Promoting Social Change Through Game Education: A Program Evaluation

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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.

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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 and critical thinking. With an告诉我 passion for interdisciplinary learning that caters to 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 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. Thus, it becomes one of the “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 STEAM (Arts included) enrichment and enrichment of social-emotional learning skills too. With game-design as their theme, it is Pixel Art's intention that participating youth assign their own values and personal learning skills. The purpose of this report is to evaluate how well Pixel Arts is meeting its aims. Not to content simply rely on anecdotal evidence or testimonies as their sole indicator of success, they follow empirically based assessment practices. This report presents their camp training and assessment model and the first stage of an effectiveness evaluation utilising data generated from eight camps. Evidence is gathered from the 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 how camp-based mechanisms effectively nurture 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:

1. (a) In the technical curriculum: game design; digital art & animation; logic & programming
2. (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 mindset
   - The elements of self-determined achievement motivation and how metacognition relates.
3. (c) How to create and maintain healthy learning environments
   - Being careful with wording, when giving praise
   - Encouraging the “falling forward” mindset ideal mistakes help you work towards mastery
4. (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 camps were after-school programs and six were intercession (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.*

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

1. Self-efficacy. α = 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, α = 0.81 & Autonomous Motivation, α = 0.82
3. Metacognition. α = 0.74; 7-item, graphical rating scale (0 = Completely False to 100 = Completely True)

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, an average of 20% believed 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…

1. 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")
2. Initially, youth were not very confident about programming ("I was nervous to code things incorrectly...") but that changed ("...but now I feel confident in all that")
3. Youth developed a new appreciation for teamwork. ("[At first] I didn't try to understand [what others] were saying, but I just need to open myself up a little more.")
4. Youth indicated an increased confidence asking for help from the start to the end of the camp.
5. "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. Youth's sense of self-efficacy (confidence) in learning increased

b. Youth's 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

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 workflow.
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.