Project Overview

Developing in Digital Worlds is a four-year project conducted by the University of Auckland's **Faculty of Education and Social Work**, in collaboration with the **Faculty of Engineering** and funded by the Ministry of Business, Innovation and Employment.

This is the first study in the world to identify links between teaching, family participation and game-based learning in order to promote educational outcomes and equity.

The project focuses on children aged 4-17 years to test how to promote cognitive and social development in the '21st Century' digital world.

Study Aims

How does participation in the digital world influence children's cognitive and social development?

What skills, knowledge and capabilities do children need to manage, engage, and benefit from participating in the digital world?

How can family, educators, and society effectively support children's involvement in the digital world?

Thank you for your contribution to this research.

More information

Following this evaluation, the research team and game developers will be using the findings and recommendations to further optimise game learning. **Should you wish to use the Astria game** in classrooms, or be part of future research opportunities, please contact the team at: **indigitalworlds@auckland.ac.nz**

If you have any queries about the project, please email the principal investigator Professor Stuart McNaughton on s.mcnaughton@auckland.ac.nz

Visit the Developing in Digital Worlds website to find out more: developingindigitalworlds.blogs.auckland.ac.nz

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

ENGINEERING
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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EDUCATION AND SOCIAL WORK
WOOLF FISHER RESEARCH CENTRE

in GAME

DEVELOPING IN DIGITAL WORLDS

Astria: Countdown to Impact

A game designed to enhance critical literacy skills

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BACKGROUND

6 classrooms (Years 7-8)
4 schools
75 pairs of players

In Term 4 2018, 147 students played Astria: Countdown to Impact, an educational game developed to assess and improve 21st century skills, namely:

- critical literacy - judgments about the credibility (or believably) of information
- collaborative problem solving - reasoning together with a game partner to foster positive interactions and decision making.

About the game

Astria, a doomed planet, is facing destruction from an approaching asteroid. Playing collaboratively in pairs, students must work with a team of scientists and Council of Elders to find a scientific solution to the threat.

Judging a series of documents for credibility, players use a source, fact, bias strategy to investigate all possible solutions to avert the asteroid crisis. Progress can be monitored through the Teacher Dashboard to provide feedback and teacher guidance for student learning.

About student and teacher prior game experience

83 students and 6 teachers completed questionnaires before game play:

- 48% of students reported playing games online at home on a daily basis
- Of those who reported playing games most days, 34% played for 5 hours or more per day
- Students reported playing online games more for fun than for school learning
- 4 out of 5 teachers reported never having used educational games that develop critical literacy skills

FINDINGS

Improved critical literacy & collaboration

The accuracy of students' judgments and evidence selection improved significantly from the beginning to end of game play (approx. 2 hours over 2 lessons):

- Overall scores improved 11% on average from 39% to 50%
- Accuracy of evidence selection to support student judgments improved by **15%**, from 29% to 44%
- Accuracy of critical literacy **judgments** (rating document credibility high, medium, low) improved 6% on average from 49% to 56%
- Improved levels of collaboration and collaborative reasoning

The recorded interactions of 8 playing pairs showed:

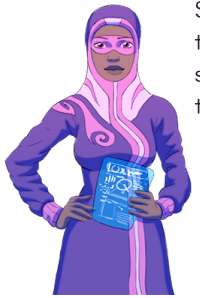
- students took turns to read aloud and support each other with difficult vocabulary
- rating of the documents in the game (e.g. websites) prompted students to reason collaboratively and reach consensus
- students found critical reasoning a challenge, such as questioning partner decisions

Greater impact from teacher feedback & guidance ('augmentation')

Teacher augmentation was tested by having two player groups:

'Augmented' Group
Teachers provided support PLUS specific guidance on critical literacy informed by the Teacher Dashboard, part way through game play

'Non-Augmented' Group
Teachers provided support with only general guidance on crticial literacy, part way through game play



Students whose game play was augmented by teachers improved more in their critical literacy scores compared with students who had no teacher augmentation:

- Overall accuracy was 9% higher on average (53% compared to 44%)
- Evidence accuracy was 13% higher on average (49% compared to 36%)
- Judgement accuracy was 5% higher on average (58% compared to 53%)

About student and teacher game experience

96 students and 3 teachers completed questionnaires after students played the game:

- Most students reported they had learnt a lot about critical literacy (95%) and felt challenged by playing (94%)

"I learned to actually deeply read the text before rating it because you can get things wrong when you just skim read...Using BIAS to rate different texts from different sources helped me to read critically online." - Student

"I have learnt to think a lot more then I normally do in class and in any learning area I learn in." - Student

- Although students felt challenged, most still felt "good at it" and found game play enjoyable (73%)

"Students of different ages love adventures and making a educational game actually interesting caught my interest" - Student

- Motivation was reduced for students who found the educational features outweighed the entertainment effects:

"I didn't like how we had to keep reading the text because it got a bit boring and me and my buddy had to take turns on reading the texts that came up on the screen." - Student

"What I didn't like about the game is that it had a lot of reading to complete...I think they could improve this game by making it a little less complex and more entertaining." - Student

IMPLICATIONS

- Astria had a positive impact on student critical literacy learning
- Having students play collaboratively promotes opportunities for thinking critically together
- Students need pre-game instruction and guidance to fully engage in critical discussion together
- Games like Astria can be more effective if augmented by teaching informed by built-in assessment data (e.g. the Teacher Dashboard)

"I am already changing the way I teach so that it can reflect why it is important for critical literacy to be present." - Teacher

"I have seen evidence of their critical thinking and needs now." - Teacher