draw sketches.

The application of computer-aided design software begins by presenting 2-dimensional images which in drawing apply only the use of straight and curved lines and apply some geometric shapes

which when making it require knowledge of mathematical formulas of a form. And along with its development and caused by a takeover by an "Autodesk" company in 1982 the software "sketchpad" has become computer-aided design software by adding features to draw objects into 3 dimensions. And since then, there are now various kinds of software with the concept of computer-aided design with various additional features without reducing and even eliminating the main function of drawing 2 or 3-dimensional objects.

The use of computer-aided design software at this time in addition to experiencing developments in terms of features. It has also developed through its ability to utilize other software so that it can become a unit that can be one software that is able to help a person or group to be able to realize their ideas so they can become real. So that it can directly provide information in the form of simulation to its users in understanding fully about the object that will be or is being designed.

As one of the media used to create simulations, computer software aided design has directly provided visuals to be able to help users see the conditions that will occur in the object design. On the one hand, the software is required to have the power that is able to provide information to users so that the user can understand the advantages and disadvantages of the object design. Because until now it was known that there were difficulties in developing objects in 2-dimensional form into 3-dimensional shapes. Especially in the case of designing a framework on 3-dimensional objects. Although it is also known that the description of the 2 or 3-dimensional design will be in accordance with the wishes or needs of the designer.

In applying a stage so that it can be a visual simulation process, it is necessary to have several steps that need to be applied by the user so that visual simulations can give results in the form of good communication to users such as the search for ideas and concepts related to objects produced based on what is learned known) to be selected so that it can be communicated through visual simulation. The success of the visual simulation display is related to the display of design objects and the reference results used. So that the design is in accordance with the wishes of the designer.

In the context of visual simulation, there are also difficulties in knowing certain parts that are made separately so that there needs to be a short statement that can communicate images with the designer and the guidelines needed to make the information contained in the visual simulation made well conveyed.

Visual simulation can sometimes also be used to test design objects before making prototypes of objects. This is intended to be able to minimize errors that can occur in the prototype. Such cases are more emphasized on design objects that have large dimensions and will be fulfilled by humans such as in the case of buildings, bridges or airplanes. This is because the object must be made "perfect" and requires a cost that is not small at the time it was first made. Even though the need for prototype objects cannot be eliminated, the visual simulation function is intended to be a prototype need what is needed will be reduced before full production of the object is carried out, and in other words, can save time and costs.

CONCLUSION

There are several applications related to basic technology from the use of computer-aided design software that can eliminate or reduce the need for manual-based designs even to make prototypes traditionally. By utilizing the database system contained in the software, it does not necessarily replace the manual process. Because as one of the supporting tools, the computer-aided design software can be one of the aids that can be utilized.

Changes from the use of computer-aided design software to present a visual simulation method can be an added value possessed by the software. Because with the software, the necessity of making a prototype in real terms that requires little cost can be minimized. Because directly the use of computer-aided design software can be increased to take advantage of its advantages such as the use of graphical simulations, mathematically in making a design object.

Simulations that use computer devices can replace working methods to be faster and cheaper and can also be close to the accuracy that is in accordance with the need for design components. At

present, computer simulation is considered as one way before producing the final object. Even though in practical conditions, simulations that utilize computer devices sometimes have to force experts to try and understand practically what is happening behind the design object's performance.

As one method in mastering the design that is made, in its development there needs to be the knowledge that can increase the ability to be able to master software, especially a computer-aided design. Therefore, with the addition of knowledge by someone, directly there will be additional capabilities, especially design.

There needs to be a component that can support computer aided design software so that it can be better to be able to help a designer to get the design results closer to real conditions. So that it can minimize the doubt of an object that is designed because it can directly minimize the use of real prototypes that require not a small amount of cost.

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