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3D CHARACTER MODELING IN MAYA AND BLENDER

BY

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3D CHARACTER MODELING IN MAYA AND BLENDER

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ABSTRACT

Two 3D modeling programs were compared with various models, and shapes, to determine the most efficient program for students, and professors. The two modeling programs included in the research were Autodesk Maya (Maya) and Blender. Maya and Blender both provide various assets for modeling. While they are very similar, it was concluded that Blender is preferred over Maya for individuals beginning to learn 3D modeling. Meanwhile, Maya is more beneficial to those who are more experienced and seek to acquiesce skills for professional environment. For teachers who are determining which program will best fit the students needs, it is important to question whether the students are learning fundamentals or more advanced terminology for industry use.

Introduction

3D modeling is being incorporated into everyday life more and more frequently. It is used for TV shows, movies, and for character animation. The two programs, Maya and Blender are two of the top 3D modeling programs. Maya has been used in movies such as The Chronicles of Narnia, Harry Potter, and the Transformers, as well as the TV show South Park. Blender was used for the movies, Captain America, Wonder Woman, and many more. Blender has had more than 500,000 downloads in a month, and over 6.5 million downloads a year (blender.org). This software makes it possible to bring characters and animation to life in video games and movies. Video Games generated \$30.4 billion in revenue in 2016 alone (theesa.com). This causes the educator to consider the following questions, what is the purpose of these programs? How do they fit into the classroom? For students and teachers, these programs are very helpful when learning 3D modeling, character creation, and animation. An important question would be, what program is most effective for students, and would be most helpful to beginners? These two programs are beneficial in different ways; they have their own unique set of tools. When looking at the differences between the two, one can see the layout variances, as well as different modes, and variances in shape and character creation. The focus of this study is to show the differences between Maya, and Blender, and which program is most effective for 3D modeling.

User Experience and User Interface are two main components of 3D modeling software and animation. It is important for software to have a user interface and user experience that will compliment one another. Having a strong interface and a strong experience will result in a good end experience for a modeler (usertesting.com). User experience is the consumer's end result with the product or software. Whereas, User interface is the system that the consumer interacts with, such as hardware and software. ("An Intro to the World", 4). When focusing on Maya and

Blender, Maya has a strong emphasis on user interface, and less on experience. Blender maintains an equal connection between user experience and interface.

Statement of the Problem

Every 3D modeling program performs differently; and has various intricacies in their user interface. For educators and students alike, it is important to utilize a program suited for creating the desired model. Whether someone desires a more intricate model-with more texture and shading, or a less detailed model used solely for animation, depends on the software one is using. The purpose of this research is to examine how various 3D modeling programs function, and compare their abilities in 3D modeling. The following study will show important difference to note, as a beginner, or as a teacher.

Significance of the Study

3D modeling is rapidly evolving; people are becoming more concerned with the process behind it. This will provide insight to those who are teaching, as well as studying the subject. This information will be helpful to students who are beginning to learn 3D modeling, and are looking for programs that provide ease of use. Furthermore, this research will help teachers looking to utilize this software in their classrooms. It is beneficial to find programs that are helpful to beginners as well as efficient in their results.

Limitations of the Study

The limitations of the study include the lack of modeling programs that were studied. Examining multiple software applications would provide a better understanding of how 3D modeling works, as well as software that could perform better than Maya and Blender. These software applications were selected however given the affordability and accessibility to

educators and students. This study goes in depth on two programs which are free to students and teachers.

Purpose and Goals of the Study

The study of the 3D modeling programs, Maya and Blender, was started to determine the most effective program. The goal of this research is to provide knowledge to students and teachers looking to use 3D modeling software.

Research Questions

The following questions were posed during this study:

- What are the differences in user interface between the two software applications?
- What are the differences in user experience between two software applications?
- How does each application handle the creation of a similar 3D model?

Research Hypothesis

The following hypotheses will be shown in this research. The program, Blender, is more user-friendly. It focuses on the creating an equal user interface and user experience. This program provides ease of use to beginners, while creating useful models. Toolbars and modes for modeling are easy to find. Maya is a more detailed, and elaborate modeling program, useful to those who have modeled for a longer period of time. The user interface is very developed, there are several toolbars and modes, creating intricate models. The user may find that it is more difficult to create simple models without experience.

Methodology

Understanding the differences between the two programs is extremely important. The attributes listed in the table below show important characteristics of the software, such as modeling time, toolbars, modes, and keystrokes. These qualities are some of the more important

features to focus on when looking at Blender and Maya. Knowledge of these tools makes it simple to understand what program one should use.

Characteristics	Maya	Blender
Modeling Time (Basic Shapes)	20 minutes (limited experience)	10 minutes
Toolbars	3	1
Modes	10	6
Keystrokes	No	Yes

User Interface Differences

When looking at the two programs, the first place to see differences is in their layouts. They both provide different layouts making it easy for people to find tools and modes to help their models. Blender has a very simple layout; it has one toolbar on the bottom which encompasses all of the tools convenient to the user. It also provides a toolbar on each side that includes extra tools not needed as often, and modifiers that one can add on to their model. This program contains a taskbar at the top for saving, and exporting. In the middle of the screen is the modeling interface (Gumster, 16). This is where one would do all of their modeling. This interface can be split into several different sections, allowing for one to see different angles without opening up a completely new window. Within Blender, there are many different ways one can customize their screen to fit their needs. The header, sidebars, and toolbar are all movable to wherever fits the model the best. This layout makes it very simple to find all of the buttons one may need, very easily. As for Maya, this program consists of several different toolbars located at the top, with more toolbars within them. It includes two large sidebars for modifiers, along with a large bottom panel allowing one to see their modifiers up close. Maya includes a large interface, which also has the capability to be split up to four times. This is helpful for those with a more detailed model. Out of the two of these programs, Maya's layout is

more complicated, one must have knowledge on the useful tools for 3D modeling to begin modeling in Maya. (Palamar, 1).

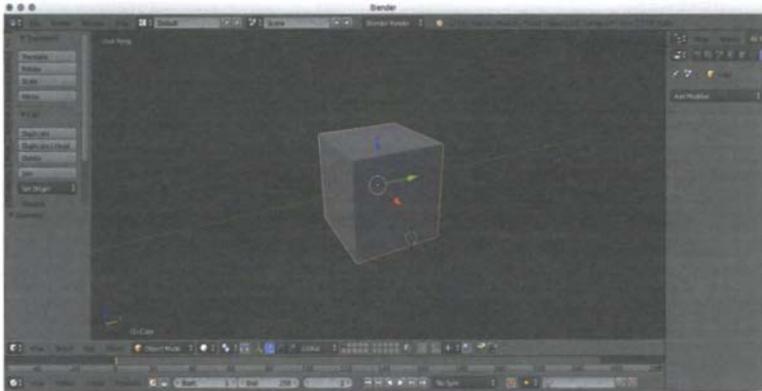


Figure 1: The main layout of Blender.

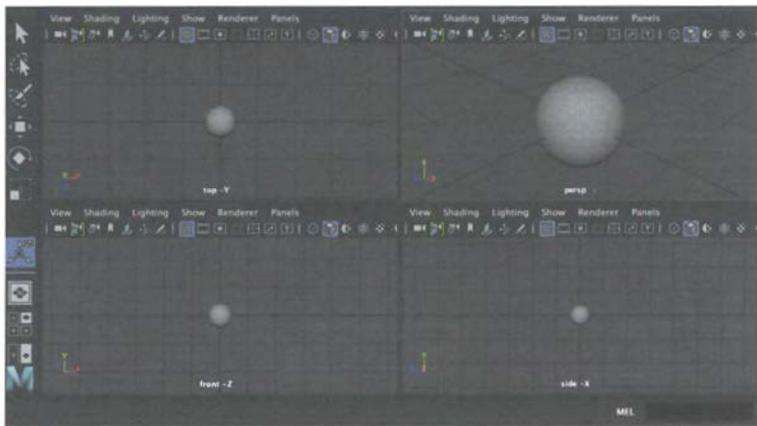


Figure 2: The Main Layout of Maya



Figure 3: Blender Toolbar



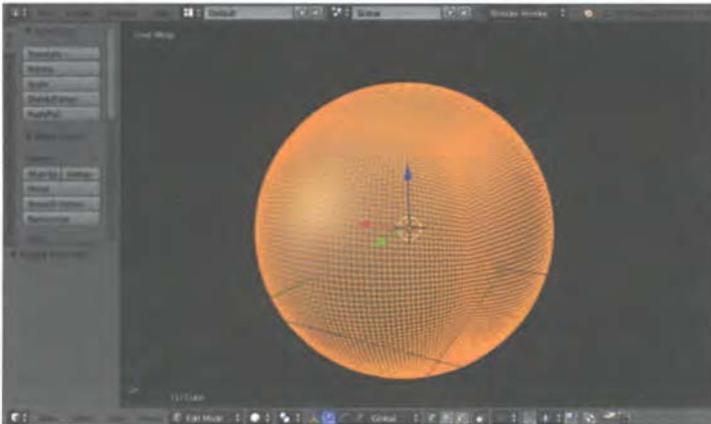
Figure 4: Maya Toolbar

Along with the noticeable layout changes between the two software's, they also have differences within their modes. In Blender, there are three main modes that one focuses on to model. These modes are Object Mode, Edit Mode, and Sculpt Mode. Within each of these, there are different tools to help create a different effect on one's model. Blender object mode is where one is able to add a new model, resize, and rotate the model being created. This mode is all about adding, and creating the basic shape behind the model. Blender has several preset shapes that can be added in this mode, such as a cube, cylinder, and sphere. Blender's edit mode is the next place to continue, in this mode it is possible to edit the vertices, faces, and edges of the model. This mode builds the structure of a model; in Blender it is simple to edit the model to the desired shape. Sculpt mode is the final mode that is very important in modeling. This mode includes various brushes to create texture on a model. This is extremely helpful when creating hair for a character, or just smoothing out the overall shape. (Gumster, 82).

Blender's three main modes are also useful in Maya, but this program has several other modes it focuses on. Maya includes the Curves, Polygons, Sculpting, Rigging, and Animation modes. Maya includes several different presets, like Blender. This is what the Curves mode is for, one is able to add Nurbs circles and squares in this mode. These are different than regular spheres and cubes, these are more editable for animation. (Palamar, 115). The polygon mode adds a basic sphere, and cube to the scene. These are useful when modifying the shape, not the animation. The sculpting mode has several different brushes to create texture for the models. Maya also includes rigging and animation, so that one could create bone structure for their character and animate it all in one step. The difference in modes between the two programs is helpful to the user in deciding which program will be most beneficial to one's model.

User Experience

When deciding what program to use, it is important to think about what the finished model is going to look like. Blender has less details, but provides quicker modeling time, whereas Maya is more detailed, and takes more time to model. Each program handles character modeling and 3D modeling as a whole differently. Within Blender, the user will take edges and vertices to shape the character. When Modeling in Maya, the user will take cylinders and other shapes placing them on top of the body and adjusting the vertices accordingly. This can take some time, creating the correct size of shape for each body part. When modeling a similar shape in both Blender and Maya, there is a time variance. Locating the tools needed to create simple



shapes in Blender is fairly simple. The various modes (Edit, Object, and Sculpt) that are used are all located at the bottom of the screen. Switching from vertex to edge mode is also located on the bottom of the toolbar with a simple drop down

menu. Keystrokes can be used in Blender to quickly switch between modes, and to create subdivisions in a shape. When using Maya, there are several different levels of toolbars to go through when looking for the correct mode and tool. There are modes within modes on each toolbar making it difficult to quickly find the tool one is looking for. To create a simple shape such as a cylinder in both programs, there are easy keystrokes in Blender to help with the modeling process. In Maya, it is important to know where each of the tools are so that one is not lost when creating a model.

Figure 5: Creating a Sphere in Blender



Figure 6: Creating A Sphere in Maya

After learning the basic layout of Maya, and how to work through all of the toolbars, it becomes simple to create shapes. The time taken to model in both programs depends solely on the user, those who are more experienced could model basic shapes in Maya in the same time that it takes them to model in Blender.

Conclusion

Overall, Blender provides ease of use, and accessibility to new users. This program is good for beginners and those who do not know where to start. Maya is most beneficial to those who are creating more detailed models, those who have more experience in 3D modeling. Between these programs there are differences to be noted, Blender focuses on sculpting, and

editing of the basic shape of models. Maya works on the animation aspect, creating separate shapes solely for animation. Additionally, Blender has less modes and toolbars to make 3D modeling more simple. Maya has multiple toolbars and features creating more thorough models. Furthermore, when deciding what program is best for modeling, it is important to determine whether one is a beginner, or looking to create more intricate designs. This research has shown that Blender is most efficient for those new to 3D modeling, and Maya is most helpful for advanced 3D modelers.

This research provides an insight to educators on which program to choose for their students in the classroom. Blender is a simple software when learning the fundamentals to 3D modeling. For a beginner course on 3D modeling, this program is easily taught and learned. As for a more advanced course, Maya provides more knowledge and tools to create more detailed modeling. This software will provide students with a complete understanding on intricate 3D modeling software.

Creation of 3D Models for Animation and Gaming Assets

Within 3D modeling, character modeling provides for a smooth transition into gaming and animation. This is why I decided to create a 3D character model which could be used for animation in future studies. This character was created in Blender, this software provided ease of use for my first character model. Tools, and modes were easy to find to create the model, making it a modest experience for an intermediate modeler. Creation of a character is made from a reference image.



Figure 7: Reference Image for Modeling

Using the reference image, one will create vertices and faces to make the shape of the model. This process can be daunting in a program like Maya, which is why I chose Blender. The modeling was quick, but tedious attempting to get every vertex to match the shape of my image. After the model was completed, it was then rigged for animation. This created the major bones in the reference image, so that they would move when animated.

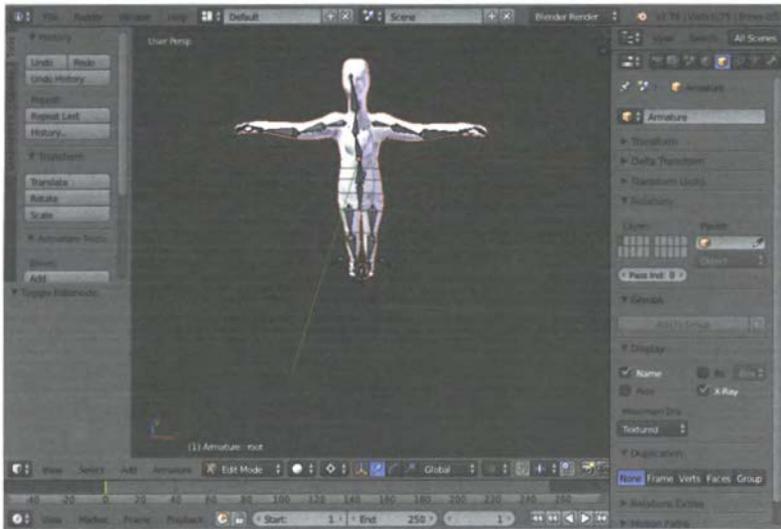


Figure 8: Final Model in Blender

The final model in Blender was exported in a .fbx file type for animation. Out of the two programs, Blender provides more tools for animation, such as rigging. This solidified my choice to model in Blender.

Future Research

Future studies on this research could be improved by creating more models in Blender and Maya. Further seeing the differences between the two programs. Also, a character model in Maya could be created with the same specifications as Blender to see the differences in Character Modeling. Creating a rigged character in Maya would help expand on the differences between the two programs.

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