

## Title

Influence of the Mass of a Tool on Task Performance in Virtual Reality

## Contacts and supervision

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Virtual reality, User study, Interaction techniques

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## Details

Virtual Reality (VR) could facilitate vocational training. VR allows people to train in safe conditions and fully controlled environments, with infinite trials and repetitions. When learning the use of a tool, it is common to rely on an instrumented replica instead of the VR headset default controllers.

Instrumenting a replica generally implies the addition of a tracking solution and electrical components, to allow this replica to be used instead of a controller within a VR application. Some sensors can also be added, to extract data concerning the replica or the trainee. This, coupled with differences between the materials used in the replica manufacturing process and those composing the original tool, can result in a different weighted replica. We have already shown that the mass of such replicas does not impact learning outcomes, under several conditions.

We want to go further with these results, investigating whether the mass influences the user's performance for another task than the ones first evaluated, and if the balance of the tool also has or not this kind of influence.

Specifically, this internship is about designing and conducting a Fitt's law experiment, with several props of different masses (and if time allows also with different balances).

A Fitt's law experiment is a pointing task where the user must point to a target as fast and as accurately as possible. Here is an example: <https://www.youtube.com/watch?v=l2VtC-1jV9k>

And some illustrations:

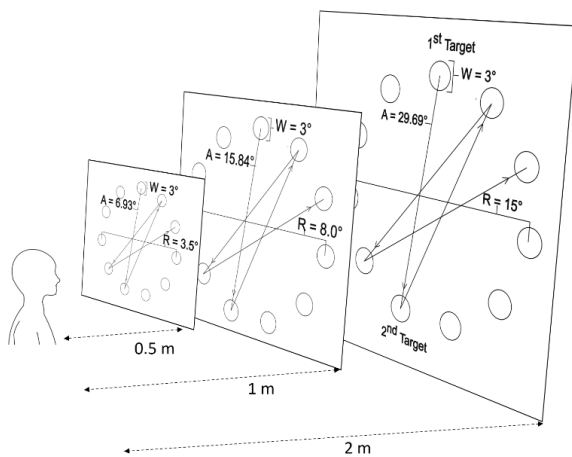


Figure 4: Fitts' Law task design with three target amplitudes (6.93°, 15.84°, 29.69°), and three depth planes (0.5m, 1m, 2m).

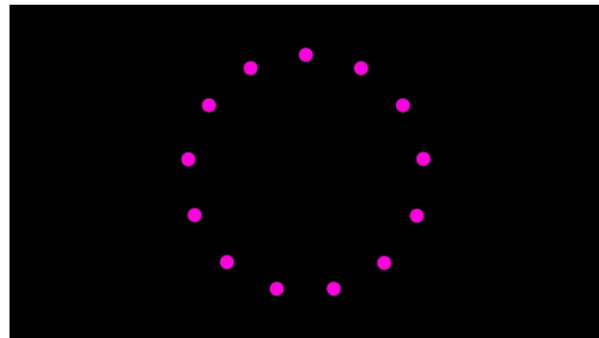


Figure 2: Participant view of the target plane in the study environment. Only one target at a time was shown during the pointing task.

The intern will have to design and then develop a VR application to perform a Fitt's law-inspired study, using Unity and a Vive headset. Weighted props will be tracked thanks to an Optitrack system.

Then, the intern will have to conduct this study, recruiting and assessing participants. If time allows, a statistical analysis of the results will be performed.

## References

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