Comparing User Interfaces for Material Assignment

User Study Instructions

Thank you for participating in our user study. During this study you can test 3 different user interfaces to assign materials to virtual 3D objects. First, you will be trained to use each interface in a small tutorial example. Afterwards, you have the task to assign materials on your own for more complex 3D object.

How would you rate your prior knowledge about assigning materials to a 3D object.
(1 = I have never done this, 4 = I have done this a several times before, 7 = I am an expert).

| 1 2 3 4 5 6 7 | [1]

Each of the following 3 sections deals with one of the 3 user interfaces. Please look at the sections in the following order:

The 1st user interface to try is described in Section   1 2 3   [2]

The 2nd user interface to try is described in Section   1 2 3   [3]

The 3rd user interface to try is described in Section   1 2 3   [4]

How to Navigate and Select Parts in the Interface

Basic Navigation and Part Selection Tutorial

Figure 1: *Screenshot of user interface 1*

In Fig.1 you see a screenshot of the user interface. In the 3D object viewer you see a 3D model of a skateboard.

Step 1 Learn how to navigate in the 3D object viewer:

- To rotate the camera around the object, press the *Alt* key on the keyboard and *Left button* on the mouse and drag the mouse in any direction.
- To translate forward or backward, press the *Alt* key and turn the *Wheel* on your mouse forward or backward, respectively.
- To translate the camera up, down, or sideways, press the *Alt* key and *Right button* on your mouse and drag the mouse in the desired direction.

Alt + Left

Alt + Wheel

Alt + Right
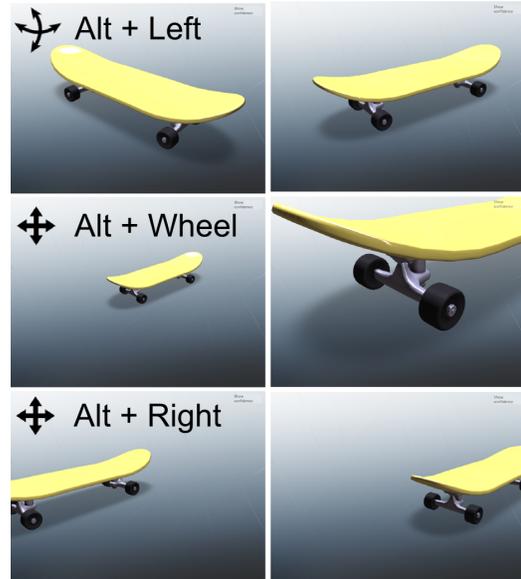
Step 2 Learn how to select an object's part to assign a material:

- If you move the mouse over a part of the object all other parts are greyed out.

- Press the *Left button* of your mouse to select a part.

Move mouse pointer over part
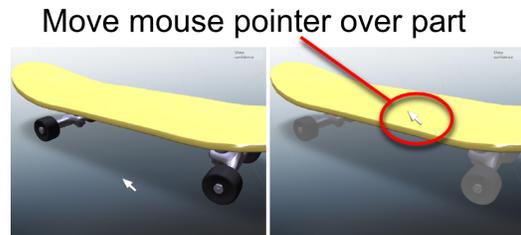
Left click to select a part

User Interface 1: Material Property Sliders

In this user interface you can a employ slider interface to edit material properties. Please let the instructor load the tutorial example.
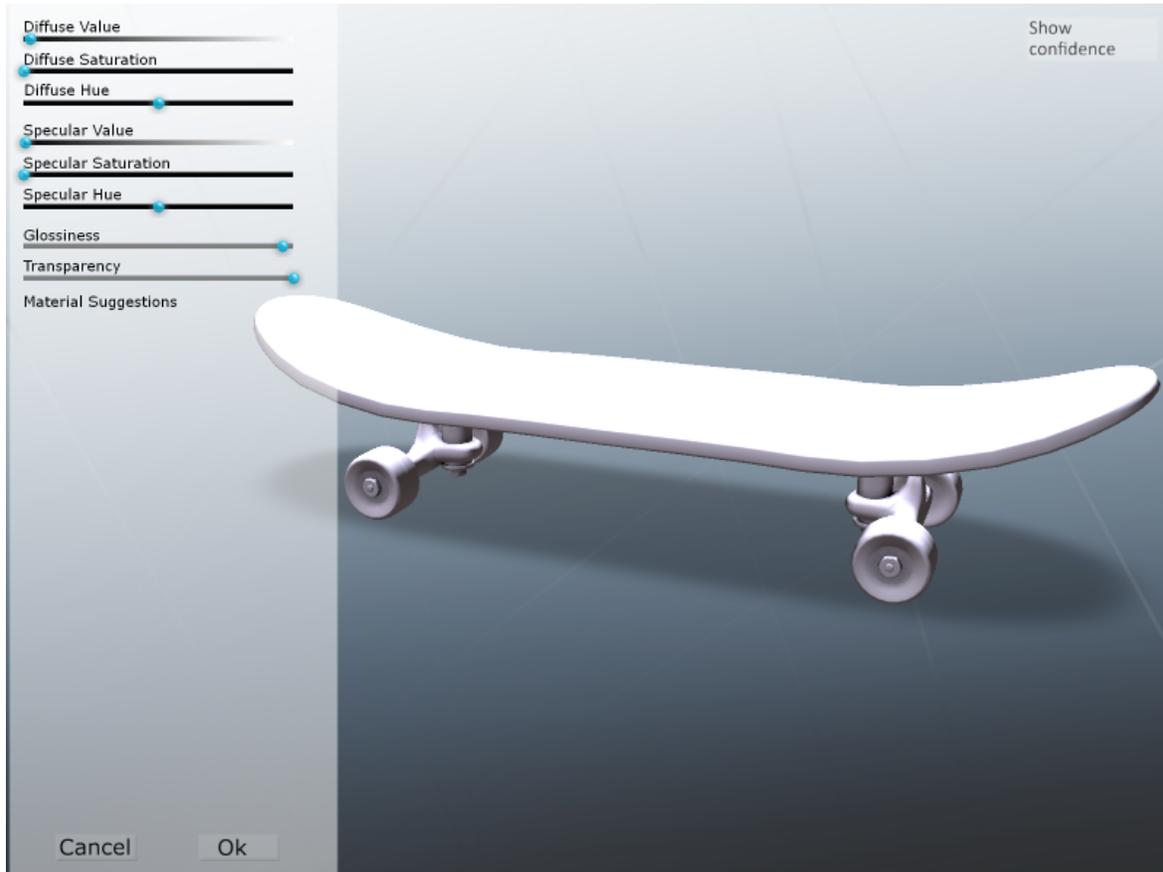

**Figure 2:** *Screenshot of user interface 1*

Tutorial

In Fig. 2 you see a screenshot of the user interface. It is divided into two areas. The left area contains the slider interface. The right area is a 3D object viewer. In the 3D object viewer you see a 3D model of a skateboard that currently has no assigned materials.

Learn how to edit and assign a material:　After selecting a part you have the option to edit the material with the slider interface.

Slider Interface

- *Diffuse Reflection:* To assign a diffuse color to the material, use the *Diffuse Value*, *Diffuse Saturation*, and *Diffuse Hue* sliders.
- *Specular Reflection:* To assign a color to the specular highlights, use the *Specular Value*, *Specular Saturation*, and *Specular Hue* sliders.
- *Glossiness:* This slider controls the appearance of specular highlights on the surface. Move the slider to the right/left to increase/decrease the glossiness of the surface.
- *Transparency:* Move the transparency slider to the right/left to increase/decrease the transparency of the material.
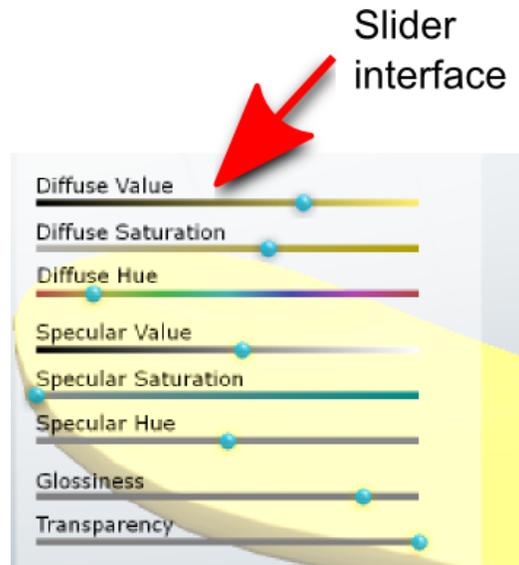
- Once you are satisfied with your material, click the *Ok* button at the bottom of the interface.

In order to practise your learned skills, please assign materials to all parts of the skateboard. Once you think you are familiarized with the interface, you can start with the experiment.

Task: Use your learned skills to assign materials to all parts of the object.

As the instructor is to measure the time that your require to complete this experiment, please do not take a break and try to concentrate on the task. The maximum allow time to complete this experiment is 5 minutes but you can also quit the experiment earlier if you think you have solved the task.

Experiment 1

Let the instructor launch the experiment. You see now a more complex 3D object in the 3D viewer.

Please note the required time for this task [   ]   [5]

Experiment 2

Let the instructor launch the experiment. You see now a more complex 3D object in the 3D viewer.

Please note the required time for this task [   ]   [6]

User Interface 2: Annotated Material Library

In this user interface you can use an annotated material library to assign materials. You can visually browse the library or search for a material using a keyword.
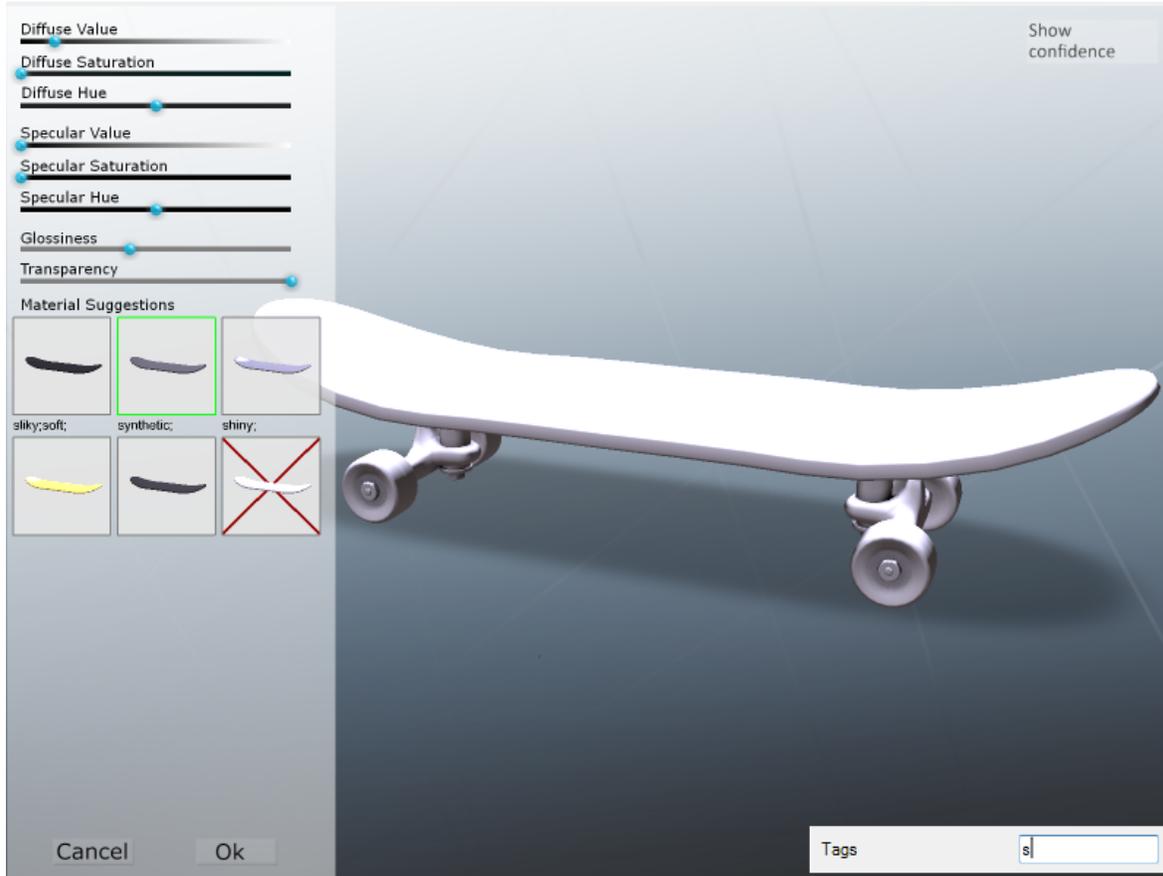

Figure 3: *Screenshot of user interface 2*

Tutorial

Please let the instructor load the tutorial example.

In Fig. 3 you see a screenshot of the user interface. It is divided into two areas. The left area is a material browser that shows available materials of the material library. The right area is a 3D object viewer. In the 3D object viewer you see a 3D model of a skateboard that currently has no assigned materials.

Learn how to run a keyword search for materials and assign them to parts

- In the keyword search interface you have two options: First, to edit the material with the slider interface at the top or, second, to search for an existing material using keywords.

  Slider Interface

- *Diffuse Reflection:* To assign a diffuse color to the material, use the *Diffuse Value*, *Diffuse Saturation*, and *Diffuse Hue* sliders.
- *Specular Reflection:* To assign a color to the specular highlights, use the *Specular Value*, *Specular Saturation*, and *Specular Hue* sliders.
- *Glossiness:* This slider controls the appearance of specular highlights on the surface. Move the slider to the right/left to increase/decrease the glossiness of the surface.
- *Transparency:* Move the transparency slider the right/left to increase/decrease the transparency of the material.

  Keyword Search

- Enter a keyword to search for a material in the provided textbox.
- In the material browser you see several suggested materials for the selected part. They are ranked according to the search keyword entered(left to right, top to bottom) starting in the top left.
- Click on the preview image to select the suggested material.
- Once you are satisfied with your material selection, click the *Ok* button at the bottom of the interface.

In order to practise your learned skills, please assign materials to all parts of the skateboard. Once you think you are familiarized with the interface, you can start with the experiment.

Experiment 1

Let the instructor launch the experiment. You see now a more complex 3D object in the 3D viewer.

Please note the required time for this task [   ]   [7]

Experiment 2

Let the instructor launch the experiment. You see now a more complex 3D object in the 3D viewer.

Please note the required time for this task [   ]   [8]

User Interface 3: Refining Automatic Material Suggestions

This user-interface automatically assigns initial materials to the object. Afterwards, you have the option to refine the material assignment. To simplify the selection progress the interface will provide a ranked list of most suitable materials for a selected part.
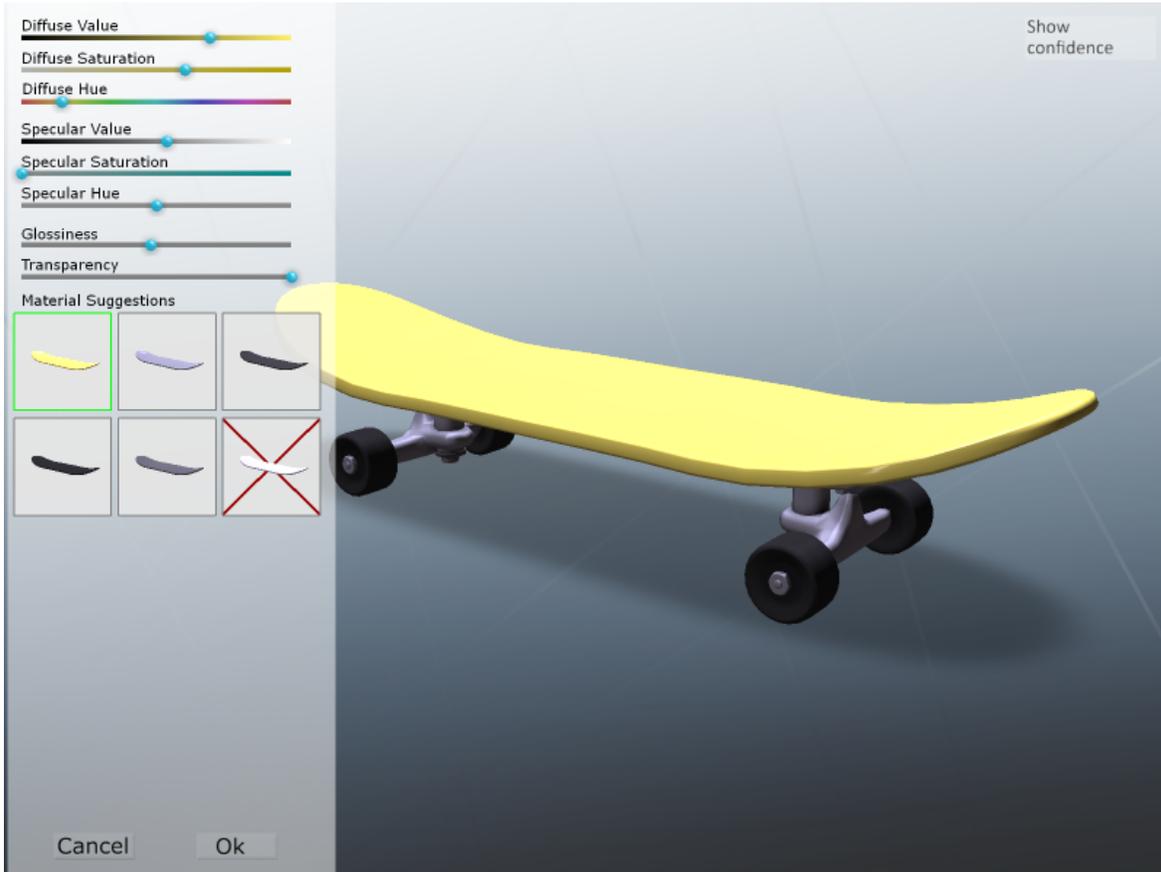

Figure 4: *Screenshot of user interface 3*

Tutorial

Please let the instructor load the tutorial example.

In Fig.4 you see a screenshot of the user interface. It is divided into two areas. The right area is a 3D object viewer. In the 3D object viewer you see a 3D model of a skateboard that already has an automatically assigned material. The left area is an interface that suggests alternative material assignments or allows to edit the material properties. This area is only visible if an part of the object is selected.

Learn how to edit a material

- In the material suggestion and editing interface you have two options: First, to edit the material with the slider interface at the top or, second, to select a material from the ranked material suggestions.

Slider Interface

- *Diffuse Reflection:* To assign a diffuse color to the material, use the *Diffuse Value*, *Diffuse Saturation*, and *Diffuse Hue* sliders.
- *Specular Reflection:* To assign a color to the specular highlights, use the *Specular Value*, *Specular Saturation*, and *Specular Hue* sliders.
- *Glossiness:* This slider controls the appearance of specular highlights on the surface. Move the slider to the right/left to increase/decrease the glossiness of the surface.
- *Transparency:* Move the transparency slider the right/left to increase/decrease the transparency of the material.

Material Suggestion

- Here you see preview images for several suggested materials for the selected part. They are rank according to their likelihood (left to right, top to bottom) starting in the top left corner with the most likely assignment.
- Click on the preview image to select the suggested material.
- Once you are satisfied with your material selection, click the *Ok* button at the bottom of the interface.
- The last suggestion that is marked with a red cross allows you to remove your manual material assignment from the part. The part will then automatically receive the most likely material assignment once you press the *Ok* button.

Manually assigning a material to a part might influence the automatic material assignment. Consequently, the material assignment for each part that does not have a manual assignment yet, might change due to your inputs.

In order to practise your learned skills, please assign materials to all parts of the skateboard. Once you think you are familiarized with the interface, you can start with the experiment.

Experiment 1

Let the instructor launch the experiment. You see now a more complex 3D object in the 3D viewer.

Please note the required time for this task [   ]   [9]

Experiment 2

Let the instructor launch the experiment. You see now a more complex 3D object in the 3D viewer.

Please note the required time for this task [   ]   [10]