PreKindergarten and kindergarten virtual school programs under COVID-19: A two-case comparative study

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Abstract
This case study aims to explore and compare two cases of virtual school programs, one asynchronized and one synchronized, regarding their pedagogical design and operationalization. The authors collected data from observations of learning activities and analyses of teaching materials. A comparison was drawn on the benefits and drawbacks of two teaching modes, and the strategies the instructors use to address the limitations.

KEYWORDS
case study, early learning, teaching methods

1 | INTRODUCTION AND BACKGROUND

The COVID-19 pandemic has forced K-12 schools to switch to an online format with little time for preparation. K-12 schools are less experienced with the online approach as academic work and social interactions primarily happen in classrooms’ physical settings. The concern is whether the virtual migration would retain the academic rigor and quality of the curriculum without imposing unrealistic expectations of the teachers.

A quick scan of the existing literature reveals very few research studies in the field of on learning for younger children, and a majority of the studies took the perspectives of the instructors and the online program service providers (Huh & Reigeluth, 2018; Luo, Hibbard, Franklin, & Moore, 2017; Smith, Basham, Rice, & Carter Jr, 2016). There lack studies that explore the virtual settings and the appropriate pedagogical designs to effectively engage K-12 school students, especially the students of lower grades, while also addressing their cognitive, social–emotional needs under self-quarantine.

This study explores two virtual school programs, one in Boston and one in Milwaukee, focusing on the differences in program designs and the impacts on children’s learning experiences. Furthermore, based on the comparative analysis, each program’s benefits and drawbacks are summarized, and implications discussed for improving online programs for children in the future.

2 | METHOD

The two cases, one asynchronized program (Case A) and one synchronized program (Case S), are based on the virtual programs that the researchers’ children participate in. After obtaining IRB approval and consent forms from both parents and instructors, researcher Wen conducted unobtrusive observations of class activities in case A with her son Larson (Grade PreK). Researcher Zhan conducted interviews with her child Dorothy (Grade K) after selective class sessions due to confidentiality concerns regarding other children’s presence in the live sessions. Course materials were also collected and analyzed.
3 | RESULTS AND DISCUSSION

The section starts with overviews of the two cases, followed by a discussion of the benefits, drawbacks, and suggested improvements.

3.1 | Case A observations

The observation on Larson's learning in asynchronized online classes began in mid-March and ended in early June 2020. Observations recorded every learning activity Larson had through SeeSaw, a teaching interaction software used in his school. Recorded information included subjects, methods, activity descriptions, parents' involvement, the kid's reactions/emotions towards the activity (Table 1).

In addition, the observation recorded whether Larson completed the activity, being distracted, and needed the parents' support. Larson showed his preferences clearly with higher completion rate, lower distraction rate, and more positive emotions (Table 2).

Parents' involvement impacted the kid's preferences. For the activities required parents' involvement, Larson needed to wait for the parents. He easily got distracted and felt impatient while waiting. In each activity, the parents recorded their involvement level on a 7-point scale. The average of involvement level was calculated to show the relationship between parents' involvement and the kid's preference ranking (Figure 1).

3.2 | Case S overview

The synchronized program evolved differently between April and June. The first 4 weeks of the virtual school reflect what the school considers the best way of "online learning." A new schedule was implemented in early May to consider the needs of parents and students, as reflected in their feedback. The revised schedule increased the class session time to support more in-class interaction and unplugged sessions for independent work on projects and assignments.

From interviews with Dorothy over 40 class sessions of varying subjects (Table 3), it was evident that her in-class engagement and performance vary with the types of independent and interactive learning activities. The setting of the virtual classroom and the instructors' and peers' presence provided the necessary motivation, and she was visibly more excited to participate if supported with interactions. However, the frequent waiting-for-her-turn to share diverts her focus, and she gets distracted and disengaged quickly.

The instructors kept the daily classroom routines with a twist, like virtual greeting and hugs, and encouraged new norms in the virtual classroom, like sharing toys, pets, and thoughts during breaks. School-wide events were also kept in a modified way to strengthen the community bond.

3.3 | Case comparison

In Diagram 1, the constant presence of the virtual classroom in the synchronized mode keeps the normalcy of in-person settings as well as community social

| Recorded info. | Details |
|----------------|---------|
| Subjects       | Math, Science, Literacy, Art |
| Methods        | Worksheets, Videos, SeeSaw games, Physical games, Crafts |
| Parents' involvements | Preparing materials, Troubleshooting technical issues, Taking photos, Correcting mistakes, Dealing with negative emotions, Uploading works to SeeSaw, Playing physical games |
| Kids' reactions | Excitement, Confusion, Impatience, Happiness |

| Preference ranking | Completion rate | Distraction rate | Main emotions |
|-------------------|----------------|-----------------|--------------|
| 1 Videos          | 100%           | <5%             | Positive     |
| 2 Worksheets      | 100%           | <10%            | Positive     |
| 3 SeeSaw games    | 100%           | >80%            | Positive     |
| 4 Crafts          | >80%           | >80%            | Negative     |
| 5 Physical games  | <80%           | 100%            | Negative     |

TABLE 1 Observation details (Case A)

TABLE 2 Kid's preference ranking for different teaching methods (Case A)
interaction. Also, there was a greater variety of learning resources and activities to ensure rigorous and quality teaching and learning. Besides, parent involvement was kept to a minimum. However, one drawback is the long screen time and the overwhelming amount of digital materials. Dorothy’s learning process is less intellectually stimulating since it lacks the hands-on component, the challenge from and exchange with the peers, and on-site guidance of the instructors.

The asynchronized teaching mode offers more freedom to be self-paced and explore different learning topics. In Larson’s case, he showed strong interests in coloring and sorting games. Besides the activities offered by the teachers, he asked for more worksheets and sorted the objects he found at home. These extra works enhanced his understanding of colors and shapes. However, Larson was not motivated to challenge himself for difficult tasks, or do the activities that he was not interested in.

In synchronized mode, the instructors addressed the drawbacks with more offline activities and frequent and longer in-class interaction in the new schedule. Moreover, to meet individual students’ varying needs, it will be helpful to add more student-teacher one-on-one sessions and support direct offline sharing and feedback between the two parties. For asynchronized mode, teachers could host live sessions for at least once a week, to build some presence of peer-pressure, and to encourage the students’ learning as they do in physical classrooms. Also, it will be beneficial to have more one-to-one communication between parents and teachers and between teachers and kids.

4 | CONCLUSION

The comparison of the two cases illustrates interesting points of students’ responses to the different designs and
helps delineate the benefits and drawbacks. It is evident that both programs evolved by integrating elements from the opposite side, in search of a balancing point in the middle of the spectrum that address the needs of students, parents and instructors.

Building upon this exploratory phase I, phase II will incorporate interview from the instructors and parents to enrich the overall understanding of virtual class formats for early education, and the responsibilities and burdens of students, teachers, and parents.

Limited by two cases, this study explored the two ends of the spectrum of virtual class formats. Anecdotal accounts indicated that many virtual school programs sprinkled along the range. It will be beneficial to incorporate “middle ground” cases to present a full spectrum. Other limitations include potential bias in data collection, since the researchers were the kids’ parents; and limited early education expertise the two researchers had to support valid interpretation of the data.

The virtual school program presents challenges and opportunities for educators, students and parents; its impact on the traditional classroom infrastructure and the teaching and learning philosophy will be long-lasting, which warrants further investigation.

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