

# *MakerTube* – Inspiring Students to Make at Home During COVID-19 School Closures

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### Abstract

The Kennesaw State University iTeach MakerBus launched in 2018 with the mission to take maker technologies and maker-centered learning to K-12 institutions and community centers around metro Atlanta [1]. Over the next two years, the MakerBus served thousands of students and teachers, but in March 2020, the MakerBus was forced off the road due to the COVID-19 pandemic and school closures. To continue to support students and teachers during virtual learning, the MakerBus team shifted how they provided students with opportunities to learn through maker-centered learning. One of these initiatives was *MakerTube* – a series of videos that challenge students to tinker and create using readily available materials. The videos were shared online for teachers and students to make and create at home with their families. As schools have opened their doors over the past two years, *MakerTube* continues to provide a way for K-12 teachers to leverage maker-centered learning in their classrooms. This poster will explain how the videos were designed and created, from pre-production to post-production, and their impact.

### Introduction

The vision for the KSU iTeach MakerBus came from a desire to increase access to maker technologies and maker-centered learning in the classroom to encourage designing, creation, and innovation in K-12 schools and communities. The iTeach MakerBus is part of KSU iTeach, the service unit within the School of Instructional Technology and Innovation in the Bagwell College of Education. KSU iTeach supports school districts with instructional technology coaching and professional development. After serving thousands of students and teachers with events, projects, and professional development, in March 2020, the COVID-19 pandemic forced the MakerBus off the road due to school closures. To continue to support students and teachers with maker-centered learning, the MakerBus team had to radically shift how students in the community were provided with opportunities to learn through maker-centered learning. After hearing firsthand from teachers and administrators about the difficulties of supporting students during remote learning, the MakerBus team decided it would be best to provide teachers with resources to share with their students to spark creativity and design thinking at home. One of the resources developed

from this period was *MakerTube* – a series of videos that challenge students to tinker and create using readily available materials at home. The videos were shared with teachers to support virtual learning and encourage students to make and create at home with their families. Now that schools have reopened, *MakerTube* has evolved into a resource for teachers to integrate maker-centered learning and design thinking in their lessons and to promote bringing the MakerBus to local districts and schools.

### Overview

Each *MakerTube* video is approximately five to seven minutes and is designed to reach a wide array of students from kindergarten to high school. Therefore, the curriculum connections for each video are open-ended so that each teacher can tailor the video to meet their specific curriculum and lesson. The topics of the videos were selected based on the materials that would potentially be available to students and teachers at home during the pandemic. The beginning of each video introduces a design challenge to get students interested and engaged in the project. This piece is critical because it brings the viewers' attention to the unique characteristics of the project they are about to make and how they can develop a unique version of that project by iterating and experimenting after learning how to make it. After the design challenge, the supplies are displayed that are necessary to begin the first iteration. The next section of each video explains how to create and design the project's first iteration. The most important part of the video is after the explanation, where students are again challenged to iterate and expand their design, using different materials or trying other techniques or strategies as a springboard for creating something entirely their own. At the end of each video, students are invited to share their creations online. This section is also critical. Sharing artifacts within a community is an essential part of constructionist learning and an integral component of maker-centered learning [2].

### Creation Process

The production process of setting up, filming, and editing each video underwent several rounds of iteration before a final procedure for each video was refined and perfected. Each video contained unique challenges because each project used different processes and materials. Some videos took only

a few hours to complete from start to finish, while others required days of filming and editing. The videos were filmed using iPhones and edited using iMovie. A top-down video angle was used for the instructions to focus the camera on what the viewer's hands needed to do to begin the first iteration of the project. This was accomplished using an iPhone camera mount with an articulating arm clamped to a desk. For the introduction and closing, a green screen was used to display the branding of the MakerBus, as well as video and photos related to the project. The audio and video production quality dramatically increased over time. For example, household lamps were initially used for lighting, and in later videos, a proper film and photography lighting rig was used for each video. Special effects were also added over time. Initially, the videos only featured an introduction, instructions, and a closing. Subsequent videos utilized features such as stop motion animation and slow motion to keep the viewer interested and engaged. Copyright-free videos and images were also used from Pixabay to add connections to places or concepts relevant to the project [3]. The audio quality also improved over time. For instance, the voiceover was initially recorded while filming. After observing and listening to the audio quality over several videos, a USB microphone was purchased for recording the voiceover. To ensure the highest quality voiceover audio possible, all recording was done in a wardrobe closet to prevent echo or external sound from being recorded. Finally, all background music was created from copyright-free GarageBand samples. After editing and exporting, each video was added to a YouTube playlist on the KSU iTeach YouTube channel [4]. The videos were primarily shared on the KSU iTeach MakerBus Twitter page and through email to teachers and administrators.

### Impact

KSU iTeach supports local school districts in Atlanta with instructional technology coaching and professional development. Therefore, the videos were initially used by classroom teachers who receive coaching from KSU iTeach and follow the iTeach MakerBus on Twitter. After distributing the links to the videos, parents, and teachers posted pictures of students completing the projects. For example, one parent tweeted, "After a long day of virtual school, we were thrilled to get outside and create with nature!" [5]. Another teacher shared a student's photo with the caption, "He made a Kazoo to learn about the science of sound! Sounds great!" [6]. Another teacher shared a picture of a student's project and tweeted, "She used bamboo skewers and bobbins from a sewing machine for her rainbow lambo" [7]. As more videos were made and shared online, the viewership expanded to reach educators and students across the country and the globe. The most viewed video is *How to make a TIN FOIL BOAT!* [8], which has been viewed 87,000 times with viewers from the United States, Canada, Australia, United Kingdom, and the Philippines. A list of the videos and their current number of views is listed in Table 1.

**Table 1 Video publication date and view count as of 07/25/2022**

Title	Published	Views
How to make a CATAPULT!	3/30/2020	889
How to make a FLIPPIN' FLYER!	4/6/2020	536

How to make a KAZOO!	4/13/2020	4,244
How to make CARDBOARD CONSTRUCTORS!	4/20/2020	375
How to make a PAN FLUTE!	4/27/2020	16, 249
How to make an ORIGAMI HEART & YODA!	5/4/2020	439
How to make a LIFESAVER LAMBO!	5/11/2020	3,415
How to make a PAPER PUPPET!	5/25/2020	2,388
How to make a RAINSTICK!	8/30/2020	651
How to make a NATURE DISPLAY!	9/14/2020	925
How to make a LAVA BOTTLE!	9/28/2020	321
How to make a CIPHER WHEEL!	10/12/2020	2,474
How to make a TIN FOIL BOAT!	12/9/2020	87,299
How to make a PAPER SNOWFLAKE!	12/17/2020	116
How to make a MARBLE RUN!	1/24/2021	115
How to make a POP-UP CARD!	2/9/2021	243
How to make a PAPER BRIDGE!	4/13/2021	582
How to make a SEED BOMB!	5/9/2021	117
How to make a PAPER WINDMILL!	5/9/201	130

### Implications

As seen in Table 1, some *MakerTube* videos currently have thousands of views on YouTube from viewers all around the globe, while others have significantly less. During the creation process, deciding which projects would support teachers the most was difficult. Therefore, as previously stated, each video was developed for a broad audience based on what materials were readily available to students during the pandemic. Despite variance in view count, the purpose of the videos was to provide a resource for students to pursue maker-centered learning when teachers were looking for resources and content to share with students during the COVID-19 school closures. Now that schools have reopened, *MakerTube* continues to be a resource for the iTeach MakerBus to promote maker-centered learning. The videos have been used to support in-person MakerBus events and as a free promotional resource to advertise for the iTeach MakerBus. Classroom teachers have added the videos to the lessons they teach each year. Some schools have also added the videos to an online virtual makerspace where students can share what they have made with other students and the broader community.

### References

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