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Three-Dimensional Printing in Occupational Therapy: An Instructional Video Series

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Three-Dimensional Printing in Occupational Therapy: An Instructional Video Series

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Background

Three-dimensional printing (3DP) is an additive manufacturing technique that uses a digital model to convert consecutive thin layers of moldable materials to produce a substantial 3D object (GCFGlobal, n.d.). 3D-printed devices are cost-effective, time-saving, effective, and highly customizable (Hunzeker & Ozelie, 2021). Medical practitioners use 3D-printed contour models, zygomatic bone implants, middle ear ossicles in maxillofacial surgery (Ghai et al., 2018) and 3D-printed vertebra bodies during spinal reconstruction surgery (Senkoylu et al., 2020). Despite the clinical potential of 3DP in occupational therapy (OT) practice, training in the use of 3DP is not an OT education standard, which leads to limited knowledge of 3DP among OT practitioners and limited use of 3DP in OT practice.

Problem

OT practitioners lack knowledge on how to use 3D printers to print assistive devices in clinical practice which impacts OT service delivery and client's occupational engagement and performance.

Purpose

To create an online instructional video series to educate OT practitioners on how to use a 3D printer to print a range of devices and equipment for use in clinical practice.

Methods

Theoretical Framework

- The Transformative Learning Theory and the Unified Theory of Acceptance and Use of Technology provided structure for this project.

Literature Review & Synthesis

- Reviewed and synthesized literature on 3DP and OT practice.

Equipment Procurement

- Rented audio-visual equipment.
- Used the free version of Camtasia and Wondershare Filmora 12 audio and video editing software.
- Utilized the Ultimaker S3 printer and print filaments at Texas Technology Access Program (TTAP) to print assistive devices.
- Downloaded free 3D models from online repositories.

Instructional Video Development

- Initiated writing of video scripts.
- Submitted scripts for feedback
- Initiated video recording
- Submitted videos for feedback

Instructional Video Revision

- Revised scripts and video after feedback
- Resubmitted videos for final feedback

Instructional Video Contents

13 instructional videos were created

Topics Covered:

- Overview of 3DP in Healthcare
- Benefits of 3DP
- Selecting a 3D printer
- Selecting an optimal print filament
- 3D model download and file conversion
- 3D model slicing.
- 3D-printed plastic bottle opener
- 3D-printed Toothpaste cap opener
- 3D-printed can lid opener
- Support structure application and removal
- 3D printer and filament maintenance.

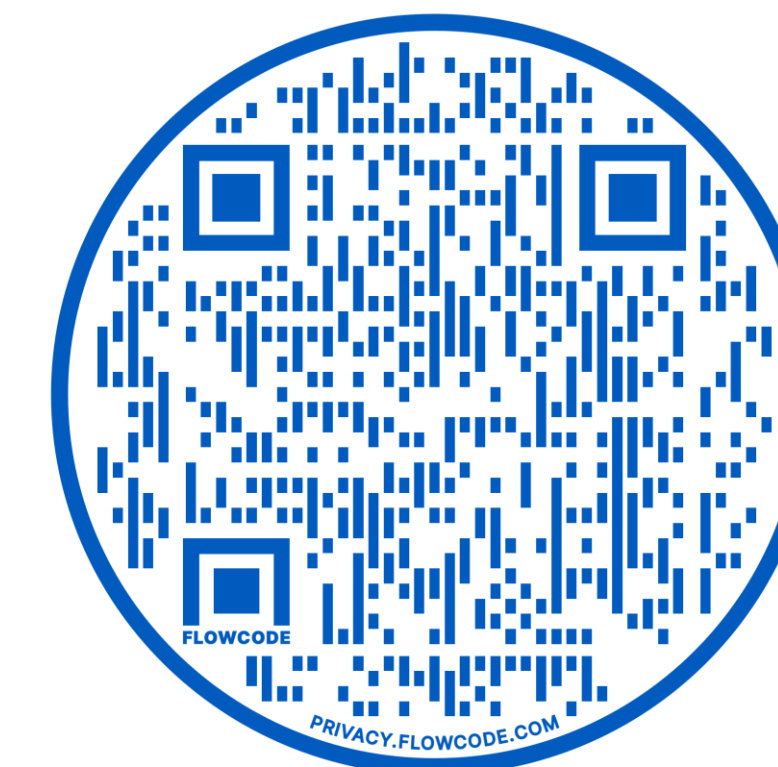
Project Dissemination

- Published videos to the project's YouTube channel
- Published to TTAP Taco Tuesday YouTube channel
- An article for OT Practice magazine
- Future project presentation at AOTA and TOTA conferences

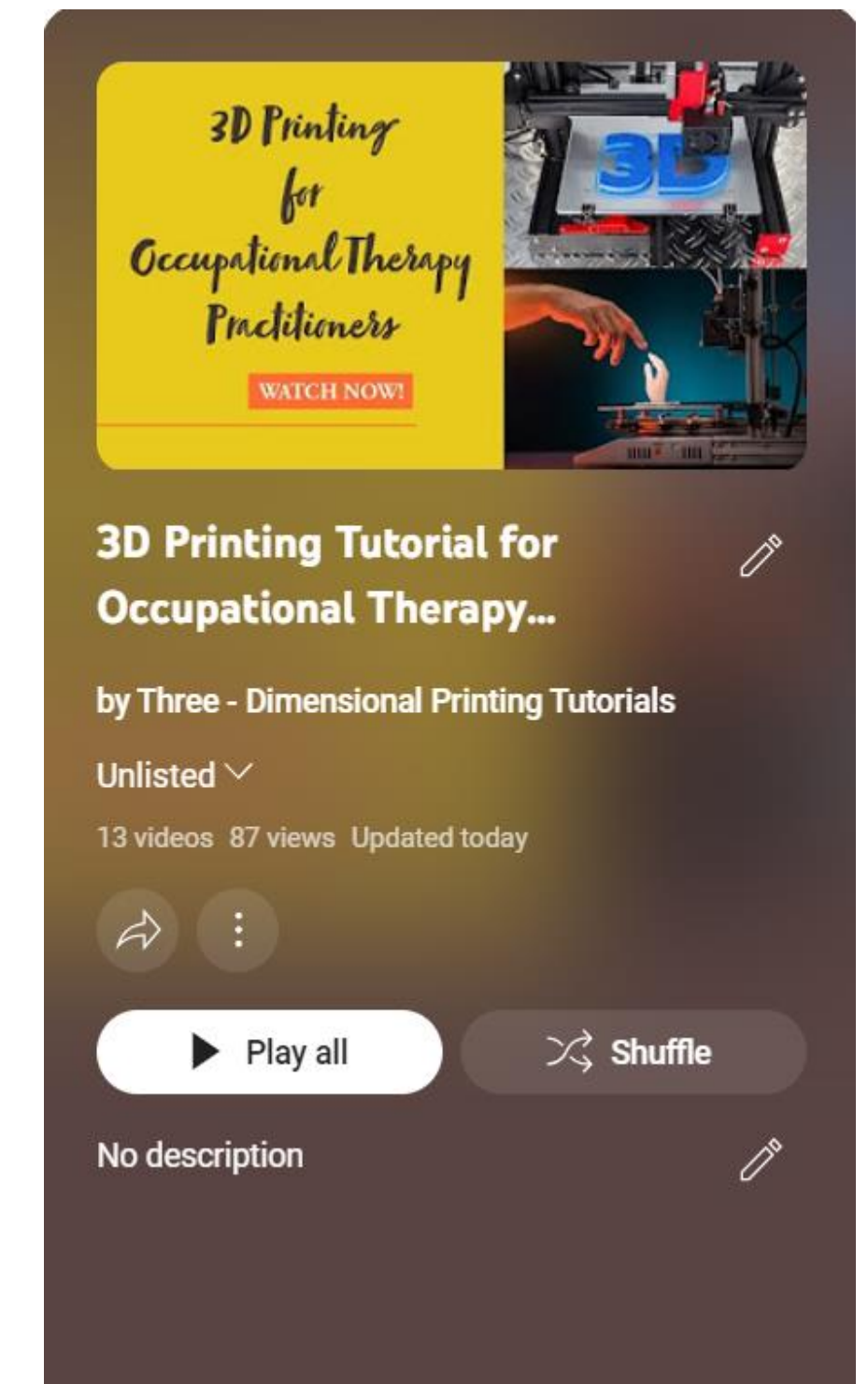
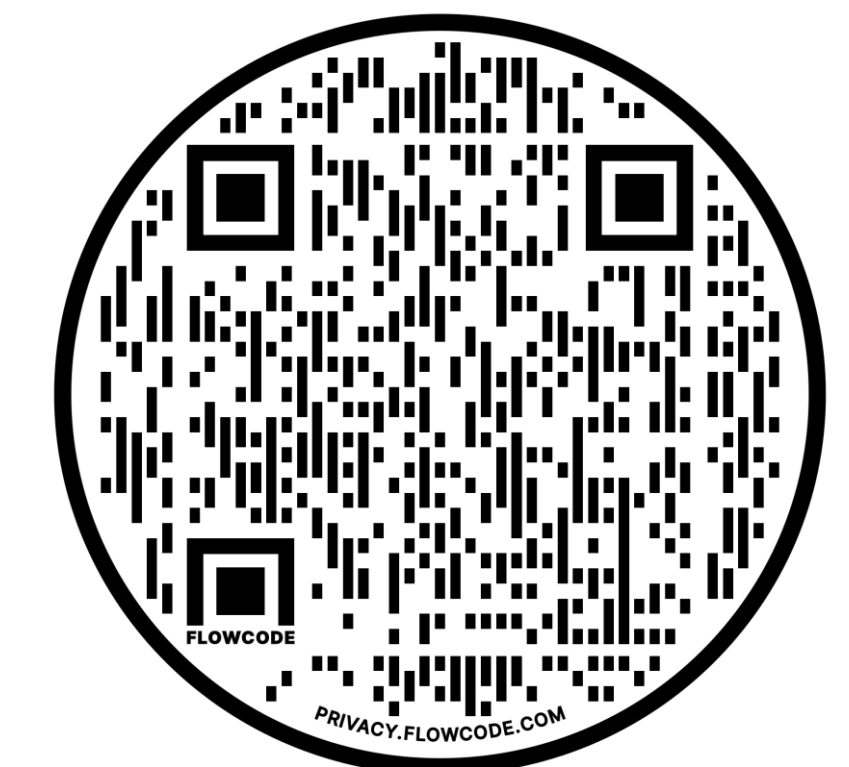
Acknowledgement



References



YouTube Channel



This project does not involve human subjects and does not require IRB approval.