

Newtoon

Newtoon is a mobile phone and web activity which aims to embed physics learning in mobile gaming. It enables young people to author, play, edit and share fast-paced microgames for their mobile phones, where game rules are based on a set of Newtonian physics principles.



Team

Soda Creative
Futurelab



Technology

Java-enabled mobile phones
Website

Outline

Newtoon is a mobile phone and website application designed to encourage young people to explore the laws of physics in a creative and engaging manner through mobile gaming. The game rules are based on physics principles and are authored by pupils on PCs by manipulating icons and objects on screen. Newtoon consists of two main parts – the 'microlab' allows teachers to demonstrate and explain physics principles, and the 'microgame' allows pupils and teachers to create their own games based on these principles. The games can then be downloaded onto mobile phones and shared around the classroom and beyond. Users are encouraged to share their games with others, and add to each other's games - building on others' knowledge and practice in an iterative design process. Players in the web application can switch from playing to creating, with the aim of transforming the gaming environment into a construction kit of physics topics.

The Newtoon experience involves a number of important learning opportunities. By authoring their own games, children are able to visualise laws of physics and manipulate their parameters with the aim of creating exciting and challenging game

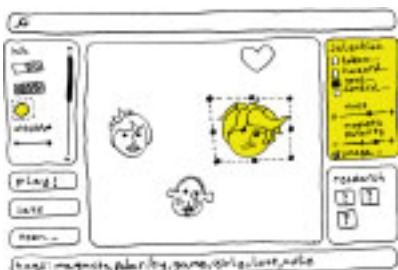
experiences for their friends. Through actively creating and editing these games, children can experiment through trial and error and observe the effects of their designs. As the online collection of experimental games grows, young people are encouraged to become a community of physics learners. By drawing on the functionality and familiarity of young people's own mobile phones, the Newtoon experience enables players to share their creations and becomes a prompt for stimulating science talk and reflection inside the classroom, at home, and anywhere in between.

This prototype is therefore an attempt to inspire children to become more science literate – to motivate them to make use of their own mobile phones for the purpose of learning, and to bridge the gap between learning abstract science 'concepts' and 'doing' science, by actively constructing science-based games. The evolution of a gaming community has the potential to invoke an interactive and collaborative classroom culture with doing, debating and deliberating science at its heart. This will involve exploring the possibilities of a 21st century science curriculum.



Scenario 1

A science teacher is anxious about KS3 Unit 8J: Magnets and electromagnets. She wonders how she can excite her pupils about the world of magnetism. The teacher launches Newton on the whiteboard and searches for a tutorial on 'magnets'. She opens a research microlab and by moving and rotating the bar magnet, she demonstrates that the ferrous bar always attracts while the bar magnet both attracts and repels depending on polarity. On their desktops, the pupils then select 'dog's dinner', a micro-game which explores magnets. Racing against the clock, the pupils steer a dog towards the bone, avoiding the magnetic forces.



Scenario 2

During the science lesson, all the pupils' games are collected into a game-carousel at the Newton website. At home, a pupil, Laura loads the game-carousel onto her mobile phone and challenges her family to play her creations. "How does it work?" her mum asks. Laura explains that her game, 'dream-date', uses magnetic variables to make her game characters attract and repel each other depending on how 'cute' they are, using pictures she has imported from the internet. She then shows her mum that her game has been the most played by her classmates, and that she has improved in her understanding of physics.

Learning Research Objectives

- To investigate the impacts of authoring, sharing and playing short computer games with embedded physics concepts and the understanding of those concepts in formal learning contexts.
- To explore the potential of developing learner-authored content as part of a 'constructivist' learning framework, and as a micro-world (a representative virtual environment) in which to contextualise physics learning.
- To explore how the use of mobile phones and the community of online game-players and authors encourages collaborative learning and communication.
- To explore how the use of mobile phones and game-authoring influences pupil and teacher attitudes to and engagement with physics learning both inside and outside the classroom.
- To investigate the relative importance of each aspect of the Newton 'ecology' to learning – game-authoring and playing; game sharing, editing and rating; online or on mobile; home or school or elsewhere – where and how does learning take place?

Research and Development Process

Futurelab and partners Soda Creative are working together in order to develop Newton as a valuable and research-informed experience aimed initially at Key Stage 3 science pupils. At an early stage in the development process we will hold workshops with physics teachers and consulting experts, and leading academics in the field of science

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learning through ICT. This work will enable us to determine a coherent and varied 'toolkit' for the Newton microlab which will correspond with particular aspects of the science curriculum. The web application will be developed so that participating children can access it from home and school in order to create, play, edit, share and rate each others' work, and the prototype will be designed for Java-enabled mobile phones so that they will be able to carry their creations with them. A scoring system will be developed which rates the most popular games. This will provide an online record of achievement which rewards and motivates children's progression within the Newton ecology from game players to creators, as and when their ability to understand and exploit the underlying physics principles allows.

Following this, we will work closely with teachers and learners in order to pilot Newton with a class of Year 7 secondary pupils. Through informant design practices, we aim to develop Newton as a resource which allows young people to learn science socially through mobile gaming. Our research data and consultations with young people will contribute to the design process, help to identify future applications for such technologies, and will allow us to explore the impact of mobile gaming on physics learning.

This idea was submitted to Futurelab's Call for Ideas programme by Soda Creative.

Further Information

Further information on this project will be added to the website as it becomes available:

www.futurelab.org.uk/showcase/newtoon

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