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Does the Learning of Computational Thinking Concepts Interact with the Practice of Digital Curation in Children? A Preliminary Case Study

兒童學習運算思維概念與數位策展能力的關聯性研究初探

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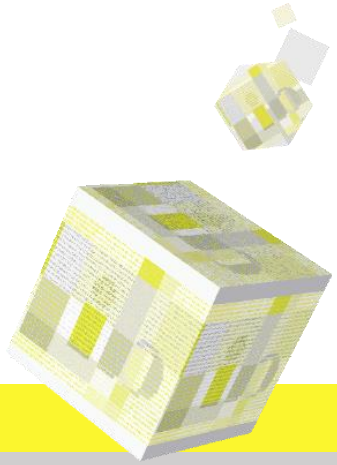
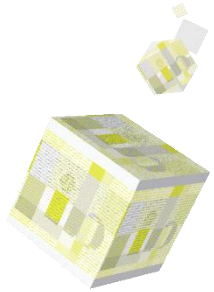
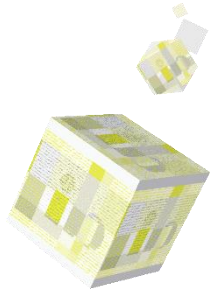


Introduction



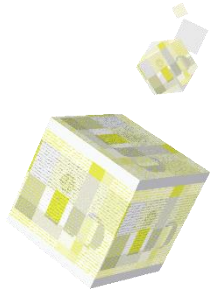
- There has been a consensus that children should learn basic computational thinking (CT) concepts at an early age.
- One common approach to engage children in learning CT concepts is through digital storytelling with block-based programming tools.
- Digital storytelling is an interdisciplinary activity that involved not only the learning of CT but also the practice of digital curation (DC).

Introduction



- Both CT and DC were essential skillsets for children to attain.
- When assessing children's digital storytelling projects, however, previous studies were more concerned with the development of CT skills rather than the practice of DC.
- What is the relationship between CT and DC skills? Are there any possibilities to implement an interdisciplinary curriculum to cover both DC and CT skills in one learning task?

Literature Review



- Digital curation (DC) and digital storytelling

  - a framework to assess one's DC skills:

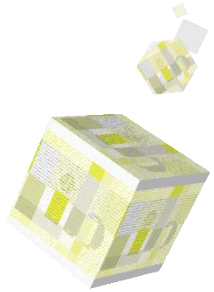
  (1) content selection, (2) content organization, (3) content originality (4) content interactivity and (5) multimedia design.

- Computational Thinking (CT) and digital storytelling

  - types of major CT concepts:

  (1) sequence (2) event (3) conditionals (4) variables and (5) loops

Literature Review



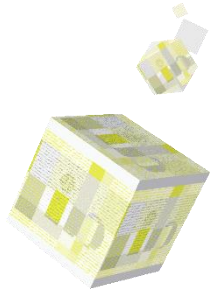
- Research questions:

1. How do students curate a digital story in terms of the five dimensions of DC?

2. How do students design a digital story in terms of the five concepts of CT?

3. What is the interrelationship between the learning of CT concepts and the practice of DC?

Methods



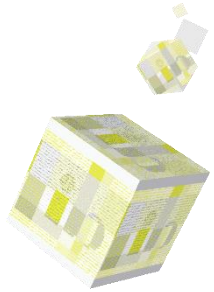
- Participants

  35 fifth graders (16 males & 19 females) from a public elementary school in New York city.

- Procedure

  - Digital storytelling workshop twice a week for ten weeks.
  - The duration was 55 minutes
  - Scratch was chosen as the development tool.
  - 30 minutes for guided instruction;
    25 minutes for hands-on design with Scratch

Methods



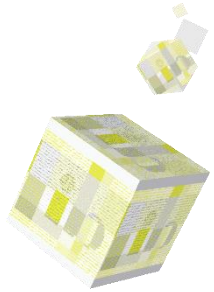
- Measures:

  Computation Measure ➔ five CT concepts *(i.e., sequence, event, conditionals, variables and loops.)*

  Curation Measure ➔ five DC dimensions *(i.e., content selection, organization, originality, interactivity and multimedia design)*

Self-made scoring rubrics are implemented to assess the two measures.

Results



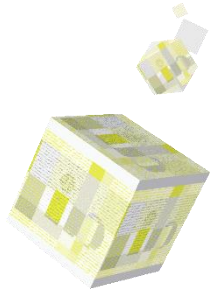
- A breakdown of Curation project by participants

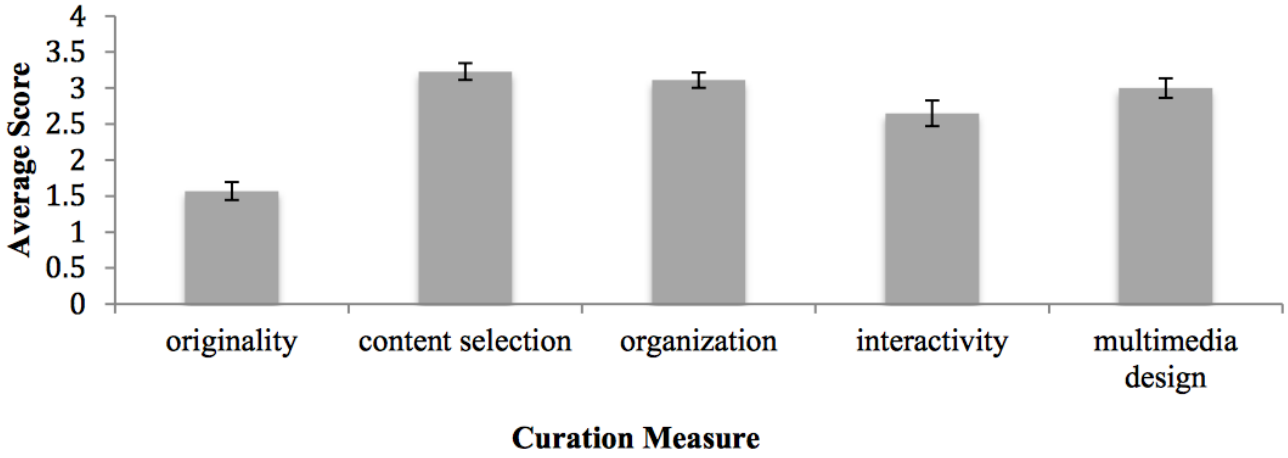
  - narrative (n=21) ➔ 60%
  - video game (n=3) ➔ 7%
  - art gallery (n=6) ➔18%
  - others (n=5) ➔ 15%

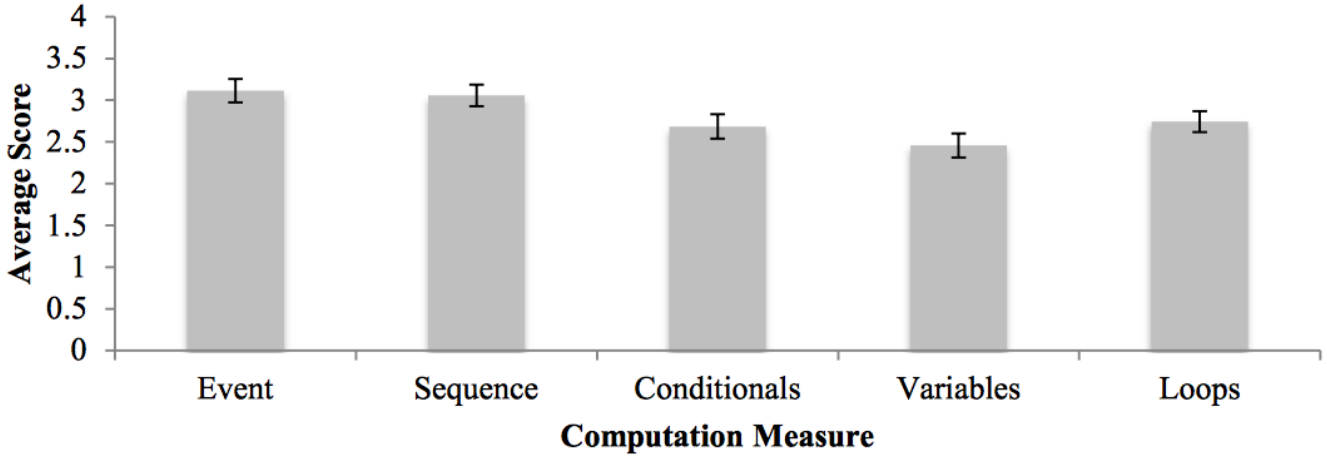
- Overall, no significant correlations were found between the Curation Measure and the Computation Measure.

- A significant positive correlation was found:
  (1) between the organization dimension and the sequence concept (r=0.535, p<0.01)
  (2) between the interactivity dimension and the conditionals (r=0.779, p<0.01) and loops (r=0.598, p<0.01) concept.

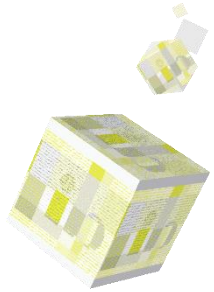
Results





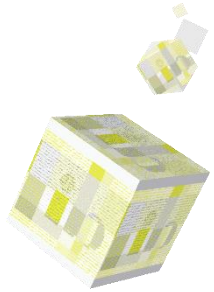


Results

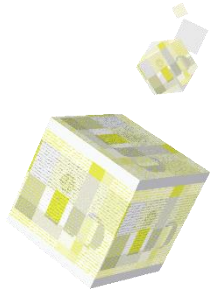


Computation Measure \ Curation Measure	Content selection	Content Organization	Content Originality	Content Interactivity	Multimedia design
Sequence	r=0.316, p=0.065	r=0.535, **p<0.01	r=0.032 p=0.854	r=-0.053, p=0.763	r=-0.104, p=0.554
Event	r=0.261, p=0.13	r=0.03, p=0.862	r=-0.061, p=0.726	r=-0.088, p=0.615	r=-0.132, p=0.45
Conditionals	r=-0.319, p=0.062	r=-0.309, p=0.071	r=-0.262, p=0.128	r=0.779, **p<0.01	r=0.169, p=0.333
Variables	r=0.076, p=0.701	r=0.064, p=0.715	r=-0.287, p=0.095	r=0.376, p=0.06	r=0.129, p=0.461
Loops	r=-0.227, p=0.19	r=-0.124, p=0.478	r=-0.207, p=0.233	r=0.598, **p<0.01	r=-0.049, p=0.778

Discussion



- Implications for DC skills
- Implications for learning CT concepts
- The interrelationship between DC and CT
  - The overall correlation was not significant, however, there were a number of conceptual linkage between the learning of CT concepts and the practice of DC.
  - The learning of CT and DC skills can be integrated into one curriculum for children.



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