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Promoting Social Change Through Game Education: A Program Evaluation

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Promoting Social Change Through Game Education: A Program Evaluation

Description

With clear vision and dedicated energy, Pixel Arts (PA) actualizes the promise of the Maker Movement in education by creating communities of practice that emphasize design for learning, that can inform youths' experience in traditional schooling (Halverson & Sheridan, 2014). PA provides youth in the greater Portland OR Metro area with opportunities to join in a community of learning that celebrates *making* in the context of games and that promotes healthy internalization of maker identities. Fueled with an awareness of the inequality in excellent educational experiences currently seen in the US, PA aims to engage youth who experience the brunt of this inequality by nurturing skills and learning identities. One "free-of-charge game-camp" at a time, PA reaches youth who, primarily for SES reasons, lack opportunities for academic and personal enrichment in STEM fields, thereby bridging the local digital-divide. With game-design as their theme, it's PA's intention that participating youth acquire both technical and personal learning skills. In this report, we present a snapshot of how well PA is doing, in terms of meeting their outcome goals. Not content to rely on anecdotal evidence/testimonies as their success-indicators, PA follows empirically based assessment practices. This report presents their camp training and assessment model and a snapshot of an effectiveness evaluation utilizing data generated from eight camps. Evidence of technical skill learning comes from work-documentation and evidence of growth in "the non-cognitives" comes from both quantitative and qualitative sources. Results indicate that PA's unique curriculum effectively nurtures youths' technical *and* non-cognitive learning skills.

Keywords

Maker Movement, STEM, after school programs, pixel arts, game education

Disciplines

Curriculum and Social Inquiry | Developmental Psychology | Educational Assessment, Evaluation, and Research | Educational Psychology | School Psychology | Science and Mathematics Education

Comments

NOTE: evaluation of the effectiveness of Pixel Arts programming is on-going. This report captures data gathered at 8 camps.

Rights

The Promotion of Social Change Through Game Education: A Program Evaluation

Pixel Arts
Play >Make >Design
http://www.gameeducationpdx.com/

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Introduction

With clear vision and dedicated energy, **Pixel Arts** actualizes the promise of the **Maker Movement** in education by creating **communities of practice** that emphasize **design for learning**; learning that can potentially inform youths' experience in more traditional schooling (e.g., Halverson & Sheridan, 2014). Pixel Arts provides youth in the greater Portland OR Metro area with opportunities to join in a community of learning that **celebrates** *making* in the context of **games** and that promotes healthy internalization of **maker identities**. Fueled with an awareness of the inequality in excellent educational experiences currently seen in the US, Pixel Arts aims to engage youth who experience the brunt of this inequality by nurturing skills and learning identities, with the aim of directing their learning trajectories towards career paths they might not otherwise see as attainable. That is, one "free-of-charge game-camp" at a time, Pixel Arts reaches youth who, primarily for SES reasons, lack opportunities for academic and personal enrichment, in particular in STEM, thereby bridging the local digital-divide that hinders many students' growth. Pixel Art's curriculum offers **STE**[A]**M** (Arts included) enrichment and enrichment of social-emotional learning skills too. With game-design as their theme, it is Pixel Arts' intention that participating youth acquire both technical and personal learning skills. The purpose of this report is to evaluate how well Pixel Arts is meeting its aims. Not content to simply rely on anecdotal evidence or testimonies as their sole indicator of success though, they follow empirically based assessment practices. This report presents their camp training and assessment model and the first phase of an effectiveness evaluation utilizing data generated from eight camps. Evidence of technical skill learning comes from work-documentation practices (i.e., portfolios) and evidence of growth in non-cognitive learning skills comes from both quantitative and qualitative sources. With this data, we examine whether the **Pixel Arts maker-based curriculum effectively nurtures youths' technical** *and* **non-cognitive learning skills** (i.e., **metacognition**, **self-determined achievement motivation**, **self-efficacy**).
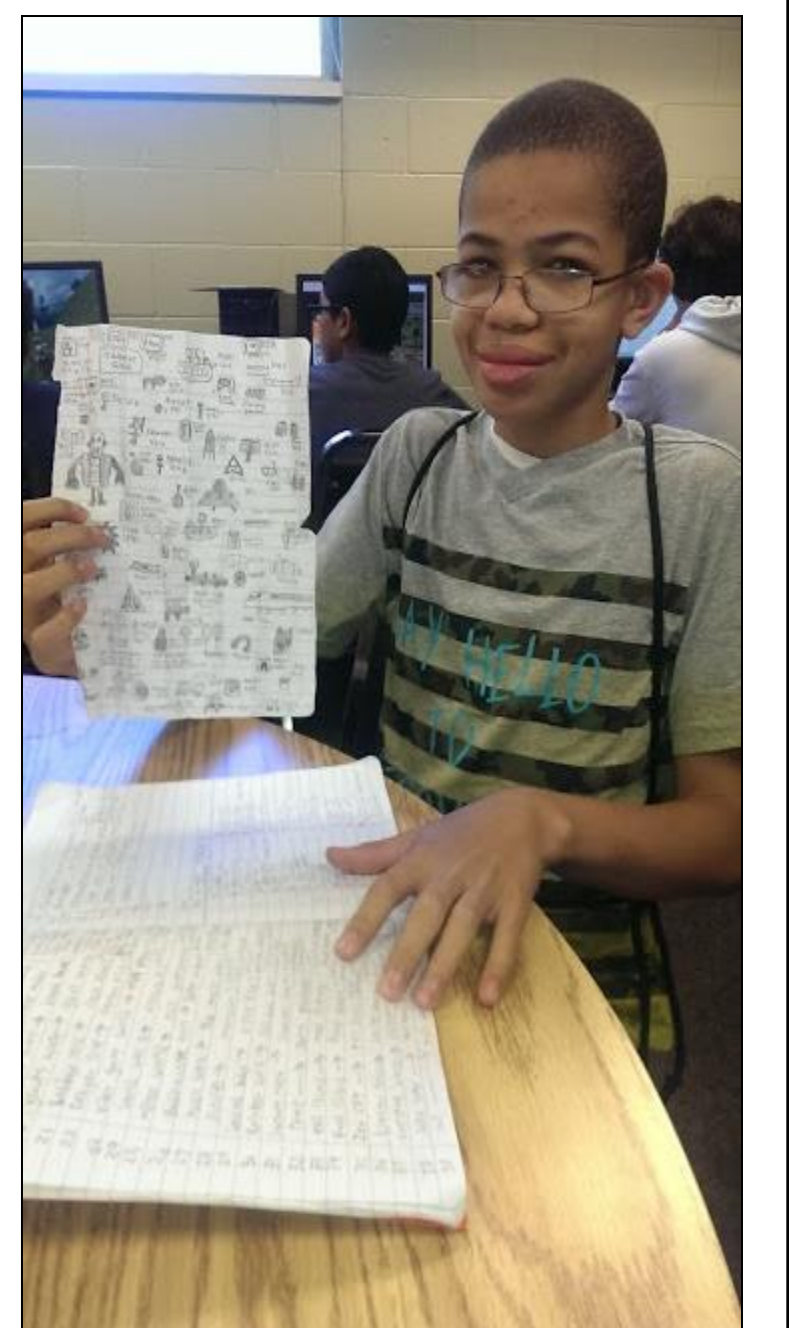
Program Design & Assessment Method

Pre-Camp Mentor Training

Camp mentors (all volunteer, game enthusiasts and industry professionals) were trained in a variety of ways:

(a) In the technical curriculum: **game design; digital art & animation; logic & programming**

(b) To understand the basics of non-cognitive learning skills. Training materials included consideration of concepts like
- The distinction between self-esteem and **self-efficacy**,
- The distinction between fixed and malleable mindsets
- The elements of self-determined **achievement motivation** and how **metacognition** relates.

(c) How to create and maintain healthy learning environments
- Being careful with wording, when giving praise
- Encouraging the "failing forward" ideal: mistakes help you work towards mastery

(d) By engaging in scripted role playing scenarios, camp mentors practiced putting this knowledge into action before working with youth.

Camps and Youth Demographics

In total, **126 youth** participated in the assessment portion of the respective camp they participated in. This report includes data from **eight different camps**: two were after-school programs and six were intersession (i.e., spring and summer breaks) camps hosted by the Multnomah Public Libraries.

In all camps, youth participated in opening warm-up activities before breaking out into learning modules.

- *"In & Out of the Circle"*
- *"Exquisite Corpse"*
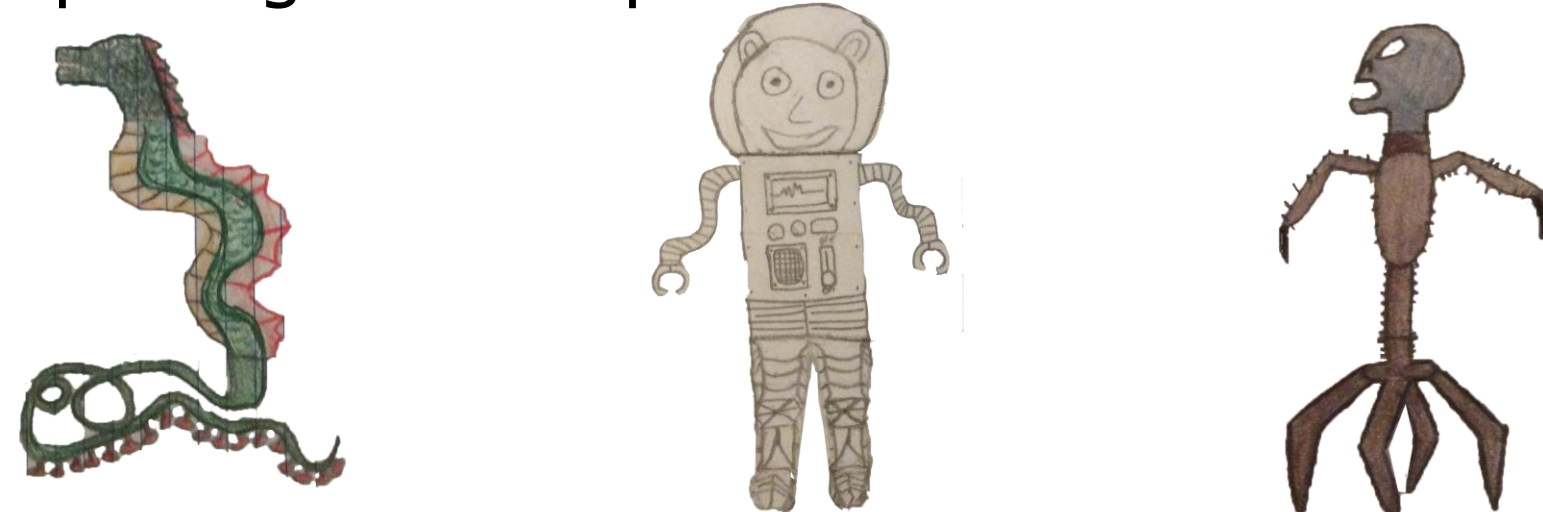
Assessment Strategy

The assessment reflects a **mixed-method concurrent triangulation approach**, where quantitative and qualitative indicators were gathered and evaluated.

*Quantitative Assessment.

Student Survey. To evaluate whether participating youths' non-cognitive learning skills grew, they completed a survey at the beginning and at the end of camp. The survey contains questions about (1) **self-efficacy**, (2) **motivation**, and (3) **metacognition**.

1. **Self-Efficacy.** $a = 0.83$; 5-item, 5-point scale (1 = *Not at all True* to 5 = *Very True*)

2. **Self-Determined Motivation.** 8-item, 4-point scale (1 = *Not at all True* to 4 = *Very True*), with 2 subscales: **Controlled Motivation,** $a=0.81$ & **Autonomous Motivation,** $a=0.74$

3. **Metacognition.** $a = 0.74$; 7-item, graphical rating scale (0 = *Completely False* to 100 = *Completely True*)

* In the first evaluation phase of the prototype camp (Kleinknecht, Sens, & Lewis, 2014), we did not detect a change in quantitative scores. Unsure whether this was because of youth demographics (very few prototype participants were in the targeted SES demographic) or because of measurement sensitivity, we scaled back in the first 5 camps, only measuring efficacy. Once camps were up and running with youth in the targeted demographic, we decided to go back to the full battery with the next 3 camps in this set.

Qualitative Assessment.

Camp Portfolio. The portfolio served two purposes: (1) to enhance youths' self reflection of their learning and engagement; (2) work documentation.

1. **Pre-Assessment:** A series of questions prompting youth to set goals, both technical and personal; e.g., **"What do you hope to learn...?"** and **"Right now, I am _____ confident in my computer skills"**

2. **Daily Work Documentation:** Youth selected which module to work in at any given time. They could elect to work in one the whole time, or to move amongst the three options.

3. **Post-Assessment.** A series of questions prompted youth to consider what they learned and to set future learning goals; e.g., **"At the start of camp I said _____, and now I see that _____"**; and **"Now that camp is over, I plan to continue ..."**

Exit Interview. The interviews addressed reflection of learned material and insight into what was gained (e.g., **do you think you gained some confidence in your ability to make a video game on your own**?).

Qualitative Coding.

Following a **grounded-theory approach**, qualitative materials were evaluated by two independent raters. After collating responses into a tabular format for ease of comparison, coders read through for themes, memoing as they went. Identified themes were compared and grouped as they related to Pixel Arts' aims at promoting technical and non-cognitive learning skills. Refinement of this process is ongoing, the first-pass is presented here.

Results & Discussion

Research Question 1: Did youths' technical skills grow? YES

a. At the start of camp youth reported a desire to learn how to make games, and they achieved this goal
- *Some learned that their initial ideals about how-to were insufficient*
- *Others started with no idea how, and learned much about design and implementation*

b. Youth learned technicalities about game design:
- *At the start of camp, on average youth were confident they knew about* **9 technical terms**
- *At the end of camp, the average increased to about* **11 technical terms**.

c. Youth learned how to program: " I am really good at programming now."

d. Most importantly, at the end of camp, youth enthusiastically reported a desire to learn more!

Research Question 2: Did youths' learning skills grow? YES

From the qualitative measures, we see that ...

a. Youth were initially nervous about not knowing anyone (*"I didn't know anyone before..."*) and about coding (*"I thought I might not figure out everything..."*). Yet they left feeling much more confident about social engagement (*"... but now I am comfortable with everyone"*)

b. Initially, youth were not very confident about programming (*"I was nervous to code things incorrectly..."*), but that changed (*"... but now I feel confident in it all"*).

c. Youth developed a new appreciation for teamwork. (*"I* [at first] *didn't try to understand* [what others] *were saying, but I just need to open myself up a little more "*).

d. Youth indicated an increased confidence asking for help from the start to the end of camp.

e. "...[before the camp] *I wouldn't really try* [making a game] *because I wouldn't know* [how]."

From the quantitative measures, we additionally see that ...

a. Youths' sense of **self-efficacy** (confidence) in learning increased

b. Youths' **motivation changed** in quality (i.e., on the **controlled subscale**) wherein they started to see some good reasons for engaging and working hard in school

Non-Cognitive Skills	Pre-Test M (SD)	Post-Test M (SD)	Inferential Statistics
Self-Efficacy	4.02 (.73)	4.43 (.80)	$t(90) = -6.21$, $p < .001$
Controlled Motivation	3.35 (.89)	3.42 (.85)	$t(30) = -2.92$, $p = .007$
Autonomous Motivation	2.49 (.59)	2.75 (.67)	$t(30) = -1.10$, $p > .05$
***Metacognition**	63.92 (20.47)	68.31 (20.96)	$t(29) = -1.64$, $p > .05$

c. Whereas we did not detect a change in autonomous motivation nor in metacognition across the board, we do believe this is due more to assessment timing.
- It takes time/ repeated experience for a sense of autonomy to grow. We don't think enough time passed in these camps for a change to be detected with this instrument.
- When looking only at the youth who participated in the After School Program, a significant change in metacognition *was* detected.
  * $t(5) = -3.32$, $p < .05$; Pre: **M = 60.76** (14.22); Post: **M = 76.45** (21.20)

Conclusions & Future Directions

1. Results suggest that Pixel Arts' aims are indeed being met. Youth are learning about game design in a healthy, positive maker-environment and are becoming better learners while they are at it.
2. As Pixel Arts continues to fine-tune their curriculum, we are changing the portfolio work documentation process to better fit the work-flow.
3. As a next step in evaluation we are thinking of ways to create meaningful comparison groups to more clearly demonstrate Pixel Arts' contribution to participating youths' increasingly healthy learning mindsets.