

Supplemental Material for Multi-view Clipart Design

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1. All 3D Shape Results from Canonical Viewpoints

We show the 3D shape results of our method from canonical viewpoints.

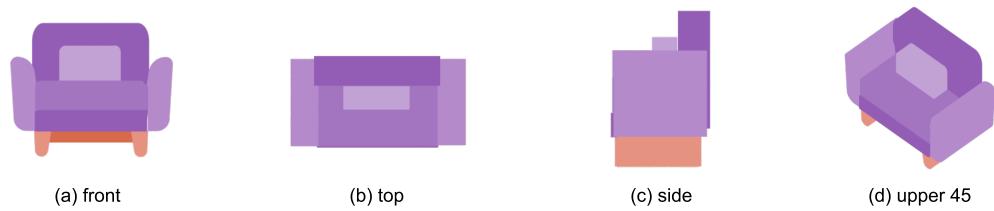


Figure 1. Chair case 1.

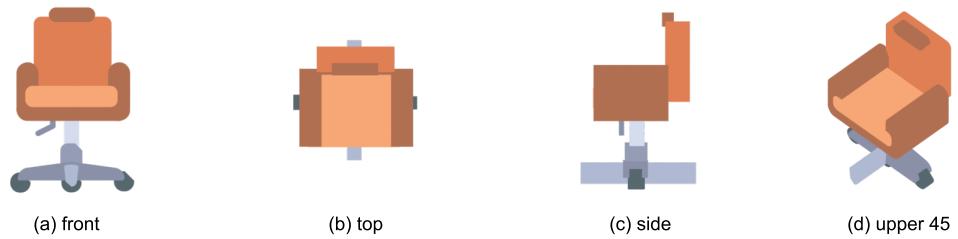


Figure 2. Chair case 2.

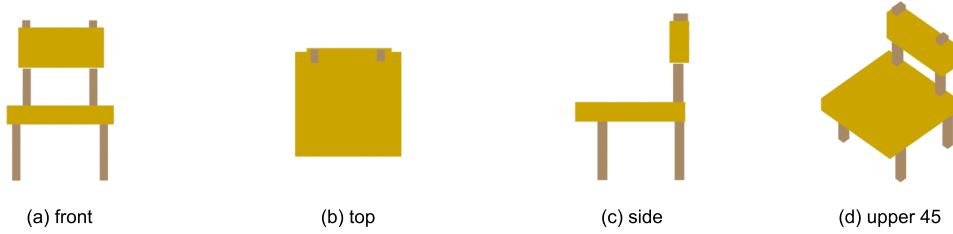


Figure 3. Chair case 3.

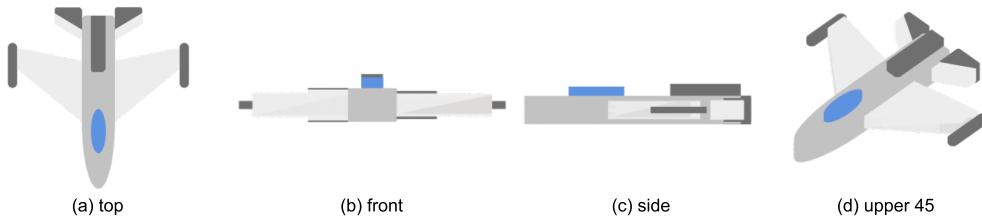


Figure 4. Airplane case 1.

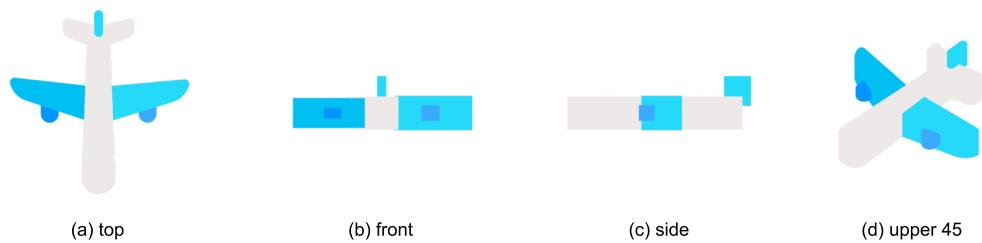


Figure 5. Airplane case 2.

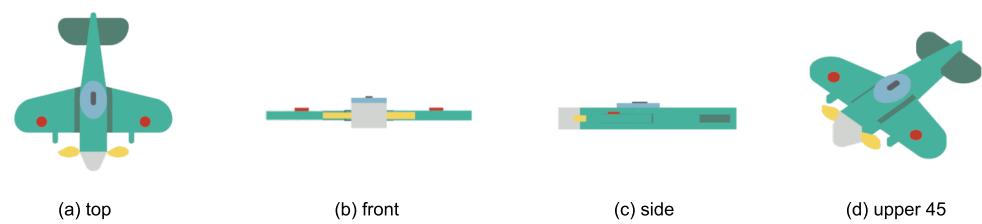


Figure 6. Airplane case 3.

2. All Results of User Study

We show all the design clipart from the participants of our user study, including two object categories, i.e., chair and airplane.

2.1. Chair case1

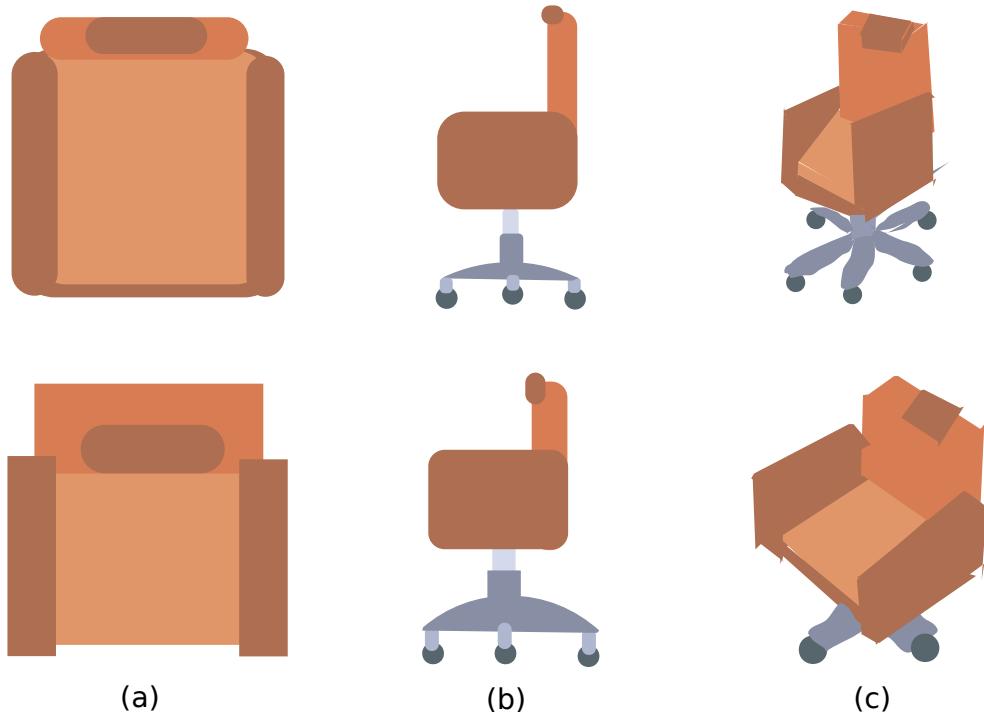


Figure 7. We show participant 01’s result from (a) top, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 8:38 mins (top), 10:29 mins (side), and 27:10 mins (upper 45°) drawing without visual scaffold, and 2:39 mins (top), 6:15 mins (side), and 8:00 mins (upper 45°) with visual scaffold.

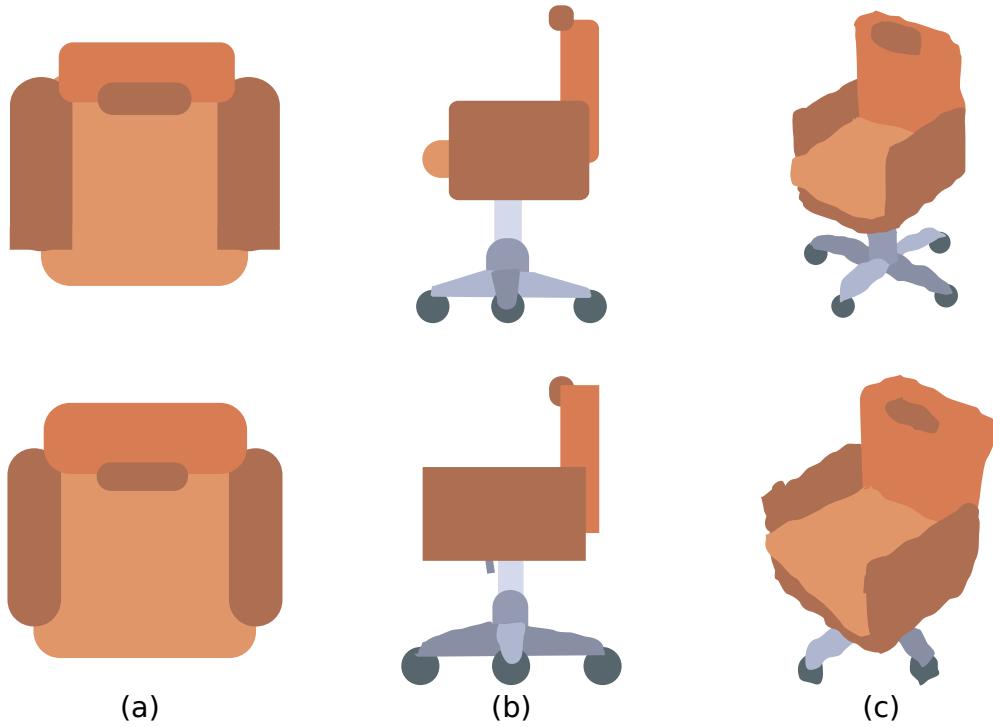


Figure 8. We show participant 08’s result from (a) top, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 18:30 mins (top), 15:46 mins (side), and 41:33 mins (upper 45°) drawing without visual scaffold, and 19:21 mins (top), 34:35 mins (side), and 26:01 mins (upper 45°) with visual scaffold.

2.2. Chair case2

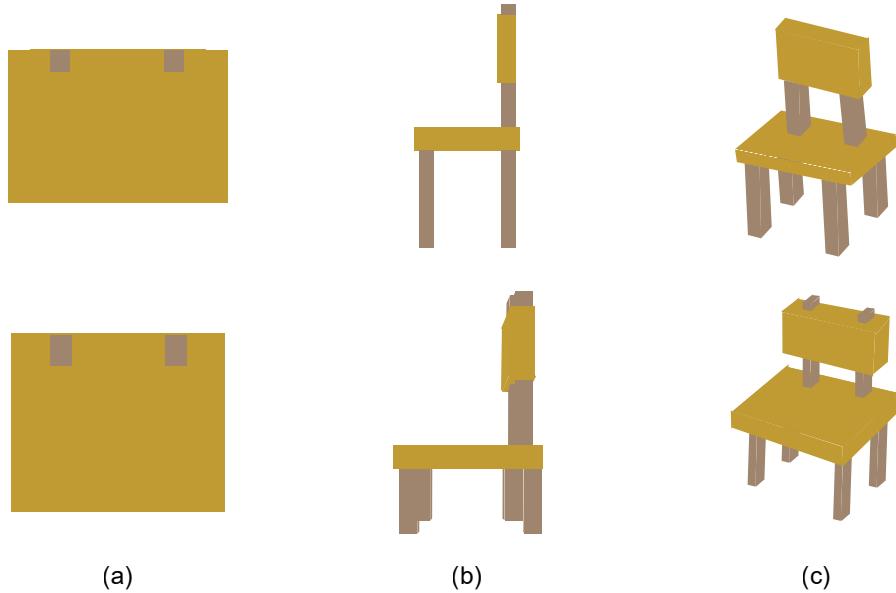


Figure 9. We show participant 04’s result from (a) top, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 3:45 mins (top), 4:40 mins (side), and 16:40 mins (upper 45°) drawing without visual scaffold, and 9:00 mins (top), 35:28 mins (side), and 37:00 mins (upper 45°) with visual scaffold.

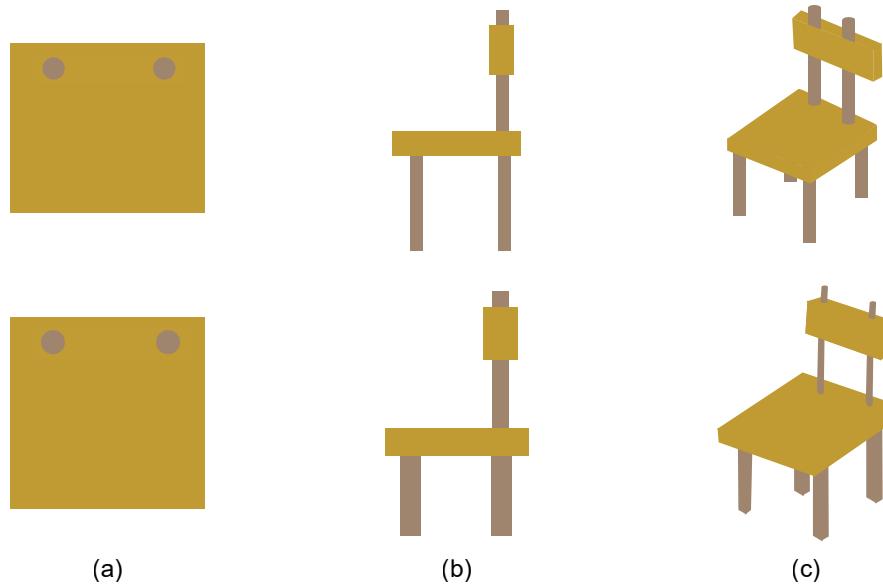


Figure 10. We show participant 10’s result from (a) top, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 5:41 mins (top), 4:20 mins (side), and 28:56 mins (upper 45°) drawing without visual scaffold, and 2:37 mins (top), 5:00 mins (side), and 31:19 mins (upper 45°) with visual scaffold.

2.3. Chair case3

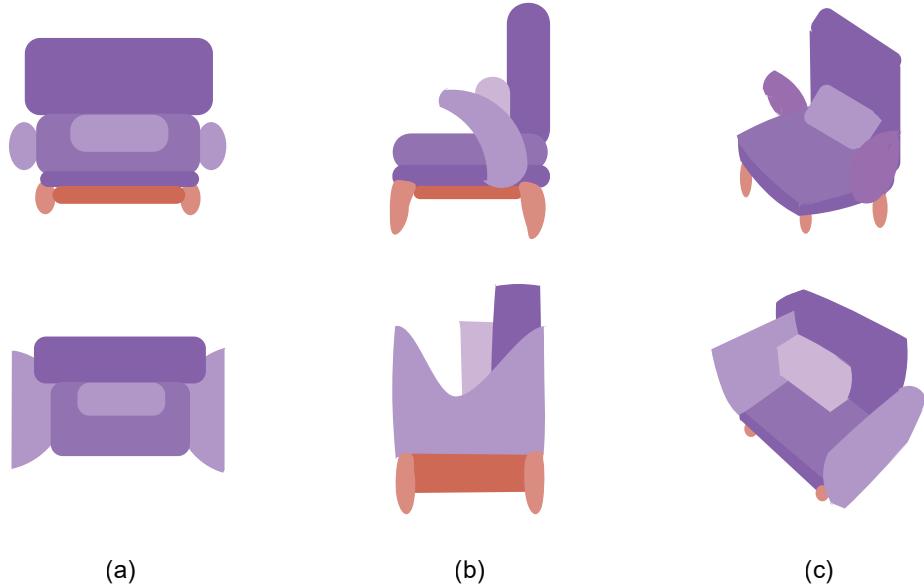


Figure 11. We show participant 03’s result from (a) top, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 19:37 mins (top), 20:39 mins (side), and 43:00 mins (upper 45°) drawing without visual scaffold, and 9:43 mins (top), 15:39 mins (side), and 18:30 mins (upper 45°) with visual scaffold.

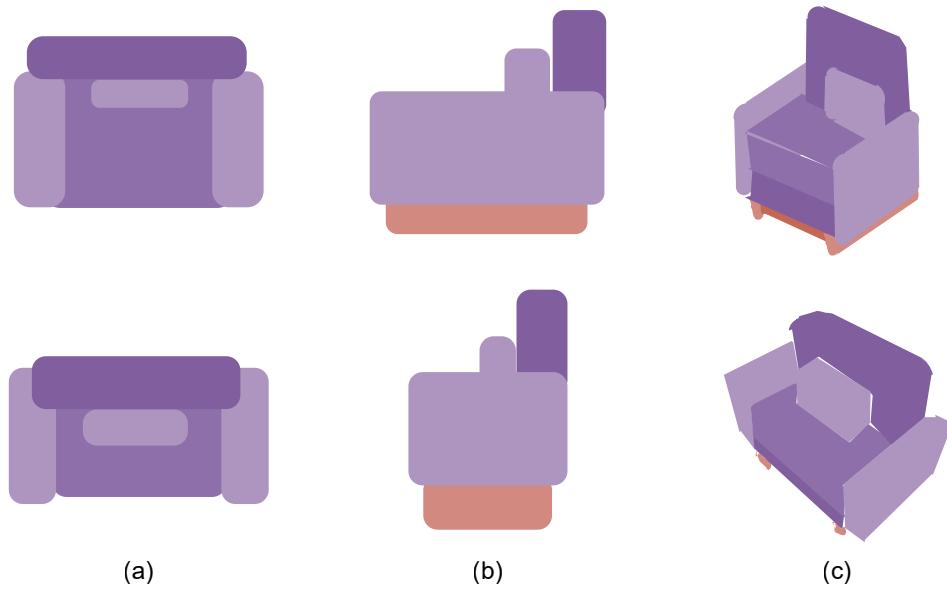


Figure 12. We show participant 07’s result from (a) top, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 08:06 mins (top), 04:19 mins (side), and 48:02 mins (upper 45°) drawing without visual scaffold, and 05:44 mins (top), 03:10 mins (side), and 09:48 mins (upper 45°) with visual scaffold.

2.4. Airplane case1

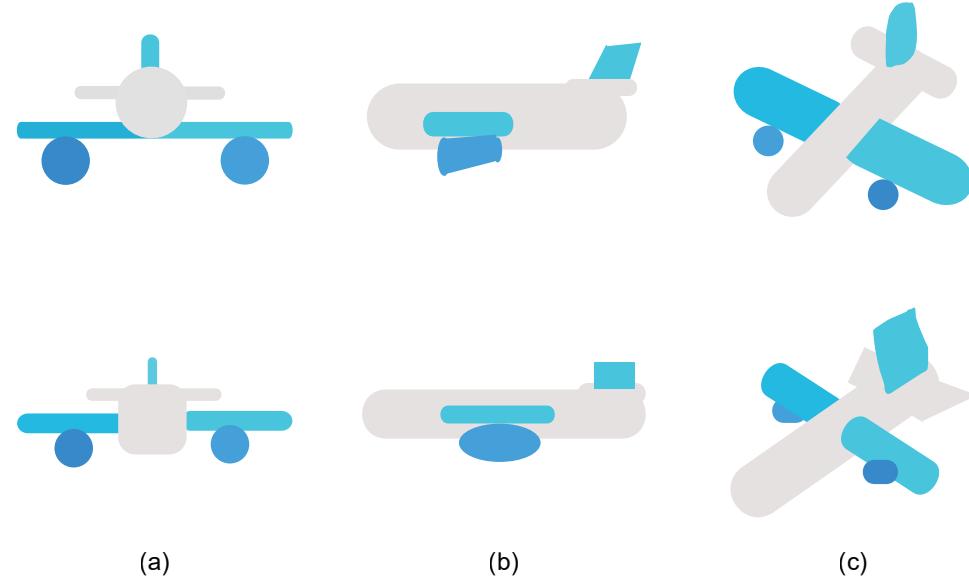


Figure 13. We show participant 05’s result from (a) front, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 12:00 mins (front), 08:21 mins (side), and 20:00 mins (upper 45°) drawing without visual scaffold, and 10:30 mins (front), 03:20 mins (side), and 09:56 mins (upper 45°) with visual scaffold.

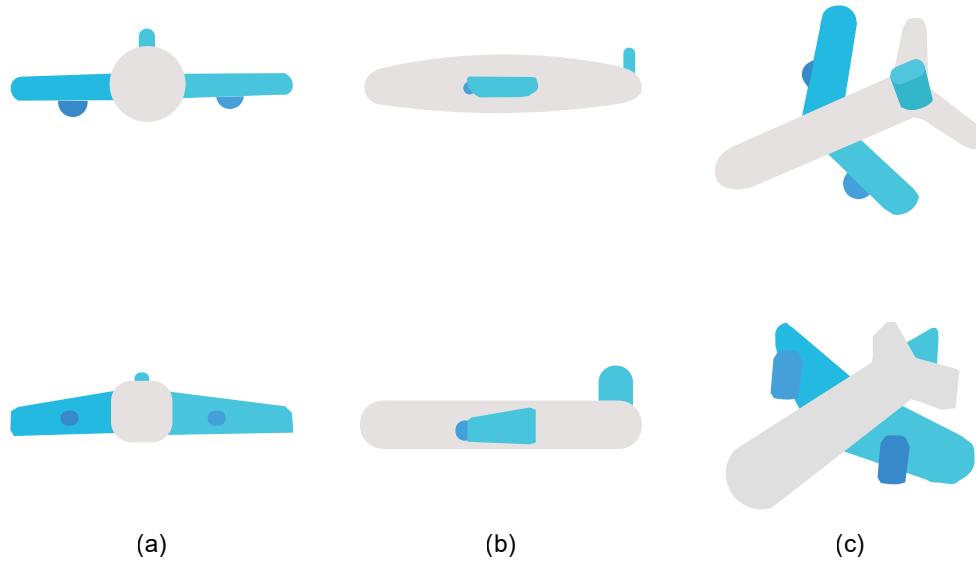


Figure 14. We show participant 06’s result from (a) front, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 09:42 mins (front), 11:21 mins (side), and 13:20 mins (upper 45°) drawing without visual scaffold, and 07:46 mins (front), 05:49 mins (side), and 16:47 mins (upper 45°) with visual scaffold.

2.5. Airplane case2

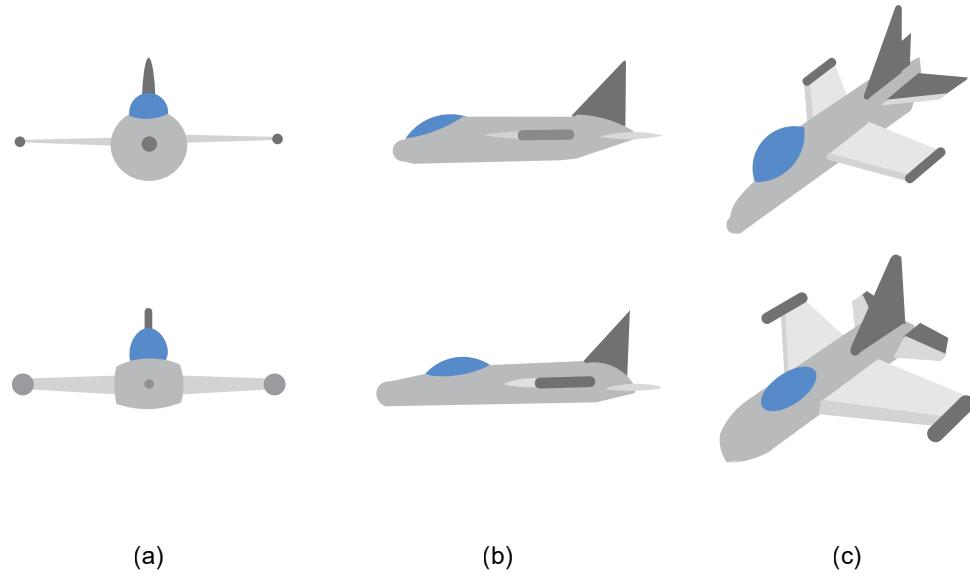


Figure 15. We show participant 02’s result from (a) front, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 10:21 mins (front), 19:48 mins (side), and 45:47 mins (upper 45°) drawing without visual scaffold, and 18:31 mins (front), 17:10 mins (side), and 16:20 mins (upper 45°) with visual scaffold.

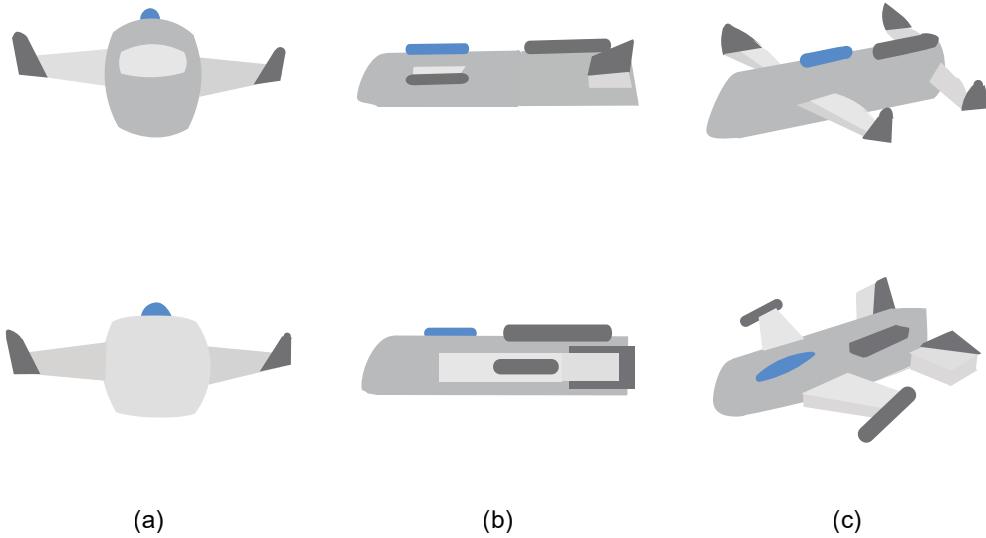


Figure 16. We show participant 09’s result from (a) front, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 32:28 mins (front), 18:20 mins (side), and 57:12 mins (upper 45°) drawing without visual scaffold, and 17:00 mins (front), 08:54 mins (side), and 41:10 mins (upper 45°) with visual scaffold.

2.6. Airplane case3

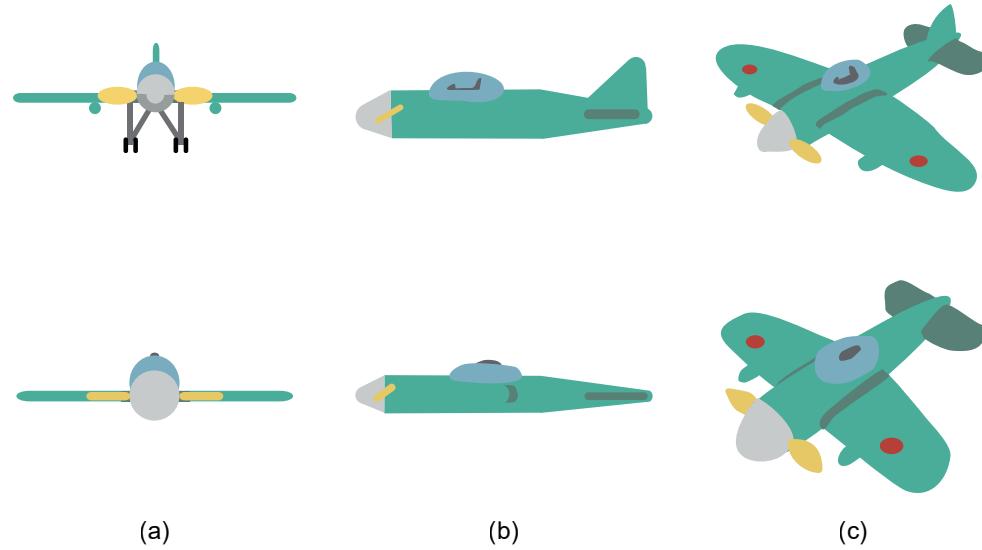


Figure 17. We show participant 11’s result from (a) front, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 90:03 mins (front), 15:11 mins (side), and 46:00 mins (upper 45°) drawing without visual scaffold, and 15:00 mins (front), 13:00 mins (side), and 26:12 mins (upper 45°) with visual scaffold.

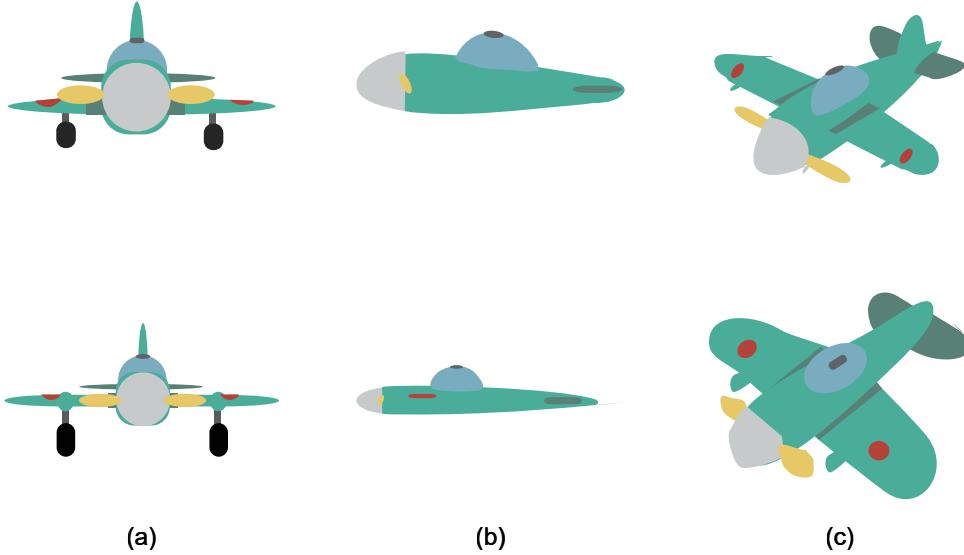


Figure 18. We show participant 12’s result from (a) front, (b) side, and (c) upper 45° viewpoints. The results in the first row are the results without visual scaffold, and the results in second row are the results with visual scaffold. This participant spent 39:00 mins (front), 20:10 mins (side), and 16:45 mins (upper 45°) drawing without visual scaffold, and 19:25 mins (front), 24:00 mins (side), and 25:18 mins (upper 45°) with visual scaffold.

3. Interview questionnaire

In this section, we provide all the questions we asked in our interview questionnaire. In the questionnaire, there are three sections, including user’s drawing experience, the viewpoint survey, and the scaffold aids survey.

3.1. User’s drawing experience

1. Do you have any drawing experiences?
 - (a) digital painting
 - (b) physical painting
 - (c) no

2. If yes, for how many years?

3.2. Viewpoint survey

1. Do you think there are differences of drawing difficulties when you draw different the clipart under different viewpoints?

(a) yes

(b) no

2. If yes, which viewpoint you think is the most difficulty for airplane clipart?

(a) front

(b) side

(c) top-side

3. If yes, which viewpoint you think is the most difficulty for chair clipart?

(a) top

(b) side

(c) top-side

3.3. Scaffold aids survey

1. Do you think visual scaffold is helpful for drawing novel view clipart?

(a) yes

(b) no

2. If yes, how the provided visual scaffold affect you while drawing? (open question)

3. Other comments and suggestions. (open question)