

## Background

- 3D printing is widely available and cheap
  - Medical equipment can be printed for medical education in resource limited settings
- Kenya is a low healthcare resource country that uses 3D printing and localization of 3DP for production of medical equipment
- There are few academic studies on the use of 3DP in medical education
- The lack of 3DP studies along with the increasingly cheaper and more accessible resource, necessitates further exploration into the efficacy of 3D printed laryngoscopes as a training tool compared to commercial video laryngoscopes

## Methods

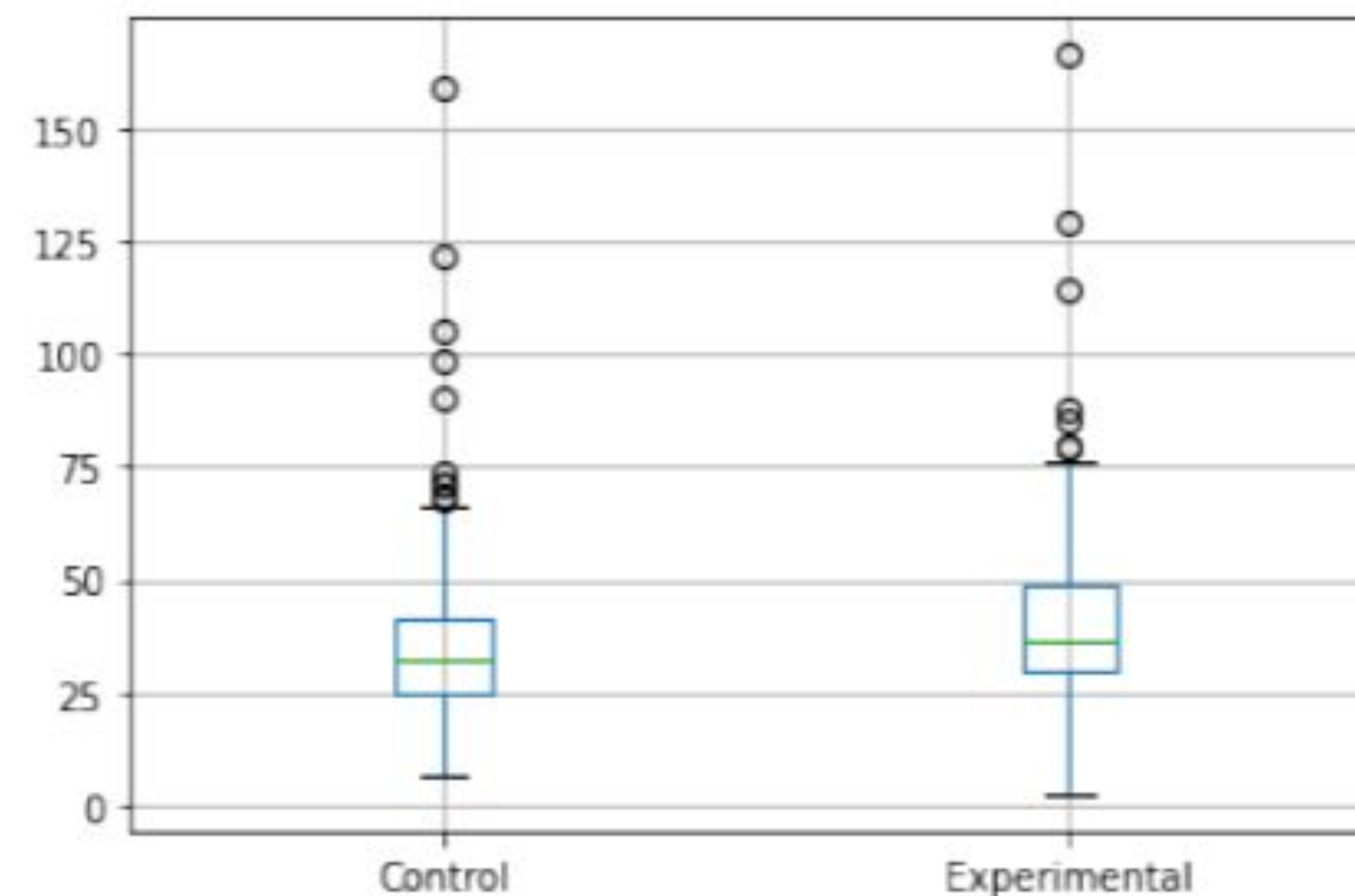
- 3DP video laryngoscope was created via PLA filament printing
- 3DP video laryngoscope was based on the Glidescope GO measurements using OpenSCAD
- Data was retrieved from medical students from CUSM and was recorded via video on intubation attempts
- Medical Students received a standardized video and instruction from either a student researcher or faculty member
- Controls were trained using Glidescope Go while Experimental used 3DP video laryngoscope
- Students intubated as many times as possible in 10 minutes using **commercial video laryngoscope**
- Survey was collected on user experience and other factors

Control	3DP
10 min training w/ Glidescope GO	10 min training w/ 3DP Laryngoscope
10 min intubation trails w/ Glidescope Go	10 min intubation trials w/ Glidescope Go

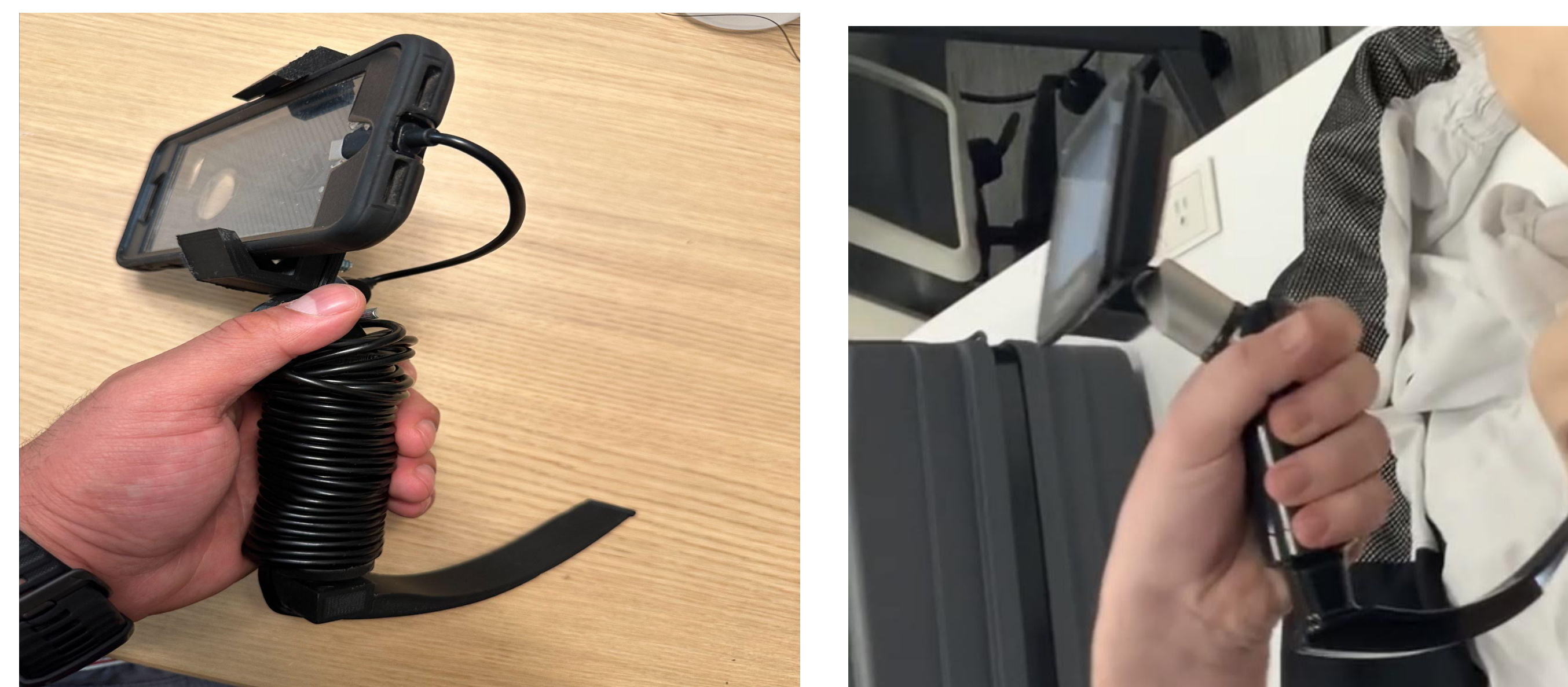
## Results

DATA		
	Control	3DP
Intubations attempted	192	164
Mean attempts per student	36.01	41.39
Mean intubation time (s)	36	41
STD	18.465	20.095

**Table 1. Data.** Data collection of attempts and average time of intubation during Block 1



**Figure 1. Comparison of all intubation time attempts made by the control and experimental (3DP) group**



**Figure 2. Image of the 3DP video laryngoscope (left) and commercial Glidescope GO (right) which uses a phone as a screen attachment**

- Students trained with the Glidescope made a total of 192 attempts during the testing block while students trained with the 3DP laryngoscope made 164 attempts
- 1 Tailed T-test results indicate statistically significant difference between intubating with commercial laryngoscopes and 3DP laryngoscopes during Block 1 ( $p = 0.004$ )

## Discussion/Conclusion

- There is a statistical difference between the control and 3DP experimental group
- Conclusions about the cause of this difference cannot be drawn based on the current data
- 3DP video laryngoscopes continues to be a potential training tool for resource limited areas

## Limitations & Future Directions

- The statistical difference calculated does not exclude failed intubation attempts nor control for any confounding factors such as teeth breaks or restarted attempts
- Further studies should seek to determine if these other factors affect results
- Further studies should seek to evaluate the user experience of students that may have affected results
- Further collaborations and studies with low healthcare resource areas that can implement 3DP laryngoscope in medical training

## References & Acknowledgments

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 [2] Ali Kaan Ataman, Emel Altintas, Comparison of a commercial 3D fabricated laryngoscope (Airangel ®) with a widely-used video laryngoscope (Glidescope®): Randomized controlled cross-over study, Trends in Anaesthesia and Critical Care, Volume 40, 2021, Pages 35-40, ISSN 2210-8440, <https://doi.org/10.1016/j.tacc.2021.05.009>.