

# A Method for Analyzing the Transference of Skill Sets Between 3D Animation Programs

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## ABSTRACT

*CGT students of Purdue University, who seek employment upon graduation, are faced with the issue of not being familiar with all industry software packages. Students in CGT(Computer Graphics Technology) Animation are taught to use Autodesk Maya while students in CGC (Construction Graphic Communications) are primarily familiar with Autodesk 3D Studio Max. In both areas of concentration, industry software packages tend to change and overlap, depending on the company. Students should be able to apply their learned software knowledge towards other applications in order to improve their employability. This paper seeks to offer a method of determining transferability of skill sets between Autodesk Maya and Autodesk 3D Studio Max.*

## Introduction

The areas of 3D animation and multimedia are becoming a major part of our society's everyday culture, thus the demand for qualified and professional individuals in these areas is constantly growing. (Madhavan, Flexman, & Betker, 2008).

With regard to these and other growing industries, the Department of Technical Graphics of Purdue University changed its name to the Department of Computer Graphics Technology (CGT) and expanded its mission in 1997. Its new mission had developed to "prepare highly skilled, and sought after, graduates with the capacity to apply their problem solving skills across a growing and broad range of industries and businesses"(Department of Computer Graphics Technology, 2004). Presently, CGT graduates are employed in a wide variety of fields spanning over a diverse range of industries.

Despite the Department's expansion, an important matter which impacts these students still exists. CGT students at Purdue University, who seek employment upon graduation, are faced with the issue of not being familiar with all industry software packages. When students graduate to pursue careers in industry, they are often required to use software packages that are not taught in their respective areas of interest. As such, CGT students should be able to apply and transfer their learned software knowledge towards other applications in order to improve their potential employment prospects.

This paper proposes a method for analyzing the transference of skill sets between 3D animation programs. A study utilizing both qualitative and quantitative data was conducted to assess the transference of a certain skill set between the two most

commonly used software packages in the Visual Effects (VFX), Computer Generated (CG), and Animation industries. According to numerous sources including Kent Estep, Benoit Saint Moulin, and Derek Chimenti who have spent many years working in the animation and visual effects industry, Autodesk 3D Studio Max and Autodesk Maya are the most commonly used software in these industries around the world(D.Chimenti, 2011) (Moulin. 2007).

The methods that were used included gathering variable data from pre-task and post-task surveys of both qualitative and quantitative measures and analyzing the results of an animation task. The experimental design and analysis of this method will be discussed later in the paper.

## Key Terms

To **Transfer** something, in the most literal sense, is to move something from one place, person, or thing to another. In terms of this paper, the transfer that was investigated is the transfer of a **skill set**, or according to Birkinshae, Bresman, Nobel, et. al, the learned power of doing something competently. In this way, "successful knowledge transfer...results in the received unit accumulating or assimilating new knowledge"(Birkinshae, Et al. 2010).

The **skill set** that was analyzed in this paper, is that of **animation**. To animate something, simply put, is to change an object's position over time. However in terms of the animation industry, to animate means "to make or design in such a way as to create the illusion of life-like movement" (Guidon. 2008). For the purposes of this paper, the type of animation that was used is **3D animation**. The concept of **3D**,

as it relates to this paper, corresponds to the dimensionality of the software packages used. "These dimensions are defined by cardinal axes X, Y, and Z. These represent length (X), height (Y), and depth (Z)" (Guidon. 2008).

### **Hypotheses**

The hypothesis ( $H_1$ ) stated that there was a positive correlation between knowledge of Autodesk Maya and transference of the animation skill set to Autodesk 3D Studio Max and vice versa.

The experiment weighed this hypothesis against the null hypothesis ( $H_0$ ). The null hypothesis stated that there was no correlation between knowledge of Autodesk Maya and transference of the animation skill set to Autodesk 3D Studio Max and vice versa.

### **Methodology**

#### **Experimental Design**

Two treatments were conducted on two separate days in order to test the transfer of the animation skill set from Autodesk Maya to Autodesk 3D Studio Max and, conversely, from Autodesk 3D Studio Max to Autodesk Maya. In the first treatment, participants were given a brief Maya Tutorial, while in the second treatment they were given a brief 3D Studio Max Tutorial.

The Maya tutorial explained the user interface of the respective software packages as well as a guided breakdown of the first task in Autodesk Maya. The participants in this treatment were not given a 3D Studio Max Tutorial for the second task in Autodesk 3D Studio Max.

Likewise, in the second treatment, participants were given a brief 3D Studio Max Tutorial, which explained the interface and provided a guided breakdown of the task in Autodesk 3D Studio Max. The participants in this treatment were not given a Maya Tutorial for the second task. This design was utilized to help ensure that the knowledge gained was indeed being transferred and not created. The tutorials used in the research can be found in the corresponding project folder on file in Knoy 329.

On the first testing day, participants were to complete the animation task in Autodesk Maya, followed by the same animation task in Autodesk 3D Studio Max. Conversely, on the second testing day, participants were to complete the animation task in

Autodesk 3D Studio Max, followed by the same animation task in Autodesk Maya.

The original design of the research experiment called for using convenient sampling to separate participants into four testing groups: Maya Group, 3D Studio Max Group, Control Group A, and Control Group B. The Maya Group and Control Group A would be tested on the first day. The 3D Studio Max Group and Control Group B would be tested on the second day.

The actual design of the research experiment, however, only utilized two testing groups. The groups were instead separated into the two testing days: Group1 (Maya- Max) and Group2 (Max-Maya). This design was utilized due to the overwhelming number of Maya knowledgeable students and the insufficient number of Max knowledgeable students. Furthermore, all of the participants who had no experience in either software package were only present on the Max-Maya testing day.

All testing groups received pre-task assessments before the two animation tasks were given. The groups were then given post-task assessments following the two tasks.

The data was compiled into statistics and the results will be discussed later in the paper. A visual breakdown of the proposed research design is shown in **figure 1**.

#### **Participants**

Participants in the Maya-Max Group had previous experience with Autodesk Maya, but most had little to no experience with Autodesk 3D Studio Max. However, participants in the Max to Maya Group had a wide variety of experience. Very few participants had 3ds Max experience, some participants had little to no experience in either software, and some participants had previous experience with Autodesk Maya as well.

There were 47 total participants who took part in the study. The study was composed of 37 male and 10 female students. The participants were all between the ages of 18 and 25 and 46 out of the 47 participants were from the Department of Computer Graphics Technology, although they were solicited from multiple colleges and departments within Purdue University.

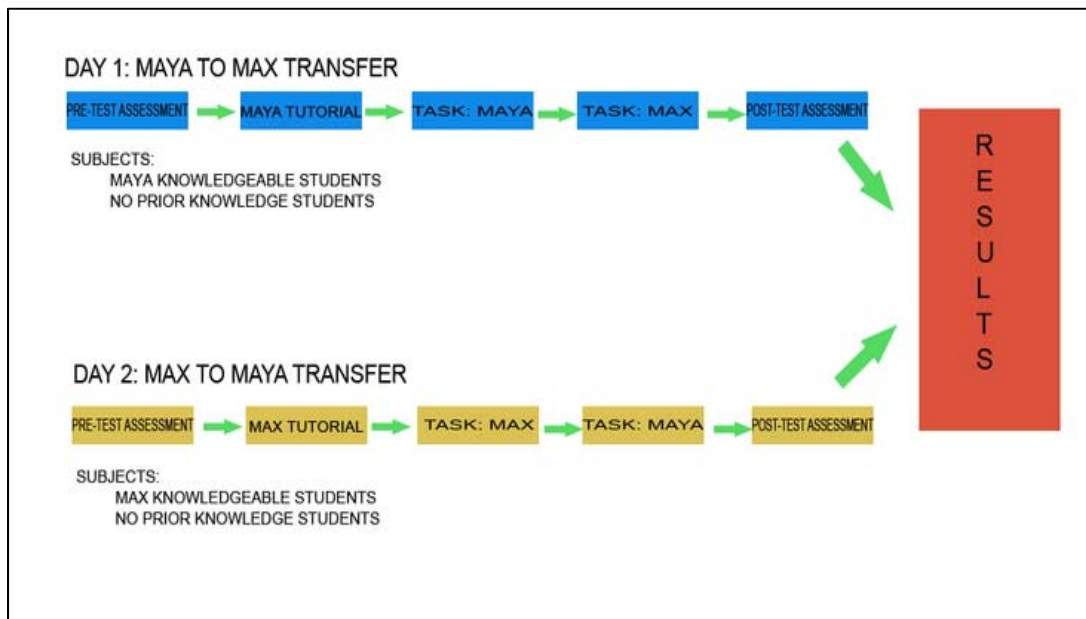


Fig1. (Proposed Methodology)

### Tutorials

Both tutorials began with an explanation of their respective software's interface, basic camera manipulation, and key framing techniques as laid out by Marc Andre Guidon in *Learning Autodesk Maya 2008* (Guidon, 2008). These explanations also included labeled screenshots of the software packages. Some of these screen shots are shown in **figures 2 and 3**.

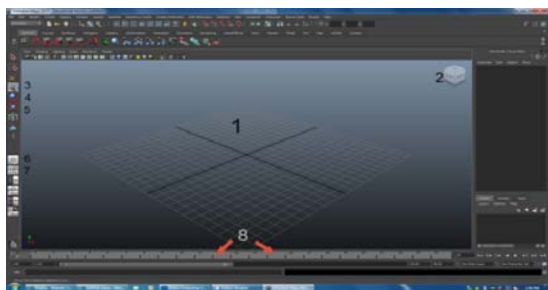


Fig 2. (Autodesk Maya)

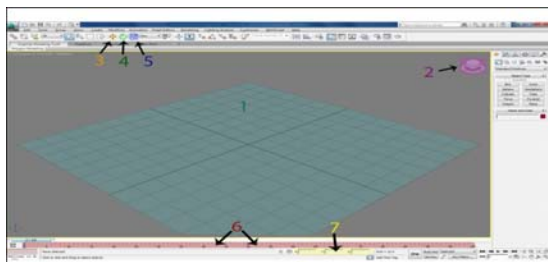


Fig 3. (Autodesk 3ds Max)

The second portion of the tutorials outlined a guided breakdown of the first task, which the participants would be asked to complete. Like the interface portion, this was accompanied by screenshots of various components of the Maya or Max interfaces. To see all of the attached screenshots refer to the full tutorials in *Appendix*.

The last item given to participants described the second task which told the participants to create an identical animation to the one created in the first task using the unknown software. The only instructions given, other than the task specifications, were guided directions on how to save the finished file. This functioned as a means for the researchers to analyze each subject's product and was believed to have no impact on the task itself.

### Evaluation of Task

The criteria was deemed an appropriate assessment of a participant's animation skill at the entry level by Professor Nicoletta Adamo-Villani. Professor Adamo-Villani is an animation professor in the department of Computer Graphics at Purdue University (Adamo-Villani, 2011).

The criteria for evaluation of the two tasks included:

1. The character's hand must wave twice
2. The character must be framed in a right perspective view
3. The character must look at the camera
4. The animation must be 2 seconds long

One point was awarded for each successfully completed criterion. Zero points were given for each unsuccessfully completed or incomplete criteria.

## Surveys

Many studies have concluded that using pre and post task surveys is a better method for analyzing a participant's ability in a given task as opposed to a time-based variable for assessment (Yuan, Chang. 2008).

Studies have shown that time is not an adequate measure in terms of successful task performance. (Machin, Fogarty. 2003). In addition, using a time-based variable for assessment was believed to be unfair to those who had little to no experience in either software package. Experienced users may have chosen not to read the tutorial material provided, and thus have a faster performance time. Therefore, the research study has followed the pre-task and post-task assessment method.

The pre-task and post-task assessments were measured through the employment of a revised Scale, which acts as both a qualitative and quantitative measure to assess participants' feelings on a particular subject. The revised Likert scale that was used for the study featured a 4-point scale instead of the traditional 5-point scale which features a neutral midpoint. The remaining 4 points featured correspond to a traditional Likert scale: Strongly Disagree(1), Disagree(2), Agree(3), Strongly Agree(4).

Numerous studies have demonstrated trends that by eliminating the middle point of a traditional Likert Scale, one can reduce "social desirability bias." This bias is described as the innate desire to not stand out by offering opinion. (Garland. 1991), (Friedman. 1981), and (Cox. 1980). Therefore, the surveys implemented in the research study eliminated the middle point in order to reduce this bias.

A 4-point revised Likert scale was used as opposed to a 6-point scale due to the fact that, according to Steven Morgan Balog in the Purdue Statistics Department, "a six point scale would be more complicated in terms of statistics. It is far more common in statistical regressions of this sort to feature data from a four point scale" (Balog. 2011).

In terms of their functions, the pre-task assessment was used as a means of gathering demographic data from the participants as well as determining their experience levels using the two software packages. The post-task assessment was used as a means to gauge participants' responses to the task as well as to appraise their own perceptions of the software transferability. The surveys used in the research study can be found in *Appendix*.

## Results

### Variables

After each task was evaluated as described above, the evaluation data, along with the data collected from the pre-task and post-task assessments, were recorded and analyzed. The variables included in the regression model were:

1. InitialMaya
2. InitialMax
3. TechnicalSkill
4. ResponseMaya
5. ResponseMax
6. MayaSkill
7. MaxSkill
8. PerceivedSuccess
9. PerceivedHinder

The variables IntialMaya [1], InitialMax [2], and TechnicalSkill [3] were retrieved from the pre-task survey questions #5, # 7, and #8 respectively. The variables ResponseMaya [4], ResponseMax [5], PerceivedSuccess [8], and PerceivedHinder [9] were retrieved from the post-task survey questions #2, #4, #5, and #6, respectively. Finally, the variables MayaSkill [6] and MaxSkill [7] were retrieved from the task evaluations. These specific variables were included under the recommendation of Steven Morgan Balog (Balog.2011).

### Process

After inputting the data for both testing groups, two linear regression models were calculated. The dependent variable for the two testing groups differed. In Group1 (Maya-Max). the dependent variable, MaxSkill [7] was analyzed using InitialMaya [1], InitialMax [2], ResponseMaya [4], ResponseMax [5], TechnicalSkill [3], and PercievedSuccess [8] as independent variables. However, in Group2 (Max-Maya), MayaSkill [6] was analyzed as the dependent variable InitialMaya [1], InitialMax [2], ResponseMaya [4], ResponseMax [5], TechnicalSkill [3], and PercievedSuccess [8] as independent variables. In both testing groups, the variable PercievedHinder [9] was not found to be a significant contributing variable to the linear regression model and was thus removed from the model.

### Data

The data from both testing Groups were interpreted to ANOVA tables and Model Summary tables. From these, the data were transformed into graphical representations such as histograms, normal regression plots, and Box Plots.

## Group1

The ANOVA table for Group1 (**figure 4**) has demonstrated a high significance level of .01. According to this data, there is only a 10% possibility that this result could have happened by chance. In other words, the test seems to indicate that there is a strong statistical significance to this data.

**ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.528	6	1.921	3.890	.010 <sup>a</sup>
	Residual	9.879	20	.494		
	Total	21.407	26			

a. Predictors: (Constant), PercievedSucces, PercievedTech Skill, Initial Max(y), Response Maya(x), Response(y) Max, Initial Maya(x)  
b. Dependent Variable: Max Skill

**Fig.4 (ANOVA Table)**

Although there appeared to be a strong statistical significance to this data, the Model Summary table (**figure 5**) has depicted an  $R^2$  value of .539. In this test, the  $R^2$  value denotes the explained variance of the model. In other words, the variables used in the model explained only about 54% of the data. Upon consulting Steven Balog, the data was confirmed to be sound. According to Balog, "in linear regressions of experiments of this kind, it is not uncommon to have this type of  $R^2$  value. The data is still sound"(Balog. 2011).

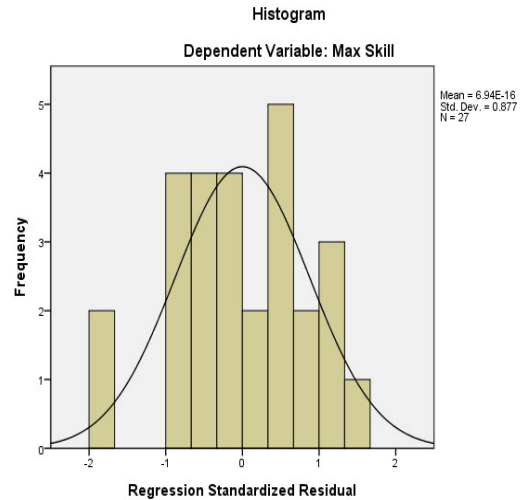
**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.734 <sup>a</sup>	.539	.400	.703

a. Predictors: (Constant), PercievedSucces, PercievedTech Skill, Initial Max(y), Response Maya(x), Response(y) Max, Initial Maya(x)  
b. Dependent Variable: Max Skill

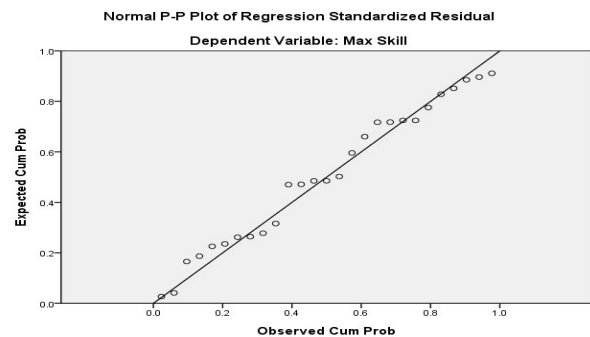
**Fig. 5 (Model Summary Table)**

The histogram of the information (**figure 6**) has demonstrated that the data roughly followed the normal probability distribution. This indicated that a regression model was adequate for the data, as the error terms were roughly normal.



**Fig 6. (Maya-Max Histogram)**

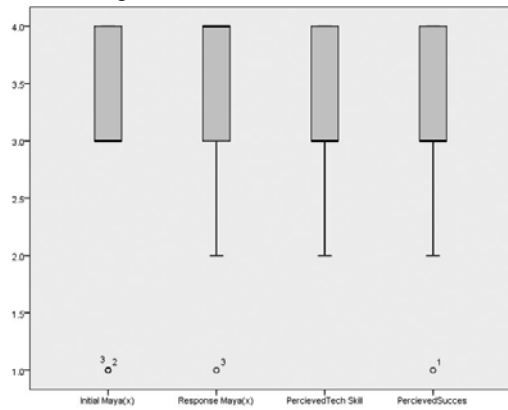
Similarly, the information seemed to indicate that the data roughly followed a normal regression plot (**figure 7**). A regression plot is a graphical method for comparing two probability distributions by plotting their quantiles against each other. This information seemed to demonstrate that the statistical assumptions made about the data were supported.



**Fig.7 (Normal Regression Maya-Max)**

The Box Plot of the variables used revealed an interesting observation (**figure 8**). Box Plots display differences between populations without making any assumptions of the underlying statistical distribution. The spacing between the different parts of the box help indicate the degree of dispersion and skew of the data, as well as identify outliers. The information demonstrated that the variables used in the regression model appeared to be significant in

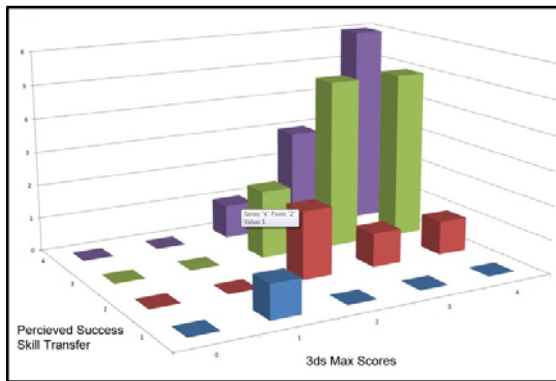
determining the end result.



**Fig 8. (Box Plot Maya-Max)**

An interesting observation was made through a comparative analysis (**figure 9**) between a participant's MaxSkill [7] and PerceivedSuccess [8]. The PerceivedSuccess [8] variable was the degree of which the participant believed that their skills in the known program helped them to be successful in the other.

The data appeared to express that there is a strong positive correlation to the participants' Max skill and the degree of which their skills in the known program helped them to be successful in the other.

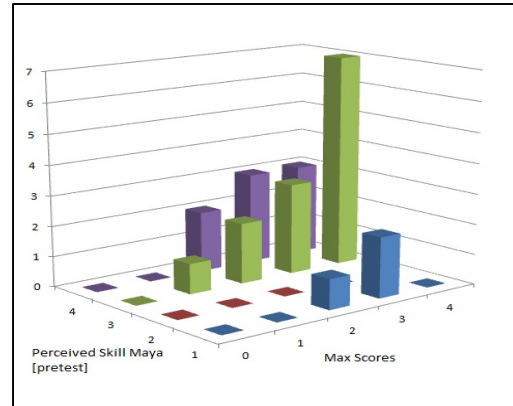


**Fig 9. (Max Skill Transition Success)**

Another interesting observation was made through a comparative analysis (**figure 10**) between a participant's MaxSkill [7] and InitialMaya [1]. The InitialMaya [1] variable was the degree of expertise which the participant believed he or she possessed at the beginning of the experiment.

The data appeared to express that there was a strong positive correlation to the participants' MaxSkill and the degree of expertise which the participant believed he or she possessed at the beginning of the experiment. This data seemed to suggest that *there was a positive correlation between know-*

*ledge of Autodesk Maya and transference of the animation skill set to Autodesk 3D Studio Max.*



**Fig.10( Skill-Score Day1)**

### Group2

The ANOVA table for Group2 (**figure 11**) has also demonstrated a very high significance level of .001. According to this data, there is only a 1% possibility that the result could have happened by chance. In other words, the test seemed to indicate that there was a very strong statistical significance to this data.

ANOVA <sup>b</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.416	6	6.569	8.957	.001 <sup>a</sup>
	Residual	9.534	13	.733		
	Total	48.950	19			

a. Predictors: (Constant), PercievedTech Skill, Initial Max(x), PercievedSuccess, Initial Maya(y), Response Max(x), Response(y) Maya

b. Dependent Variable: Maya Skill

**Fig. 11 (ANOVA Table Max-Maya)**

An interesting observation was seen in the Model Summary table for Group2 (**figure 12**). This Model Summary table depicted a much higher R<sup>2</sup> value of .805. Therefore, the variables used in the model explained about 81% of the data.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.897 <sup>a</sup>	.805	.715	.856

a. Predictors: (Constant), PercievedTech Skill, Initial Max(x), PercievedSuccess, Initial Maya(y), Response Max(x), Response(y) Maya

**Fig. 12 (Model Summary Table Max-Maya)**

The histogram of the information on Group2 (**figure 13**) demonstrated that the data roughly followed the normal probability distribution. This appeared to indicate that a regression model was ade-

quate for the data, as the error terms were roughly normal.

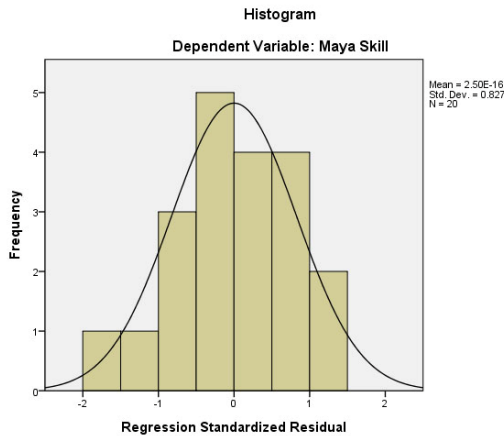


Fig 13. (Max-Maya Histogram)

Again, the information demonstrated that the data roughly followed the normal regression plot (figure 14). The data for this normal regression indicated a stronger correlation than the data for Group1. This information appeared to demonstrate that the statistical assumptions made about the data were sound.

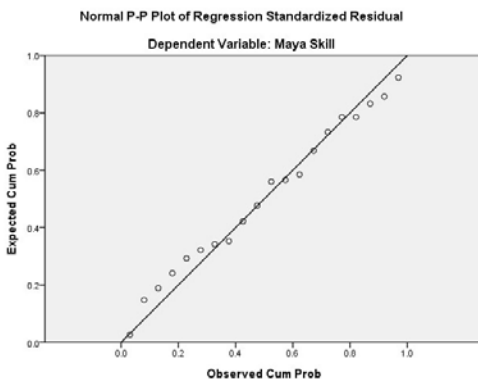


Fig.14 (Normal Regression Max-Maya)

The information from Group2's Box Plot (figure 15) appears to demonstrate that the variables used in the regression model are not as significant in determining the end result. Upon consulting Steven Balog, however the data was still confirmed to be sound. According to Balog, "the variables are still important to the data by acting as stabilizers for the model" (Balog. 2011).

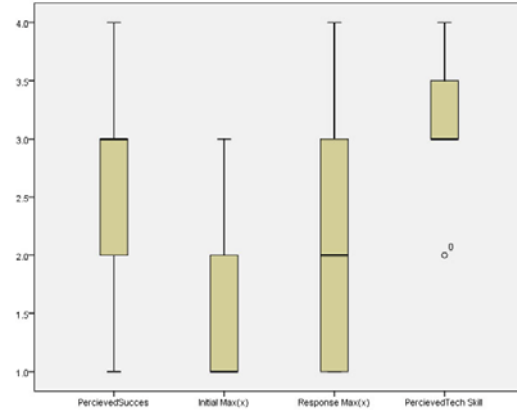


Fig 15.( Box Plot Max-Maya)

Corresponding to the comparative analysis chart of Group1 (figure 9), another interesting observation was made through a comparative analysis of Group2's data(figure 16).The analysis was conducted between a participant's MayaSkill [6] and Perceived-Success [8]. Again, the PerceivedSuccess [8] variable was the degree of which the participant believed that their skills in the known program helped them to be successful in the other.

The data appeared to express that there was a positive correlation to the participants' Maya skill and the degree of which their skills in the 3D Studio Max helped them to be successful in Maya.

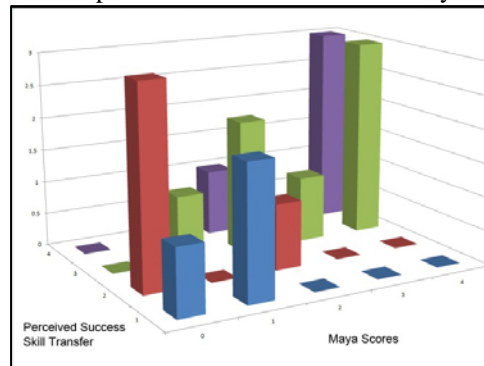


Fig 16. (Maya Skill Transition Success)

Another interesting observation correlating to the comparative analysis of Group1's data (figure 10) was conducted on the data from Group2 (figure 17). The analysis was conducted between a participant's MayaSkill [6] and InitialMax [2]. The Initial-Max [2] variable was the degree of expertise which the participant believed he or she possessed at the beginning of the experiment.

The data did not appear to express that there was a strong positive correlation to the participants' MaxSkill [7] and the degree of expertise which the participant believed he or she possessed at the beginning of the experiment. This data seemed to support the null hypothesis that *there is no correlation*

between knowledge of Autodesk Max 3D Studio Max and the transference of the animation skill set to Autodesk Maya.

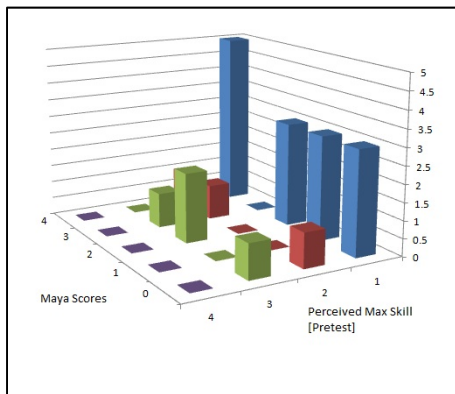


Fig.17(Skill-Score Day2)

## Discussion

### Issues and Complications

The trends that were indicated through the data and graphical representations were believed to be influenced by a few key confounding variables.

The primary confounding variable appeared to be that there was not significant variation in the groups. As previously stated, the number of students that were knowledgeable in Maya was overwhelming. 30 out of the total 47 had experience in Maya, while only a meager 5 had prior experience in 3D Studio Max, 2 of which also had experience in Autodesk Maya.

In addition, the majority of participants who had little to no experience in either software were only present on the Max-Maya day of testing. Furthermore, some participants who had previous experience in Maya were present on the Max-Maya testing day, despite the listed participant requirements of the experiment.

### Recommendations for Further Research

It is believed that this type of research merits further study. Should an experiment similar to this study be conducted, the researchers of this experiment would like to offer a few additional recommendations to consider before proceeding:

1. Future researchers should acquire a larger number of participants from multiple departments. A larger number of participants

from varying backgrounds may improve the significance of the data.

2. Future researchers should invoke a preliminary screening of the participants to ensure that they fall into the correct testing categories.
3. Further research including an additional testing group containing individuals who possess knowledge of both software packages may prove beneficial.
4. Further research detailing the transferability of additional skill sets other than the animation skill set may prove beneficial.
5. This type of study may be used as a framework for determining skill transferability between other types of software programs.

## Conclusions

In conclusion, the data supported the hypothesis ( $H_1$ ) that suggested that there was a positive correlation between knowledge of Autodesk Maya and the transference of the animation skill set to Autodesk 3D Studio Max.

However, the data did not entirely reject the null hypothesis ( $H_0$ ). The data suggested that there is no correlation between knowledge of Autodesk 3D Studio Max and the transference of the animation skill set to Autodesk Maya.

CGT students at Purdue University, who seek employment upon graduation, are and always will be faced with the issue of not being familiar with all industry software packages. However, this study appeared to indicate that CGT students may not have to be familiar with all proprietary software packages in order to work successfully in industry. CGT students should be able to apply their learned software knowledge towards other industry applications. The data appears to support the fact that CGT students at Purdue University indeed are acquiring "the capacity to apply their problem solving skills across a growing and broad range of industries and businesses."

## Acknowledgements

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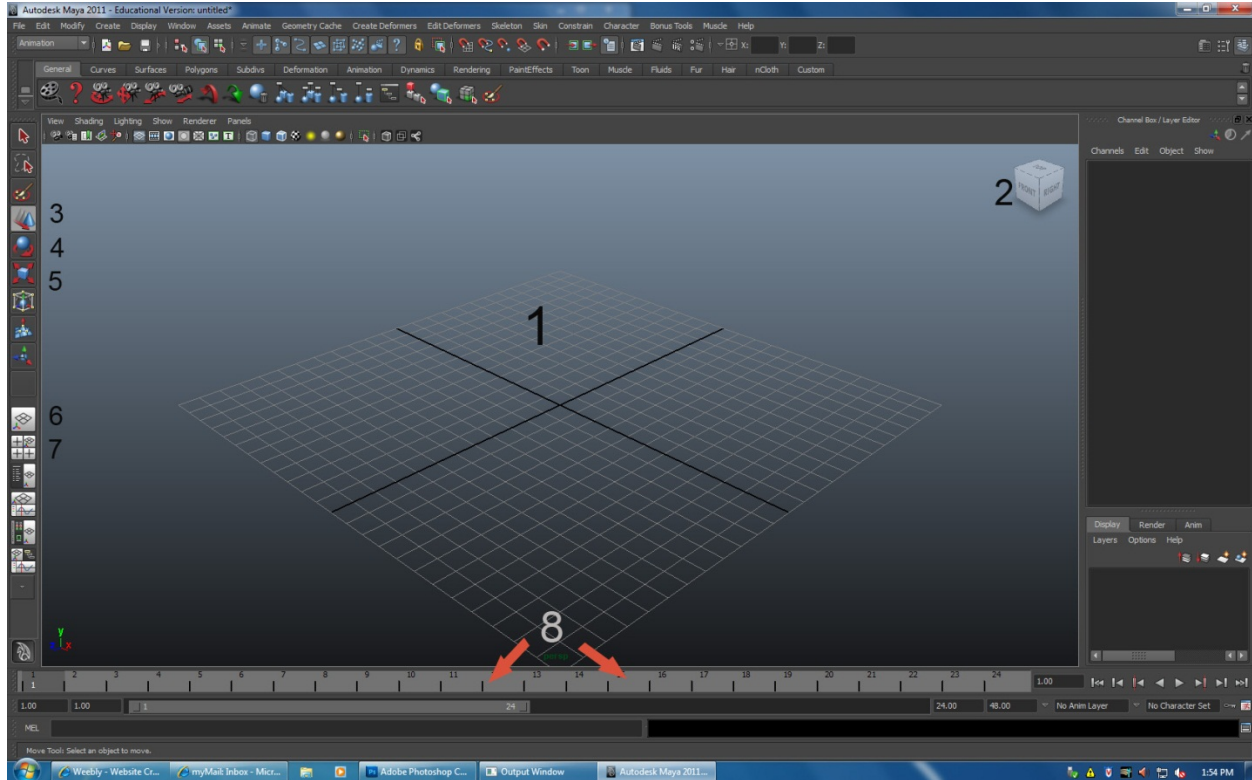
## Appendix

This section contains all materials used in conjunctions with this study.

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## Maya Tutorial

### Interface



1. The Grid: This is the working plane. The grid uses XYZ coordinate system which is indicated by the axis located on the bottom left of the window. Y correlates to the up/down. X correlates to the left/right. Z correlates to the front/back.
2. The View Cube: Clicking the sides on the view cube will allow you to switch the view from the current Perspective view to the Front, Right, or Top View. After clicking a view, the arrows will allow you to rotate the cube to see different angles. To return to the original Perspective view, click the Home Icon located next to the View Cube.
3. The Move Tool: This tool allows you to *translate* or move an object along the XYZ axis.
4. The Rotate Tool: This tool allows you to *rotate* or pivot an object at any angle.
5. The Scale Tool: This tool allows you to enlarge or shrink an object to any size.
6. Single Perspective Window: this button returns you to the single Perspective window.
7. Four View Layout: this button allows you to see the Front, Side, Top, and Perspective views simultaneously. To look at a single window, left click the window and hit the Spacebar. To return to the Four View Layout, click the button again or hit the Spacebar.
8. Time Line: This bar shows the frames of the animation and the keys. Default time line setting is 24 frames, ie. 1 second of animation.

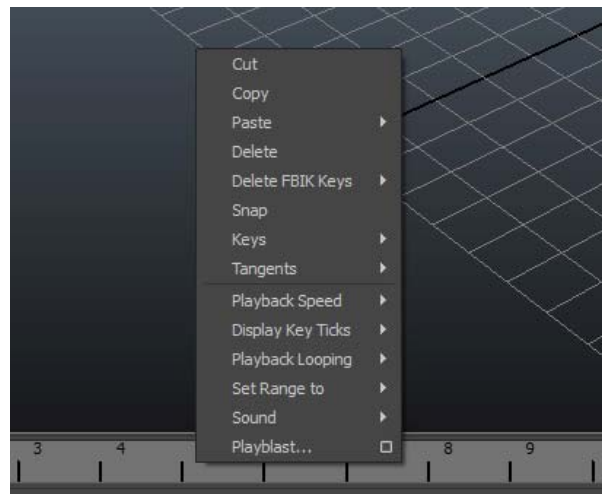
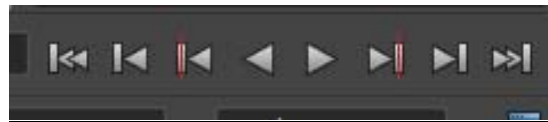
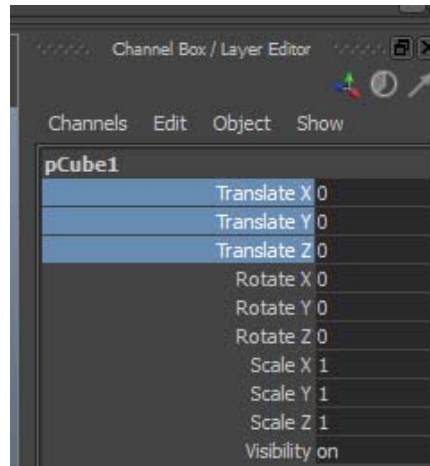
### Moving Around In Maya

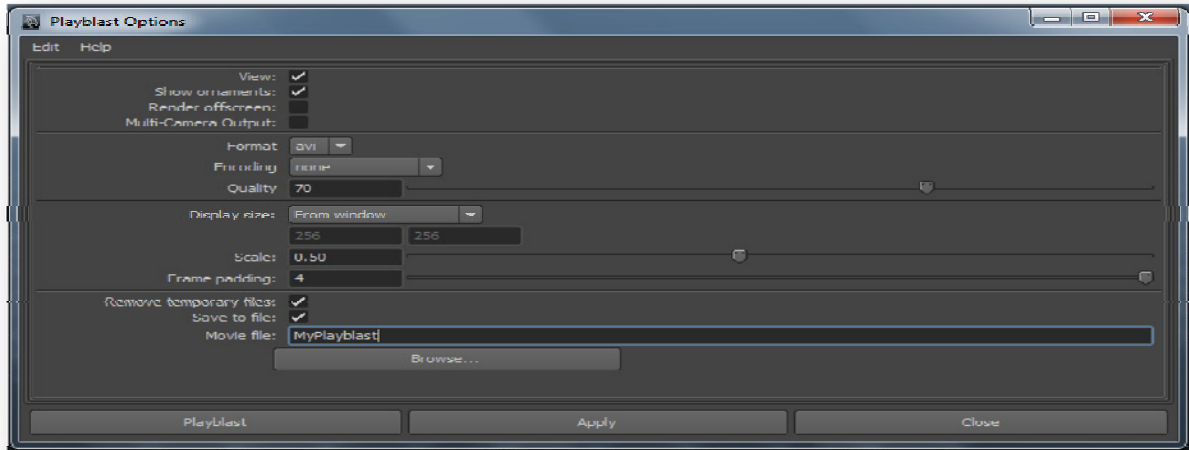
1. Dolly In/ Dolly Out: To *dolly*, or move in or out, hold Alt+ Right mouse button.
2. Panning: To *pan*, or move the camera up, down, left, right; hold Alt+ Middle mouse button.

3. Rotating: To *rotate* or pivot the camera, hold Alt+ Left mouse button.

### Setting Keys and Animating

1. On the starting frame, highlight the *attributes*[*translate, rotate, scale*] you want to animate in the Channel Box located on the upper right. Hold the right mouse button and drag down to *Key Selected*.
2. On the ending frame, highlight the *attributes*[*translate, rotate, scale*] you want to animate in the Channel Box. Hold the right mouse button and drag down to *Key Selected*.
3. Play back the animation using the *Playback* button located in the bottom right corner of the screen.
4. When the animation is done, Right Click on the Timeline and go down to *Playblast* and click the box next to it.
5. In the Playblast Options dialogue box, you can change the settings of the playblast. Make sure the save to file checkbox is checked. After you name your file, Click the Playblast button and you will be able to see it played in your Media Player.





## **TASK 1**

You will create a simple animation using Autodesk Maya. You will need to make the Character wave his hand *twice* in 2 seconds. Remember, there are 24 frames per second. You must also frame the character in a *perspective view with the character looking at the camera*. When the task is done, save a Playblast file to the folder named T1. Save the file as *(your subject #)\_T1.avi*. When you have finished the task, please notify one of the Media4orce members and they will give you the second part of the task.

### **Breakdown**

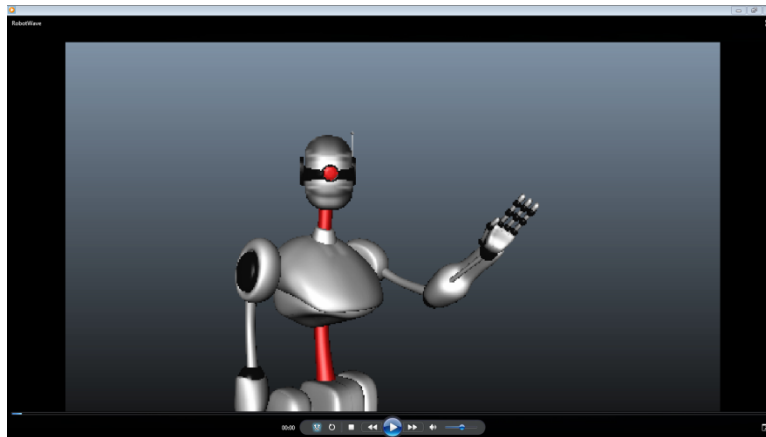
#### Step 1: Getting Started

-File> Open Scene > Desktop> T1.mb.

-In the boxes below the timeline on the lower right. (where it says 24 and 24) change these values to 48.

#### Step 2: Making Waves:

-Rotate the arm and hand as shown in the image below:



- Key the *Rotate X* attribute to approximately -60 in the channel box on **frame 1**.

-Go to **frame 9** and change the *Rotate X* attribute to approximately -100.

-Go to **frame 18** and change the *Rotate X* attribute to approximately -30

-Go to **frame 27** and change the *Rotate X* attribute to approximately -100.

-Go to **frame 36** and change the *Rotate X* attribute to approximately -30

-Go to **frame 48** and change the *Rotate X* attribute to approximately -60.

#### Step 3: I'm Ready for my Close-up, Mr. Director.

-Rotate, pan, and dolly the camera so that you are looking at the character like in the image above.

Step 4: Look at the Birdie

-Turn the character's head so that you he is looking at the camera. (Change the *Rotate Y* Attribute.

Step 5: Play it again, Sam.

-Click the playback button to see your animation. When you are satisfied, click it again to pause it.

Step 6: Let's Make a Movie

-Right click the *Timeline* and scroll down to Playblast and click the option box.

- Click Browse and save a Playblast file to the folder named T1. Save the file as (*your subject #*)\_T1.avi.

END OF TASK 1

notify a Media4orce Representative to begin Task #2

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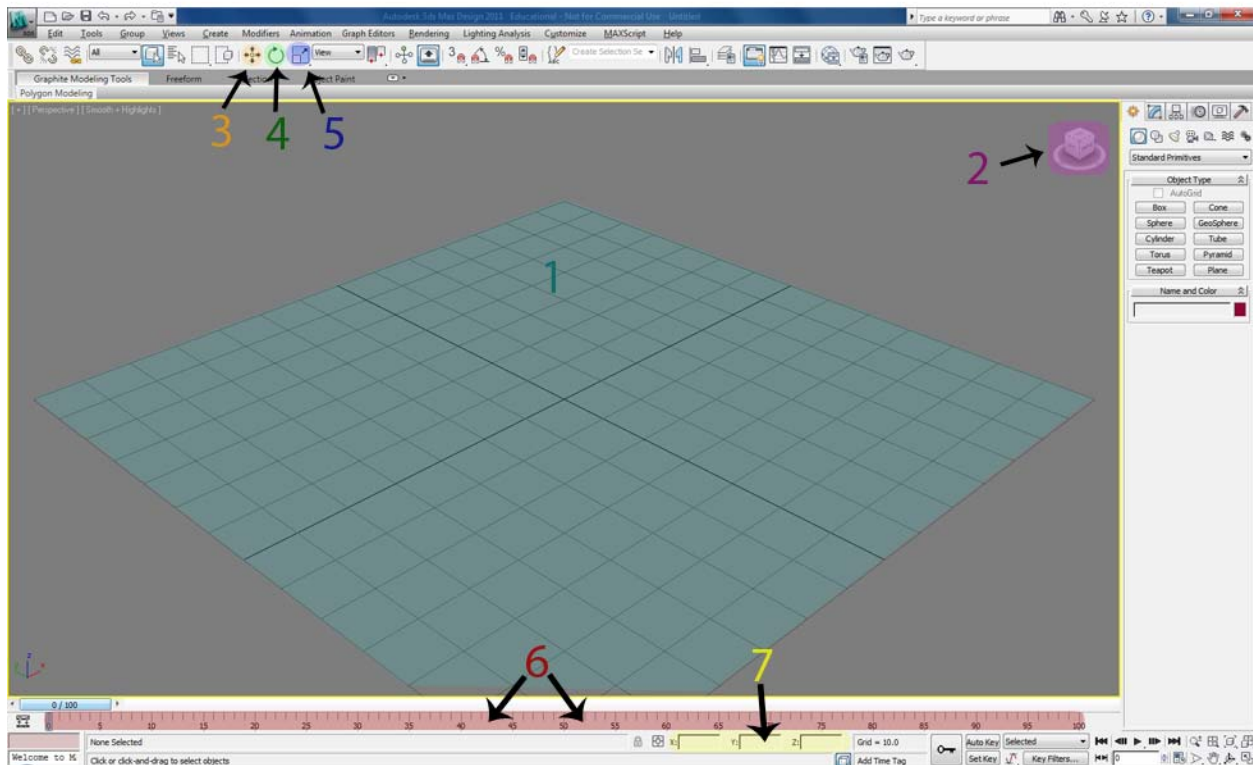
## TASK 2

You will create a simple animation using Autodesk 3D Studio Max. You will perform the same task you just accomplished, but there will be no tutorial. You will need to make the Character wave his hand *twice* in 2 seconds. Remember, there are 24 frames per second. You must also frame the character in a *perspective view with the character looking at the camera*. When the task is done, save a Playblast file to the folder named T2. Save the file as (*your subject #*)\_T2.avi. When you have finished the task, please notify one of the Media4orce members and they will give you the post-assessment survey.

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## Max Tutorial

### Interface



9. The Grid: This is the working plane. The grid uses XYZ coordinate system which is indicated by the axis located on the bottom left of the window. Z correlates to the up/down. X correlates to the left/right. Y correlates to the front/back.

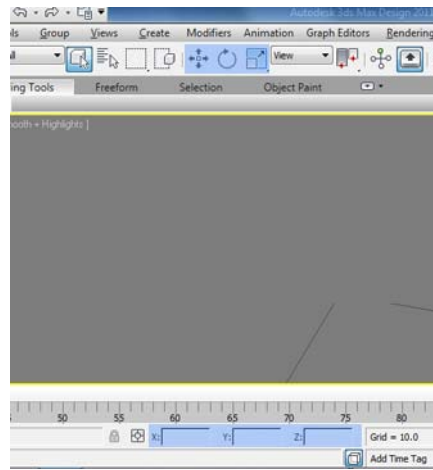
10. The View Cube: A single left-click on the sides on the view cube will allow you to switch the view from the current Perspective view to the Front, Right, or Top View. Left-clicking and holding, on the View Cube will allow you to rotate the cube to see different angles. Left-clicking and dragging on the circular compass below the View Cube will allow you to rotate around the center of the grid. To return to the original Perspective view, click the Home Icon to the top left of the View Cube (or press z).
11. The Move Tool: This tool allows you to *translate* or move an object along the XYZ axis.
12. The Rotate Tool: This tool allows you to *rotate* or pivot an object at any angle.
13. The Scale Tool: This tool allows you to enlarge or shrink an object to any size.
14. Time Line: This bar shows the frames of the animation and the keys. Default time line setting is 100 frames.
15. Transform Attributes: The transform attributes allow you to type in specified angles, distances, or sizes for each of the three axes for rotation, translation, and scaling respectively.
16. The Time Slider: This allows you to select a particular frame for keying purposes. Simply drag the blue box to change the Frame number.

### Moving Around In Max

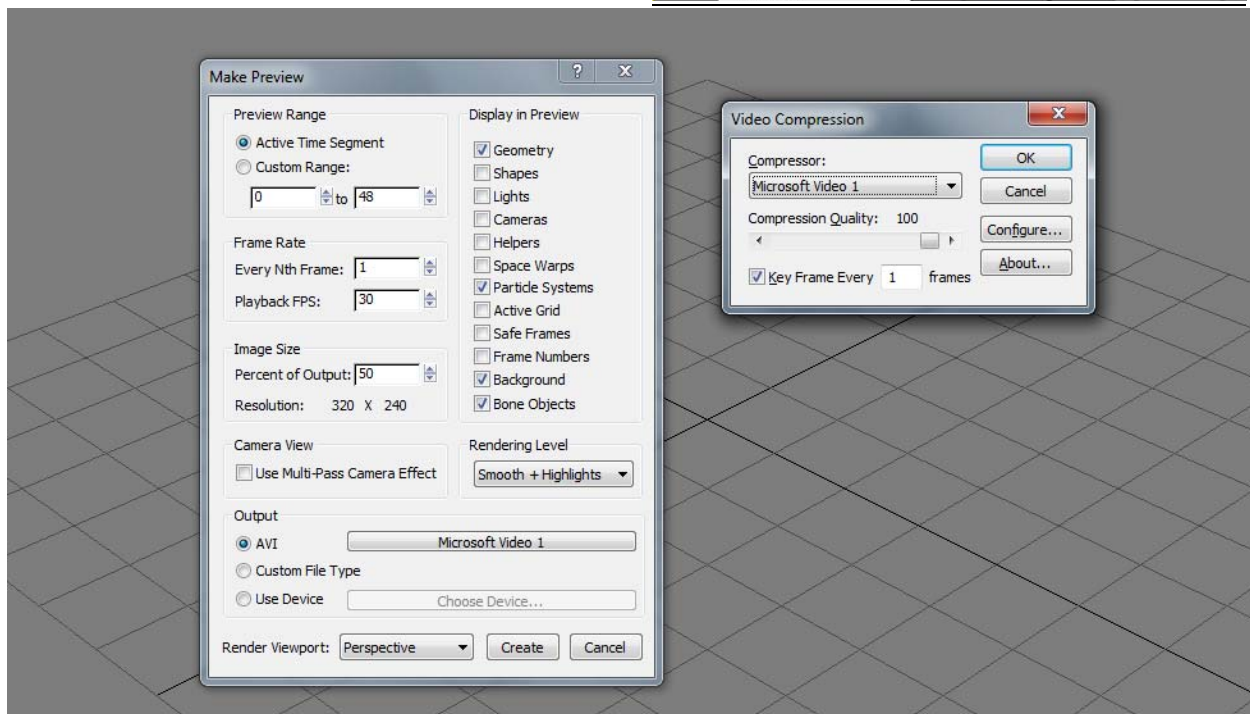
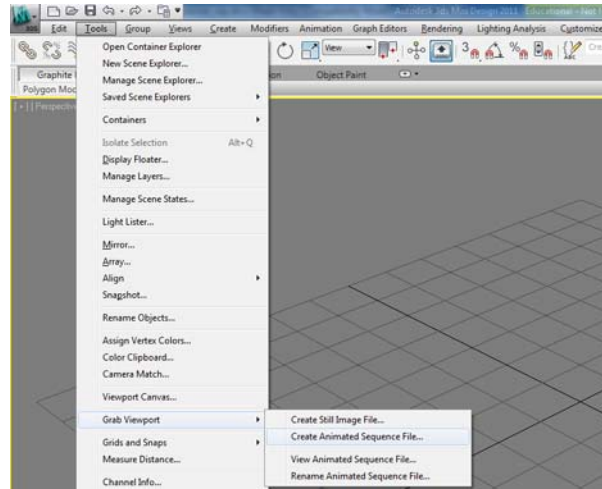
4. Dolly In/ Dolly Out: To *dolly*, or move in or out, Alt + scrolling the mouse wheel.
5. Panning: To *pan*, or move the camera up, down, left, right; middle mouse click and drag.
6. Rotating: To *rotate* or pivot the camera, hold Alt+ middle mouse button.

### Setting Keys and Animating

6. With the desired frame chosen with the *Time Slider*, select the proper tool [*translate, rotate, scale*] and manipulator. Then type in a specific number in the Transform Attributes of either X, Y, or Z.
7. Hit the *Set Key* button at the bottom of the screen till you see a red border on screen, double check the *Time Slider* is where you want it, and hit the key-shaped button.
8. Move the *Time Slider* to the next desired key, and with the *Set Key* button still activated again hit the key-shaped button.
9. Play back the animation using the *Play Animation* button located in the bottom right corner of the screen.
10. When the animation is done, go to *Tools > Grab Viewport > Create Animated Sequence File* to Create a .avi preview of your animation.
11. In the Make Preview dialogue box, you can change the settings of the Animated Sequence File. Make sure the



FPS is set to 24, and then click on Microsoft Video 1/Choose Codec. Here make sure it is set to Microsoft Video 1, Compression Quality 100, and Capture Every 1 Frame. For help retrieving your .avi file see the Task description below.



### TASK

You will create a simple animation using Autodesk 3D Studio Max. You will need to make the Character wave his hand **twice times in 2 seconds**. Remember, there are 24 frames per second. You must also frame the character in **a perspective view with the character looking at the camera**. When the task is done, save a Preview file to the folder named T2. Save the file as *(your subject #)\_T2.avi*. When you have finished the task, please notify one of the Media4orce members and they will give you the second part of the task.

#### **Breakdown**

Step 1: Getting Started

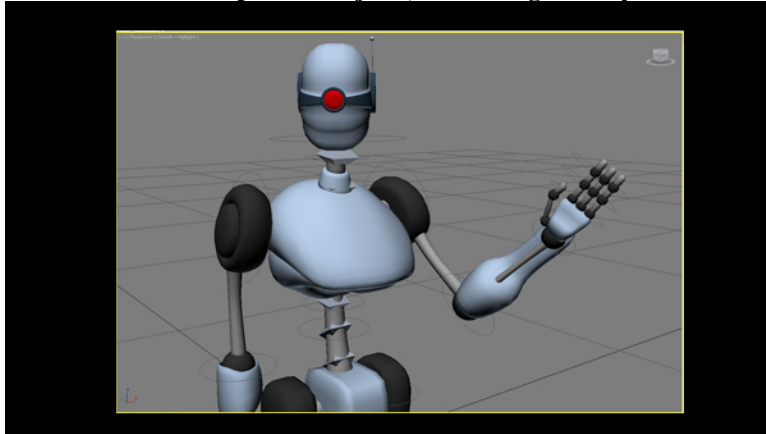
-File> Open Scene > Desktop> T2.max.

-Left of the eight buttons in the bottom right of the screen is a Calendar/Clock symbol. Click it. In the dialogue that pops up under Animation change End Time from 100 to 48.

Step 2: Making Waves:

-Rotate the arm and hand as shown in the image below:

**\*Note: only manipulate the circular manipulator objects, NOT the geometry of the character itself\***



-With the rotation tool selected, click the gray manipulator around the shoulder joint and key the X attribute in the Transform Attributes to -82.823 (make sure the Slider is on **frame 0**).

**\*Reminder: to set a key, click the Set Key Button. Ensure the Time Slider is in the proper position.**

**Then, with the desired manipulator selected hit the key shaped button.\***

- With the Time Slider still on **frame 0**, select the elbow manipulator (gray circle) and key the X attribute to approximately -170.

-Go to **frame 9** and change the *X attribute* to approximately -130.

-Go to **frame 18** and change the *X attribute* to approximately -110.

-Go to **frame 27** and change the *X attribute* to approximately -140.

-Go to **frame 36** and change the *X attribute* to approximately -110

-Go to **frame 48** and change the *X attribute* to approximately -170.

Step 3: I'm Ready for my Close-up, Mr. Director.

-Rotate, pan, and dolly the camera so that you are looking at the character like in the image above.

Step 4: Look at the Birdie

-Turn the character's head so that he is looking at the camera. (Change the *Rotate Z* Attribute.

Step 5: Play it again, Sam.

-Click the Play Animation button to see your animation. When you are satisfied, click it again to pause it.

Step 6: Let's Make a Movie

- Go to Tools> Grab Viewport> Create Animated Sequence File

-In the Make Preview dialogue, change Playback FPS to 24.

-Under Output click Microsoft Video 1 and set "Key Frame Every" to 1 Frame.

-Click Ok. Then click Create.

- To retrieve your .avi file, go to System(C:) > Users > Your Username >My Documents >

3dsMaxDesign>Previews

- Rename the file as (*your subject #*)\_T2.avi and drop it in the folder named T2

END OF TASK

Notify a Media4orce Representative to begin Task #2

## **TASK 2**

You will create a simple animation using Autodesk Maya. You will perform the same task you just accomplished, but there will be no tutorial. You will need to make the Character wave his hand **twice in 2 seconds**. Remember, there are 24 frames per second. You must also frame the character in **a perspective view with the character looking at the camera**. When the task is done, save a Playblast file to the folder named T1. Save the file as (*your subject #*)\_T1.avi. When you have finished the task, please notify one of the Media4orce members and they will give you the post-assessment survey.

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Pre-Test Survey

Subject # \_\_\_\_\_

1. Are you:
    - a. Male
    - b. Female
    - c. Choose not to answer
  2. do you have any impairments that may hinder your ability to perform a computer-based task.
    - a. Yes
    - b. No
- 

\*If you answered Yes to question #4, please inform a Media4orce representative. At this stage, we ask that you turn in your pretest. You will still receive compensation for your time, however we cannot use your data for this research task.

3. Are you a Computer Graphics Technology major?
  - a. Yes
  - b. No

Evaluate the following based on

1= Strongly Disagree

2= Disagree

3= Agree

4= Strongly Agree

\*[Put a check mark on top of the number]

4. I would consider myself knowledgeable in Autodesk Maya.

\_\_\_\_    \_\_\_\_    \_\_\_\_    \_\_\_\_  
1       2       3       4

5. I have acquired the skills necessary for basic animation in Autodesk Maya.

\_\_\_\_    \_\_\_\_    \_\_\_\_    \_\_\_\_  
1       2       3       4

6. I would consider myself knowledgeable in Autodesk 3D Studio Max.

\_\_\_\_    \_\_\_\_    \_\_\_\_    \_\_\_\_  
1       2       3       4

7. I have acquired the skills necessary for basic animation in Autodesk 3D Studio Max.

—      —      —      —  
1      2      3      4

8. I typically have no trouble acquiring new technical skills.

—      —      —      —  
1      2      3      4

9. I consider myself proficient in computer literacy.

—      —      —      —  
1      2      3      4

---

### Post-test Survey

Evaluate the following based on

1= Strongly Disagree

2= Disagree

3= Agree

4= Strongly Agree

1. I would consider myself knowledgeable in Autodesk Maya.

—      —      —      —  
1      2      3      4

2. I have acquired the skills necessary for basic animation in Autodesk Maya

—      —      —      —  
1      2      3      4

3. I would consider myself knowledgeable in Autodesk 3D Studio Max.

—      —      —      —  
1      2      3      4

4. I have acquired the skills necessary for basic animation in Autodesk 3D Studio Max.

—      —      —      —  
1      2      3      4

5. I found the Maya task easy to accomplish

—      —      —      —  
1      2      3      4

6. I found the Max task easy to accomplish

—	—	—	—
1	2	3	4

7. Based on the test I just completed, I would likely pursue a career which required the use of a competitive/similar software to that which I am familiar with.

—	—	—	—
1	2	3	4

8. My knowledge in one software package helped me to be more successful in the other.

—	—	—	—
1	2	3	4

---

### CHECKLIST EVALUATION FOR TASK

Subject # \_\_\_\_\_

1. Is the camera framed in a right perspective view?

Satisfactory  Not Satisfactory

2. Is the character looking at the camera?

Satisfactory  Not Satisfactory

3. Is the animation 2 seconds long?

Satisfactory  Not Satisfactory

4. Does the character wave twice?

Satisfactory  Not Satisfactory

---

*end of Appendix*

