



A new interaction experience in Extended Play at Faraday Museum

Cathode Ray augmentation using Augmented Reality for
Faraday Museum

Agenda

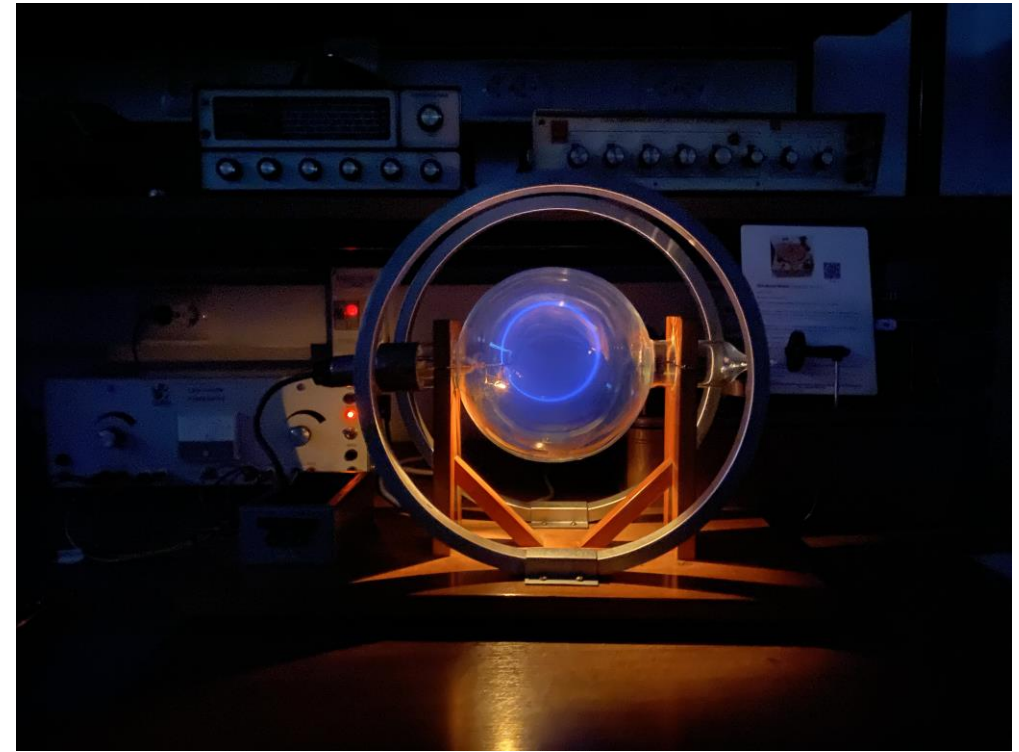
- Introduction & Objectives
- Work developed
- WebGL App
- Android App
- Evaluation
- Conclusion



Introduction & Objectives

Introduction & Objectives

- Improve the visiting experience of the IST' Faraday museum.
 - Augmenting the Cathode Ray
 - Evaluate the work done so far by testing with users, changing any interaction problems found.



The Cathode Ray Object



Work Developed

Work developed

- WebGL App
- Android App
- Faraday Museum Disseminations
- Technical Report

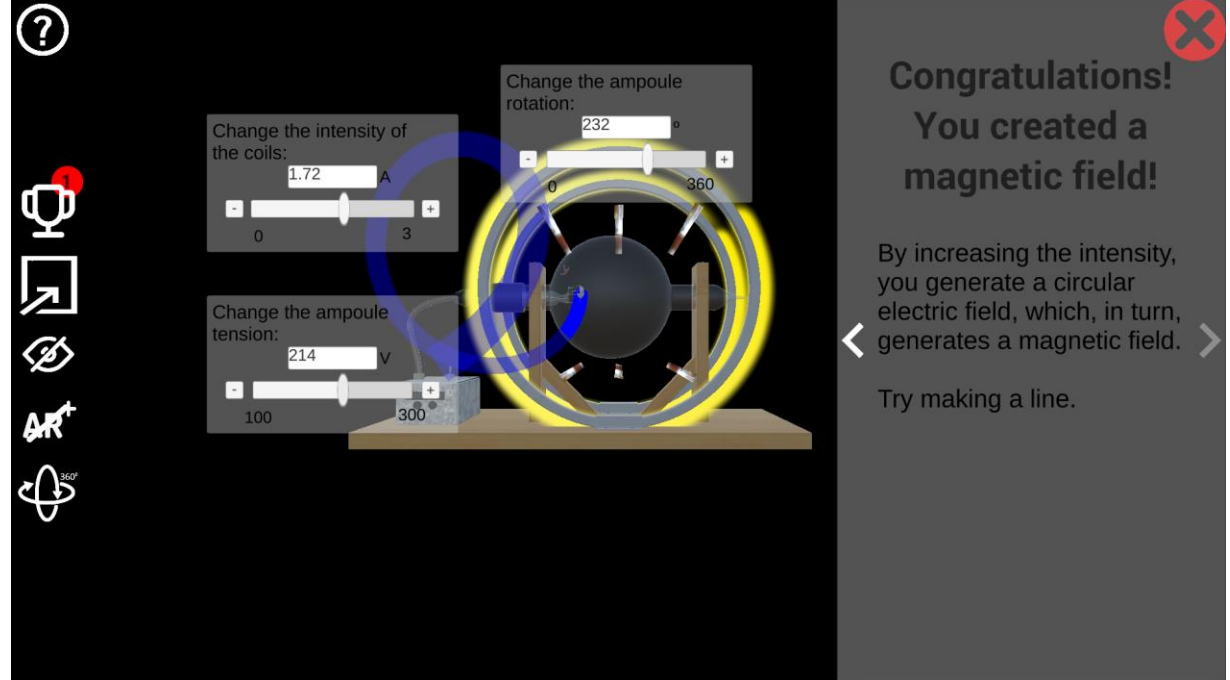


WebGL App

Please press the button  to play the game in full screen!

Located in bottom right corner

Next



The screenshot shows a game interface with a 3D model of a magnetic field setup. The interface includes three sliders on the left: 'Change the intensity of the coils' (set to 1.72 A), 'Change the ampoule tension' (set to 214 V), and 'Change the ampoule rotation' (set to 232°). The 3D model shows a central ampoule surrounded by a circular magnetic field. On the right, a dark grey panel displays the text: 'Congratulations! You created a magnetic field!'. Below this, it says: 'By increasing the intensity, you generate a circular electric field, which, in turn, generates a magnetic field.' and 'Try making a line.'.

Change the intensity of the coils: 1.72 A

Change the ampoule tension: 214 V

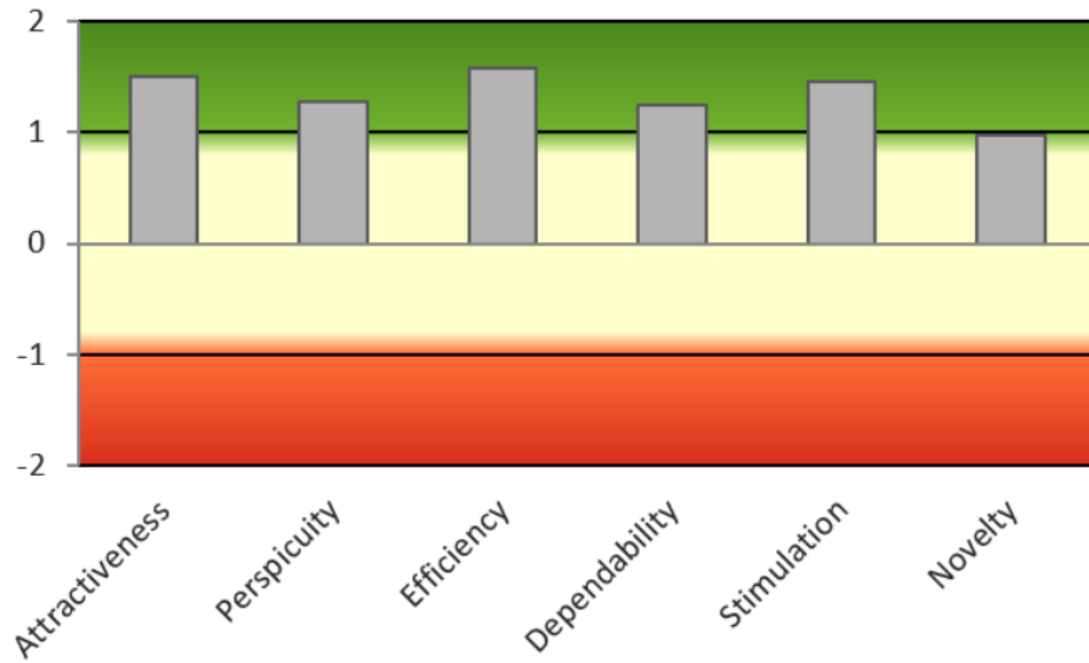
Change the ampoule rotation: 232°

Congratulations!
You created a magnetic field!

By increasing the intensity, you generate a circular electric field, which, in turn, generates a magnetic field.

Try making a line.

App overview



- 35 User completed the game
- Augmentation of the electric field well accepted
- Augmentation of the magnetic field needs improvements
- The UI was well accepted

Evaluation Results

The background is white with two large teal geometric shapes. On the left, a teal triangle points towards the center. On the right, a teal trapezoid is positioned, also pointing towards the center. The text 'Android App' is centered between these two shapes.

Android App



Technical aspects

Warning: Read before use

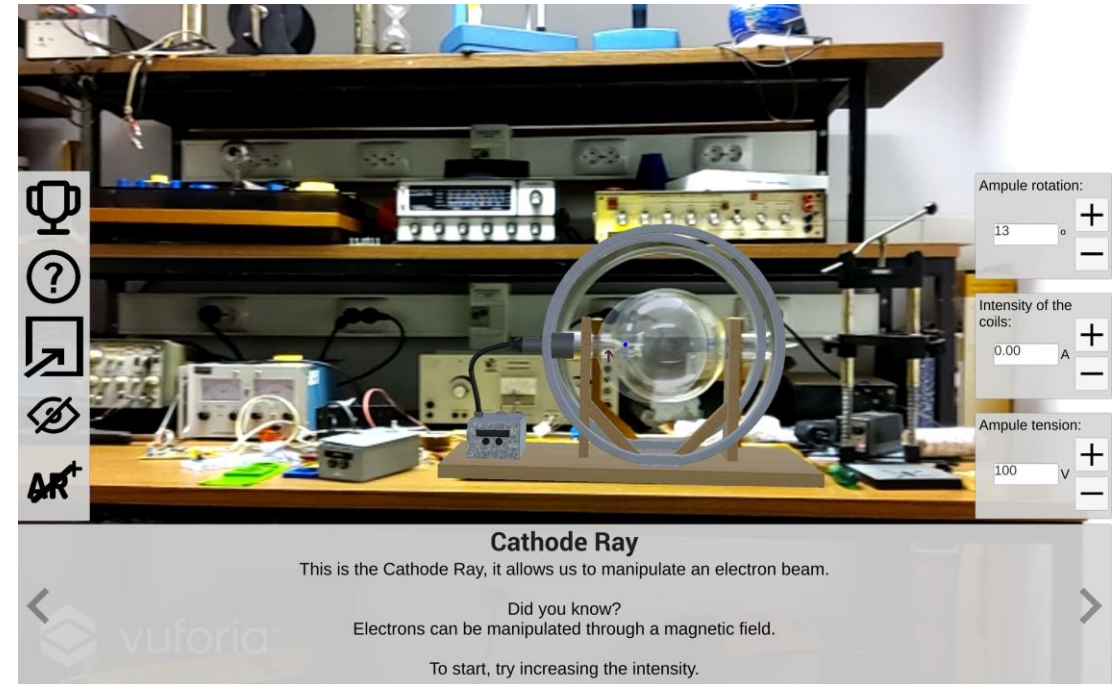
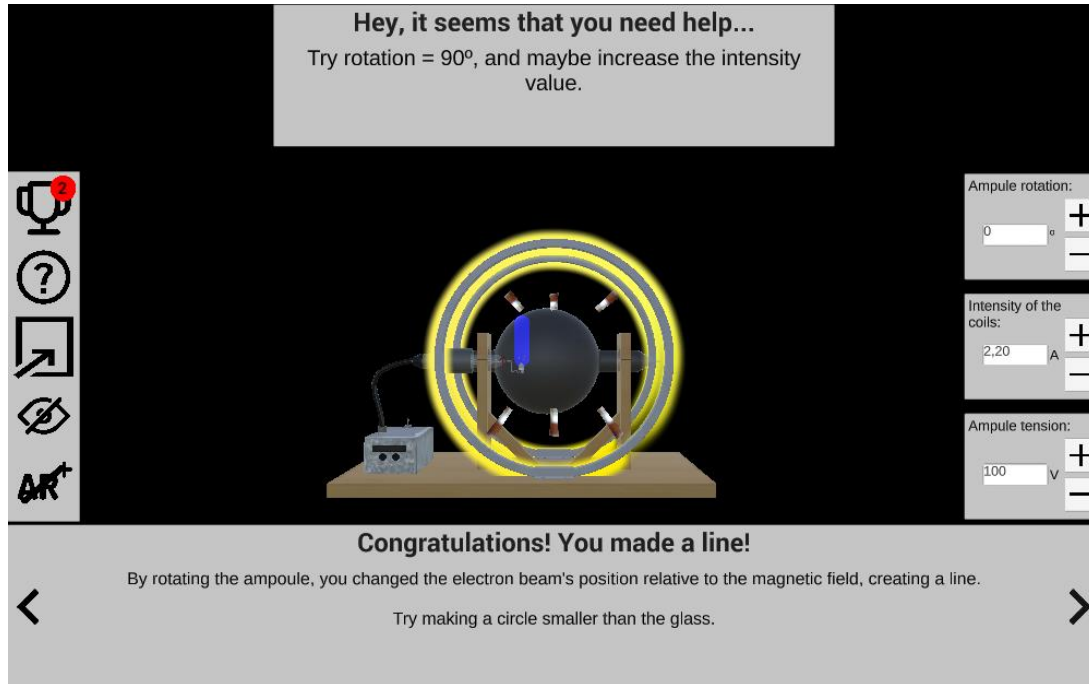
A small percentage of people may experience seizure when exposed to certain lights, patterns or images, even with no history of epilepsy or seizures.

If you, or anyone in your family has an epileptic condition or has had seizures of any kind, consult your physician before playing.

If you or your child experience any of the following health problems or symptoms: dizziness, altered vision, eye or muscle twitches, loss of awareness, disorientation, seizures or any involuntary movement or convulsion. IMMEDIATELY use and consult your physician before resuming gameplay. Resume game play only on approval of your physician.

-- Press anywhere to continue --

App overview



App overview



Compassionate: How much is love?

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The slide features a light gray background with two large teal geometric shapes. On the left, a teal triangle points towards the center. On the right, a teal trapezoid is positioned, also pointing towards the center. The text 'Android Evaluation' is centered between these two shapes.

Android Evaluation

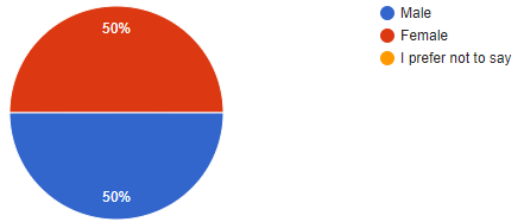
Objective

- Measure the User Experience of the app
 - acceptance
 - Enjoyable
 - Understandable UI
- Interactions gestures
- Landscape or Portrait orientation.

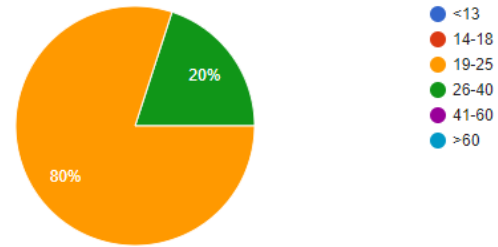


Methodology

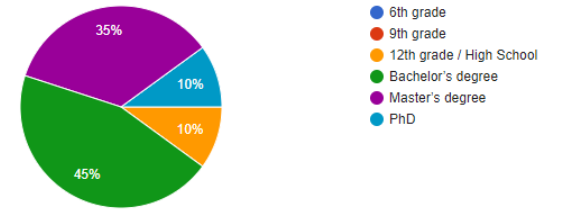
Gender



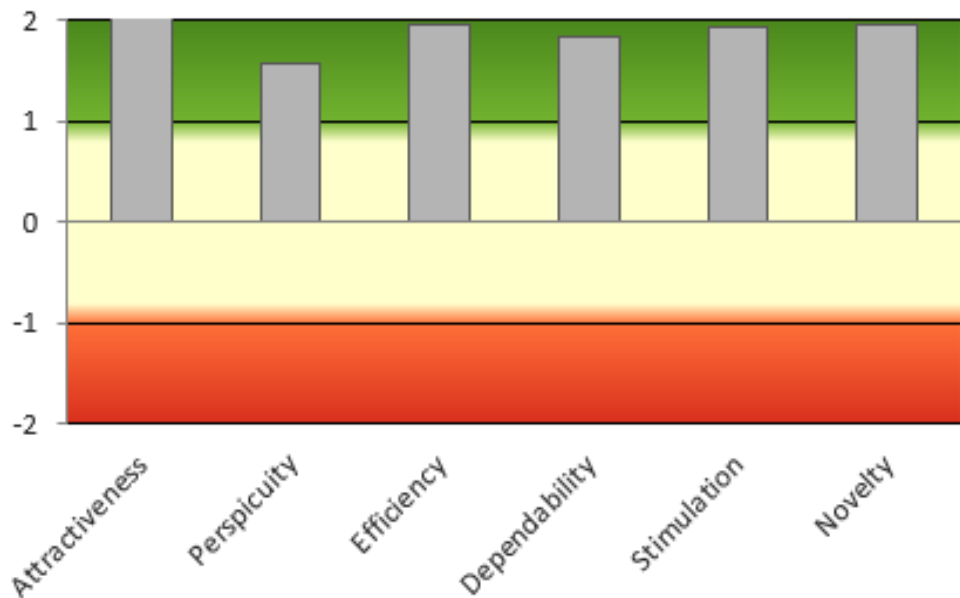
Age



Academic Qualifications



Demographic Results



Scale	Mean	Std. Dev.	Confidence	Confidence interval	
Attractiveness	2,067	0,784	0,344	1,723	2,410
Perspicuity	1,575	1,133	0,497	1,078	2,072
Efficiency	1,963	0,824	0,361	1,601	2,324
Dependability	1,838	0,828	0,363	1,475	2,200
Stimulation	1,925	0,851	0,373	1,552	2,298
Novelty	1,963	0,808	0,354	1,608	2,317

UEQ Results

Conclusion of the results

- Two problems identified:
 - Holding the device in position
 - Learning curve
- Landscape mode is preferable
- “The interface is well designed, uniform and with all the necessary functionalities to work correctly”- anonymous user
- Results were extremely good, and they go according to our objectives

The slide features two large teal geometric shapes. On the left, a teal triangle points towards the center. On the right, a teal trapezoid is positioned, also pointing towards the center. The word "Conclusion" is centered between these two shapes.

Conclusion

Conclusion

- Work delivered:
 - WebGL App
 - AR Android App- "Extended Play at Faraday Museum"
 - Model target and image target
 - English and Portuguese version
 - Only Cathode Ray version and all artifacts version
 - Technical Report
 - Github Repository

Conclusion

- Good results in booth apps
- From the tests we can concluded that our app is fun, interesting and helps the user enjoying the museum
- The goals of the Thesis were achieved

Conclusion

Limitations:

- The Cathode Ray artifact is supposed to work on a dark room, however this was not covered by us
- However, our UI is very responsive, may not work very well in very small or large screens

Future work:

- Calculate the thickness of the e-beam and relate it to the tension/intensity
- Test the BLE connection with the museum module
- It is possible to foresee some problems for older users to hold the tablets in the right place during the whole experience
- 2D ArtWork documentation
- ~~• To decrease the possibility of semantic errors, create a Target ID database~~
- ~~• Allow the user to select the level of expertise in the electromagnetic field, and change the explanations according to that~~

“We believe augmented reality is going to change the way we use technology forever. We’re already seeing things that will transform the way you work, play, connect and learn.” —Tim Cook

João Henriques