Instructional Designer Recommendations:

1. Considering the Cognitive Theory of the multimedia learning Figure 1, meaningful learning can be achieved if the learners engage in the following cognitive process:

   As mentioned in Colvin, & Mayer (2016):
   - Selecting words and images: the first step is to pay attention to relevant words and images in the presented material.
   - Organizing words and images: the second step is to mentally organize the selected material in coherent verbal and pictorial representations.
   - “Integrating: Finally, to integrate incoming verbal and pictorial representation with each other and with existing knowledge” (p.36)

2. Pitfalls to keep in mind (Colvin, & Mayer, 2016 a):
   - “Too much of a Good Thing”: It’s tempting to use an eye-catching mix of animations, sounds, audio, and printed text to convey your content. However, we have good evidence to support our advice: Don’t do it!”(p.18) more details in Coherence Principle section (2.3. Techniques for Reducing Extraneous process.)
   - “Not enough of a Good Thing” (p.18): It is opposite to ‘too much of a good thing’ when it is omitting interactivity, other than back and forward buttons. Learners might lose attention after 15 minutes (Hattie & Yates, 2014), even if it is using beautiful pictures but without interactivity related to the topic.
   - “Losing Sight of the Goal” (p. 18): the technological tools should be used depending on the goal of the learning activity. Gravitating towards to the latest cool trends of virtual tools should be considered in support of the learning and the task.

3. Teacher and instructors should give Instant feedback, even more, when it is a complex task, as well as address misconceptions. This practice should decrease negative feelings (Cevik, & Altunt, 2016).

4. “Design appropriate materials according to the learners’ prior knowledge” could potentially reduce the intrinsic cognitive overload. The study found after conducting the experiment (see Reference) that the higher the intrinsic cognitive load in a task is, the lower the learning outcomes are likely to be. This can be also affected by the students’ prior knowledge (Leppink, Paas, van Gog, van der Vleuten, 2014).
**Figures**

**Figure 1:** Video length graph  

**Figure 4.** Median normalized engagement times vs. length for tutorial videos. Students engaged more with Khan-style tablet drawing tutorials (a.) than with PowerPoint slide and code screencast tutorials (b.). Error bars are approximate 95% confidence intervals for the true median [14].