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Trends and Issues in K-12 Virtual Academies: Perspectives of Virtual Academy Leaders

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With the rising demand for virtual learning, districts are establishing virtual schools to offer more flexible education. This study investigates K-12 virtual learner characteristics, examines trends and issues in virtual academies, and outlines opportunities and challenges faced by stakeholders in a southeastern U.S. state. The study used a mixed-method design, combining quantitative survey data and qualitative interviews with virtual academy leaders. Results reveal that virtual learners opt for this mode of schooling due to busy extracurricular schedules, a desire to avoid crowded schools or health concerns. These students include those with special needs and high-achieving individuals. Collaboration between parents and teachers plays a crucial role. Essential factors include reliable internet access, teacher tech proficiency, and diverse curriculum development approaches. However, diverse curricular methods require additional implementation support. Balancing instructional flexibility with accountability poses a significant challenge. Virtual teachers need resources, professional development, and time, especially when transitioning from traditional to digital curriculum. Effective communication and interpersonal interactions are vital. Involving home learning coaches and community partnerships enhances the educational experience. While virtual schools offer flexible and personalized support, they encounter challenges related to resource access, social isolation, and student motivation.

Prior to COVID-19, the majority of K-12 students experienced their education in a traditional brick-and-mortar setting, where they were surrounded by peers, with a classroom teacher leading from the front of the room. In March 2020, this familiar educational landscape underwent a dramatic shift as the majority, if not all, of K-12 students transitioned to remote learning due to COVID-19. Unprecedented numbers of K-12 students found themselves navigating online and hybrid classrooms during the 2020-21 school year as a result of the global pandemic. This sudden shift is often referred to as "emergency remote instruction" (Hodges et al., 2020). As a consequence of this rapid transition, distance education has begun to play an increasingly critical role at all levels of education. In a southeastern state in the United States and throughout the country, districts are capitalizing on this momentum by opening virtual schools. These virtual school options provide solutions for scheduling conflicts, access to highly qualified teachers in subjects with limited availability, flexibility for athletes and homebound students, and remedies for addressing small class sizes and unexpected teacher shortages (Gemin et al., 2015). As the shifts in how K-12 instruction is delivered continue, it becomes evident that district and state-level policies will play a crucial role in ensuring increased student opportunities through support for online schools and courses (Gemin et al., 2015).

In the early days of distance learning, the primary focus was on serving homebound students and providing vocational education at the postsecondary level. This approach utilized various technologies, including print materials, CD-ROMs, and video conferencing, to deliver instruction and facilitate communication across multiple sites (Gemin et al., 2015). As distance learning evolved, especially with the advent of the Internet, online courses began to be developed to cater to specific needs. These courses were designed for groups such as Advanced Placement students or subjects often unavailable in rural or inner-city schools. In its early stages, K-12 online learning primarily centered on the adaptation of traditional classroom courses into a distance education format. This involved the replication of course content and assignments, and over time, it evolved to include the facilitation of interactions between teachers and students, students and course content, as well as peer-to-peer interactions among students (Wicks, 2010). The scope of K-12 online education services has expanded considerably. These services range from individual courses offered to students enrolled in traditional brick-and-mortar schools to the provision of all online instruction by full-time virtual schools and academies (Molnar, 2021). Full-time virtual schools can take various forms, including district virtual schools, private virtual schools, and charter schools. Each of these models contributes to the diverse landscape of K-12 online education.

This study seeks to address several critical questions in K-12 online education, focusing on K-12 virtual learner characteristics, trends and issues for K-12 virtual instruction, and opportunities and challenges for K-12 virtual learners.

REVIEW OF LITERATURE

K12 Virtual Learner Characteristics

The landscape of online education, particularly in K-12 settings, is evolving rapidly, driven by technological advancements and changing educational needs. In this context, understanding the characteristics of online learners, the demographic disparities in virtual schools, and the readiness factors contributing to student success becomes increasingly important.

Research by Yükseltürk and Top (2012) categorized the online learner profile into ten aspects. These aspects include gender, age, work status, self-efficacy, online readiness, self-regulation, participation in discussion lists, participation in chat sessions, satisfaction, and achievement. The Virtual Schools in the U.S. 2021 report by Molnar (2021) highlights significant demographic disparities in virtual schools compared to the national public school population. Specifically, 58% of virtual school students are identified as White and non-Hispanic, surpassing the national average of 49.8%. In contrast, Black (10%) and Asian (1.5%) students are underrepresented in virtual schools relative to their representation in the national public school population (25.5% and 4.8%, respectively). Virtual schools also exhibit underrepresentation of specialized populations, including students eligible for free and reduced-price lunch, those in special education programs, and English language learners.

Online learner readiness is a critical factor in learner success. While prior research has extensively explored online learner readiness in higher education (Hung et al., 2010; Martin, Stamper et al., 2020; Yu & Richardson, 2015; Zimmerman & Kulikowich, 2016), further investigation is necessary to understand K-12 virtual learner readiness. Martin, Stamper et al. (2020) discussed attributes, time management, communication, and technical competencies as essential for student success in online learning. Çiğdem and Yildirim (2014) found that students' prior experiences in web-based education and access to a home computer impacted their readiness for online learning. Fogerson (2005) observed that prior online course experience and computer-related experience predicted student confidence in online learning.

New district-operated virtual schools have contributed to the expansion of full-time virtual education options. However, these district virtual schools, serving various grade levels from kindergarten to twelfth grade, tend to be smaller in scale compared to virtual charter schools. In the 2020-21 school year, enrollment in district virtual schools exceeded 332,379 students, marking an increase of nearly 30,000 students and an 11% growth rate since 2017-19 (Molnar, 2021).

The context in which online learners engage with their education plays a crucial role in their success. Roblyer et al. (2008) discussed how a student's learning environment can impact their performance in online courses as much as their personal characteristics. Borup et al. (2019) emphasized the importance of support for K-12 online learners, including advising, orientation to online courses, caring relationships, strategies to facilitate interactions and motivation. Additionally, Colorado and Eberle (2010) found that the age of online learners can affect their self-regulated learning, which is vital for success in online courses and has positive relationships with interaction, communication, and collaboration.

Trends and Issues in K-12 Virtual Instruction

The landscape of K-12 virtual instruction has undergone significant changes and challenges, particularly in the wake of the 2020 pandemic. Emergency remote learning, while enabling student engagement, also brought forth a myriad of issues. Stress, anxiety, illness, and the abrupt shift to unfamiliar learning methods profoundly impacted student learning (Middleton, 2020). Researchers such as Dabbagh (2007) and Kauffman (2015) had previously initiated investigations into student characteristics and instructional strategies that facilitate successful online learning, a significance that has only grown more pronounced in the current context. These explorations gave rise to crucial questions: What factors contribute to successful online courses in terms of student outcomes and satisfaction? Are there specific student traits that correlate with positive learning results? Which aspects of online course design enhance academic achievement, and which present barriers to success (Dabbagh, 2007)?

More recently, Martin, Sun et al. (2020) embarked on a comprehensive review of 619 research articles published in the last decade, categorizing online learning research into 12 prominent themes. Among these, online learner characteristics and online engagement emerged as areas of frequent examination. While virtual schools increasingly engage in course development, scant research delves into the needs of course designers, especially those who are nontraditional, such as K-12 teachers (Oliver et al., 2010). Furthermore, significant gaps persist in research concerning organizational-level topics encompassing leadership, policy, management, access, culture, equity, inclusion, and ethics within the context of virtual K-12 education (Martin, Sun et al., 2020).

Diversity notably characterizes virtual schools in terms of curriculum development preferences. Virtual schools often create curricula rather than rely on vendors for course acquisition or licensing (Oliver et al., 2010). Research has underscored the necessity for educators to receive professional development to craft high-quality online learning experiences (Molnar, 2021; Oliver et al., 2010). In contrast, findings by Gill et al. (2015) suggest that teachers in online charter schools predominantly utilize vendor-created materials and allocate less time to planning and preparation than their counterparts in traditional brick-and-mortar schools (Gill et al., 2015).

The recruitment, preparation, and retention of teachers, administrators, and support staff for fully virtual schools remain subjects requiring further exploration (Molnar, 2021). Given the reduced face-to-face interactions between teachers and students (Gill et al., 2015), the definition and development of evaluation processes, recruitment methods, and role delineation become pivotal factors for the prosperity and sustainability of virtual schools (Molnar, 2021).

While the positive impact of parent and community engagement on student learning and achievement is widely acknowledged (Boulton, 2008), limited research exists on best practices within K-12 virtual settings. Borup et al. (2019) introduced the Adolescent Community of Engagement (ACE) framework to comprehend various student support systems in virtual contexts. These responsibilities span from organizing students' environments and schedules to aiding in content navigation and facilitating student interactions (Stevens & Borup, 2015). Research by DiFrancesca and Spencer (2022) underscores the significance of forging partnerships with parents or caregivers to foster successful online learning experiences for K-12 students.

Opportunities and Challenges for K-12 Virtual Learners and Teachers

The increasing popularity of online courses in K-12 education has transformed how students learn and educators teach. These changes present opportunities and challenges for students and teachers in virtual school environments.

For K-12 learners, virtual schools offer a range of opportunities. These schools eliminate traditional barriers of time and place, providing students with expanded educational choices. Students can access a wider array of courses and expertise that may not be locally available (King et al., 2014). Virtual schools also serve as a safe and supportive alternative for learners facing issues such as bullying or peer pressure (Derrington & Partin, 2022). The flexibility offered by virtual schools in terms of scheduling and resource access is advantageous for students with varying learning preferences and individual needs (Chang-Bacon, 2021; Gewertz, 2021). Additionally, these schools enable educational institutions to expand their course offerings, especially in subjects that are difficult to staff (Lee & Choi, 2010).

Incorporating multimedia and interactive elements into virtual learning environments enhances engagement and retention, making the learning experience dynamic and captivating (Afify, 2020).

However, transitioning to virtual education also brings challenges for K-12 learners. The digital divide remains a significant concern, as not all students have equitable access to digital devices and high-quality internet connections (Graves et al., 2021). Developing digital literacy skills is essential for learners to effectively navigate online platforms and adapt to evolving technologies and e-learning practices (Torres Martin et al., 2021). The online learning environment places a premium on self-regulation skills, such as time management and self-discipline, which can be demanding for K-12 students (Abdullah, 2018).

K-12 teachers in virtual schools also encounter distinct challenges. They must invest time in designing and adapting instructional materials for online delivery, which can be resource-intensive (Tawfik et al., 2021). Ensuring accountability within an online format can be complex, requiring strategies for monitoring and assessment (Tawfik et al., 2021). Adequate administrative support for online teaching is crucial for teacher success. The absence of face-to-face interactions can impact teacher-student dynamics and the development of crucial social and emotional skills (Hawkins et al., 2012). Technical issues can disrupt the teaching process, affecting the quality of instruction (Ocak & Karakus, 2022). Additionally, the level of support from parents or caregivers can vary, impacting the teacher's ability to effectively engage students (Ocak & Karakus, 2022).

Conceptual Framework

To situate this research study, we developed the K-12 Virtual Learning Landscape as our conceptual framework (Figure 1). The framework builds upon the digital learning landscape (Gemin et al., 2015) and online learning research themes identified by Martin, Sun et al. (2020) for a more holistic view of virtual schools. Key components include learner characteristics (demographics, context, needs, and readiness) and design principles (technology and connectivity; curriculum and services; teachers and administrators characteristics, organizational development, and parent and community engagement), which are both critical for learner outcomes (learner opportunities, challenges, experiences, and success). The framework will guide us in addressing the research questions.

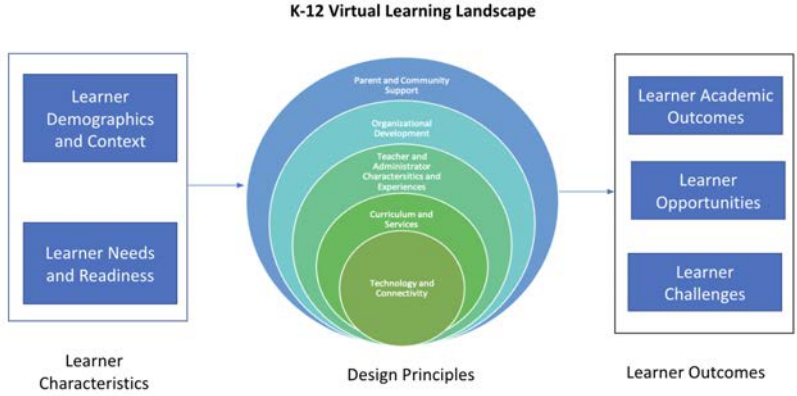

Figure 1. K-12 Virtual Learning Landscape.

Purpose of the Study and Research Questions

Virtual Academies are evolving in K-12 education, and in addition to creating the capacity for administrators and teachers to implement effective virtual teaching and learning, there is an urgent need to ensure equitable access and quality for this particular school model. K-12 virtual learners have different characteristics from the students in traditional schools, and the trends and issues of virtual academies are different. Also, K-12 virtual learners and teachers have different opportunities and face different challenges. These differences resulted in this study with three research questions.

To address this need, this study addresses the following questions.

- What are the characteristics of K-12 virtual learners based on their demographics, context, needs, and readiness?
- What are the trends and issues in virtual public academies based on technology and connectivity, curriculum and services, teacher characteristics, organizational development, parent and community engagement, and school demographics?
- What are the opportunities and challenges of K-12 virtual learners in virtual academies?

METHODS

This convergent parallel mixed-method study uses quantitative and qualitative methods to examine trends and issues in virtual public academies. The K-12 virtual learning landscape conceptual framework guided the study in quantitative and qualitative methods.

Research Design

This mixed-method case study uses quantitative and qualitative data collection methods through online surveys and interviews. Specifically, the study used a convergent parallel design (Teddlie & Tashakkori, 2009) where data was collected using the survey and interviews where virtual academy trends and issues were analyzed separately; however, the findings are compared for interpretation. Mixed methods were used so that the survey and interview data could complement each other.

Participants

Fourteen virtual academy leaders completed the survey, and 11 leaders participated in interviews. The demographic details of the interview participants are included in Table 1. Nine leaders participated in both the survey and interviews.

Table 1

Demographic Information from Interview Participants

Interviewee	Educational Degree	Roles in Education	Years in K-12 Education	Gender	Ethnicity
Leader 1	MA School Administration, EdD Educational Leadership	Classroom Teacher, School Administrator	17 years	Female	African American
Leader 2	BA Elem Ed, MA School Administration	Classroom teacher, School Administrator	13 years	Female	Caucasian, Non-Hispanic
Leader 3	BA Elem Ed, MA Administration, EdD Educational Leadership	Classroom Teacher, AP, Principal	14 years	Female	Caucasian, Non-Hispanic
Leader 4	BA Mathematics, MEd Curriculum & Instruction, EdD Educational Leadership	Classroom teacher, Curriculum Specialist, School Administrator, Accountability Director	20 years	Female	Caucasian, Non-Hispanic
Leader 5	BS International Politics with Teaching Cert, MA Curriculum & Instruction	Classroom Teacher, Curriculum Coach, School Administrator	20 years	Female	Caucasian
Leader 6	MA School Administration; Principal Fellow	High School Science Teacher, AP, School Administrator	20 years	Female	Caucasian

Table 1, *Continued*

Interviewee	Educational Degree	Roles in Education	Years in K-12 Education	Gender	Ethnicity
Leader 7	BS English, MA English, MA School Admin (C&I)	Classroom Teacher, School Administrator	13 years	Male	Asian; Two or more races identified
Leader 8	BS Business Admin, MA Ed Leadership, EdD Educational Leadership	Teacher, Instructional Management, School Administrator	23 years	Female	African American
Leader 9	BS Elementary Education, MA Technology & Media, EdD Educational Leadership	Teacher, Instructional Technology Facilitator, Administrator	19 years	Female	Caucasian, Non-Hispanic
Leader 10	BS Elementary Education, MA School Administration	Teacher, School Administrator	29 years	Female	Caucasian
Leader 11	BS in Electrical Engineering, MBA, MA in Teaching and Learning, Working on EdD Educational Leadership	Teacher, Curriculum Facilitator, Math Coach, School Administrator	20 years	Female	African American

Instruments

The survey questionnaire was developed by the research team using the K-12 virtual learning landscape to guide the development of the items on the survey. There were a total of 23 items on the survey, with the first question focusing on the demographic profile of the virtual academy. There were five questions on technology and connectivity, six on curriculum and services, six on teacher characteristics, three on organizational development, and two on parent and community engagement. The survey included multiple-choice, multiple-answer, and open-ended items.

The research team developed the interview protocol. There were 12 questions included in the interview protocol, with the first focusing on getting to know the virtual academy leader. The interview protocol is included in an appendix at the end of this manuscript.

Data Collection

IRB approval was received from the researchers' institution before virtual academy leaders were recruited for the study. Consent was requested on the first page of the online survey. The survey participants were included in a random drawing of one $25 Amazon gift card. For the online interview, consent was requested through a Google form before scheduling the interviews.

The survey was administered through a Google form, while interviews were conducted through Zoom. The source of quantitative data was the survey, which was primarily descriptive data, and the qualitative data came from the semi-structured interviews. The length of the interviews ranged from 26 minutes to 43 minutes. Each interview participant received a $25 Amazon gift card. Both survey and interview data collection occurred during spring 2023.

Data Analysis

Descriptive statistics and frequencies were used to analyze the quantitative data from the survey. The qualitative data from the interview was analyzed to identify themes and patterns (Glesne, 2015). Both data sets were analyzed concurrently to allow the data to inform the results and interpretation of the findings. After downloading the transcription from Zoom, the doctoral student researcher cleaned the interview transcripts. The lead author and the doctoral student researcher read the transcription, keeping the purpose of the study and research questions at the forefront. Then, attempting first to identify the meaning within the text without any preconceptions, conducted open coding for the qualitative data analysis. The codes derived during phase one open coding were categorized using a priori codes purposefully developed from the K-12 Virtual Learning Landscape conceptual framework. This two-phase process of coding allowed the lead author, supported by the doctoral student researcher, to capture the authentic voice of the participants prior to categorizing them based on the established conceptual framework.

RESULTS

In this section, we provide the results from the survey and interviews and organize them based on the research questions focusing on K-12 virtual learner characteristics, trends and issues in K-12 public virtual academies, and opportunities and challenges for K-12 virtual learners.

K-12 Virtual Learner Characteristics

Three themes that emerged for K-12 virtual learner characteristics included demographic characteristics, contextual factors and learner needs influencing enrollment, and learner readiness for virtual learning.

Demographic Characteristics

According to survey data collected from 14 virtual school leaders, most students identified as male or female. Fewer than 25% of students were reported as non-binary by 13 school leaders, with one school reporting 26-50% non-binary students. Similarly, all 14 schools reported fewer than 25% of students identifying as transgender.

The approximate racial representation of students in virtual schools was also examined. Across the 14 schools, none reported more than 25% of students from American Indian, Asian, Hispanic, or Pacific Islander backgrounds. One school reported 25-50% of students being of two or more races, while the other 13 schools had fewer than 25% of students falling into this category. Regarding black students, four schools reported 25-50%, four reported 51-75%, two had fewer than 25%, and one reported 76% or higher. White students showed a varied breakdown, with seven schools reporting 51-75%, two reporting 25-50%, two reporting 76% or higher, and one having fewer than 25% white students. Overall, the majority of students in virtual schools were reported as either Black or White.

Contextual Factors and Learner Needs Influencing Enrollment

Interviews with school principals shed light on the factors influencing students' decisions to enroll in virtual schools. Individual needs, student preferences, and family circumstances emerged as key motivations. Principals reported that some students with special needs or compromised immune systems find virtual schools better suited to their physical well-being. One principal highlighted, "Whether they feel unsafe, physically, mentally, emotionally, in a brick and mortar setting... they saw that the virtual setting was probably a better option." Another principal stated, "We have other students who just... appreciate that in a virtual academy, disruptions are at a bare minimum if they have to occur at all." Four principals interviewed claimed that some students thrived in the virtual setting due to their self-motivation and preference for independent learning. Additionally, students involved in athletics or extracurricular activities with demanding schedules were reported by principals to have found virtual education more manageable. Virtual schools also cater to families' desires for greater involvement in their student’s education or to accommodate specific needs.

Learner Readiness for Virtual Learning

Five of the 11 virtual academy principals interviewed reported that their students came with academic deficits, with challenges in addressing them. As one principal explained, "My kids are not very proficient, to begin with, and it's difficult for us to gain proficiency with students who didn't come in proficient." Students' initial proficiency levels, COVID-related learning gaps, and limitations in virtual interventions made closing these gaps difficult. Additionally, principals expressed concerns about enrolling students with severe needs in virtual schools, recognizing the importance of providing support beyond academic assistance, such as addressing food and clothing insecurity, homelessness, or mental illness. Although efforts are made to provide accommodations, there are situations where principals have to inform parents that a virtual setting may not be the most suitable option for students requiring extensive accommodations or support.

One principal commented that kindergarten and first-grade students had not yet learned foundational online skills, such as alphabet recognition and typing, so the pace of these students' education in virtual schools can be significantly affected. Two principals mentioned phasing out early grades in virtual schools. Additionally, one principal shared that virtual academies conduct continuation reviews periodically to assess students' progress and adherence to program requirements. These reviews determine whether students can continue in the virtual academy or risk losing their seats. Principals report that students have been removed from the virtual academy due to non-compliance. The review process ensures that students remain engaged and committed to their education, but it can also reduce enrollment numbers over time.

TRENDS AND ISSUES IN VIRTUAL PUBLIC ACADEMIES

Trends and Issues in virtual academies are provided based on the design principles of the K-12 virtual learning landscape framework, including technology and connectivity; curriculum and services; teachers and administrators characteristics; organizational development; and parent and community engagement.

Technology and Connectivity

Trends and issues that emerged in the technology connectivity design principle were learning management systems, devices and support services, internet connectivity for teachers and students, technology support and resources, and challenges and opportunities with technology.

Learning Management Systems (LMS)

The survey data revealed that Canvas was the primary learning management system (LMS) used by most schools, with nine out of 14 indicating its utilization. Three schools reported using Canvas with other LMSs. Additionally, nine principals highlighted the diverse range of platforms and tools utilized in their schools, including tools like Nearpod and Google Meet. Teachers actively explored and incorporated these digital resources to enhance instruction and engage students in virtual academies.

Devices and Support Services

Schools provide a variety of devices and services to support students' learning. Laptops were the most commonly provided device, offered by 12 schools, followed by hotspots, provided by 10 schools. Three schools offered tablets, and two schools provided Chromebooks. Nine schools provided software and/or internet applications, while two offered internet services.

Data collected during the administrator interviews support the survey findings, indicating that all participant districts provided one-to-one technology access for students. This distribution included the provision of Chromebooks, iPads, and laptops to ensure students had the necessary tools for virtual learning. However, administrators expressed concerns regarding disparities between the devices provided by the district and the preferences of teachers and students. While the district offered Chromebooks or iPads, some teachers and students preferred laptops due to better software compatibility and a wider range of educational tools.

Virtual academy teachers were equipped with a range of technology tools, such as multiple monitors, document cameras, webcams, iPads, Apple pencils, and multiple learning platforms. Principals reported that these resources enabled teachers to leverage technology effectively in their instructional practices. Despite these advancements, administrators highlighted their frustration during interviews concerning the inequities in technology access and support at home for both students and teachers, as these challenges impacted student ability to fully participate in virtual learning experiences.

Internet connectivity for teachers and students

The data showed that most schools reported that their teachers had reliable internet connections, with 13 out of 14 indicating this. However, one school reported that their teachers had only a somewhat reliable connection. In contrast, eight schools reported that their students had reliable internet connections, while six reported they were challenged with securing reliable connectivity. The principal interviews emphasized the importance of access to high-speed Internet for virtual learning. It was noted that some students and families faced challenges in accessing reliable Internet at home. Districts have been working to provide hotspots and support Internet connectivity for families in need.

Technology support and resources

According to the survey data, shared instructional technology support and shared hardware technology support were the district's most common types of technology support, with 12 and 13 responses, respectively. Designated instructional technology support and designated hardware technology support followed closely behind, with four responses each. One principal indicated they also served as the school's instructional technology facilitator. Principals highlighted the importance of ongoing technology support and professional development in helping teachers effectively integrate technology into their virtual teaching. They emphasized that teachers benefit from assistance and training in utilizing technology tools. Five districts have taken the initiative to assign dedicated technology facilitators or tech support personnel who work closely with teachers. These specialists assist teachers with addressing technological issues and provide them with training to enhance their technological skills.

Challenges and opportunities in technology

The interviews shed light on virtual schools' various technology challenges, including connectivity issues, software compatibility, and platform updates. Teachers and students often encountered disruptions and invested significant time addressing technology-related issues. Certain platforms, such as Zoom, posed compatibility problems with specific devices like Google Chromebooks. Moreover, there was a notable variation in student technology skills, with some being proficient in using digital tools while others struggled with basic technology tasks like logging in or navigating online platforms. Nevertheless, respondents reported that students demonstrated technological competence and adaptability, quickly embracing new platforms and tools.

During the interviews, administrators shared insights into the challenges associated with technology around discipline and potential misuse. Despite these challenges, administrators are firmly committed to supporting their teachers and students by providing advanced technology and additional resources to enhance virtual learning. One administrator conveyed their aspirations, stating, "We are thinking big. We would love to be able to give our teachers advanced technology so they can continue to grow as virtual teachers."

Curriculum and services

Trends and issues that emerged in the curriculum and services design principle included curriculum alignment, curriculum development, school schedules, modes of instructional delivery, digital instructional content, and assessment.

Curriculum Alignment

According to findings from the principal interviews, virtual school teachers prioritize aligning their instruction with the state's standard course of study and utilizing their district's curriculum resources. One principal emphasized this by stating, "Even though we're virtual, we're still providing grade-level appropriate, standards-based curriculum and instruction to students." Additionally, principals mentioned the importance of keeping pace with the district's curriculum guides. One principal highlighted this: "We pretty much keep abreast with the pacing guide that the district has," although ten of the eleven principals shared difficulties with adapting curriculum to online formats.

Challenges in Curriculum Development

Developing a curriculum in virtual schools involves a blend of approaches. Out of the 14 surveyed schools, 9 implemented a combination of methods. These approaches include curricula created by the school's educators themselves, district-level frameworks, external providers, and virtual learning providers at the state level. Two schools rely solely on the curricula designed by their own teachers, while one school acquires its curriculum from the district. One school outsources its curriculum design to an external provider.

During the principal interviews, a common concern arose regarding the lack of a curriculum specifically designed for online instruction. Principals highlighted the need to modify existing curriculum materials created for face-to-face instruction to suit the virtual learning environment. Adapting these materials posed a significant challenge, particularly for discourse-based curricula where meaningful discussions were limited due to asynchronous learning. Principals emphasized the necessity of curriculum resources that seamlessly integrate with virtual platforms and provide engaging content suitable for independent learning. One principal expressed this need: "To address the limitations of traditional textbooks and instructional resources, we need curriculum specifically designed for online instruction."

School Schedules

Virtual schools also focus on their schedule and organization to optimize student learning. Administrators recognized the need for potential schedule adjustments and improvements. They emphasized the importance of well-prepared student schedules to ensure a smooth virtual learning experience. Curriculum development and support were essential aspects of virtual school schedules. Administrators acknowledged the importance of adapting the curriculum and developing instructional materials for the virtual setting and used asynchronous days to give instructors time for these tasks.

According to one administrator, "Most of our instructional staff's time spent outside of those live sessions with our students is that piece of adapting what is mostly curriculum built for brick and mortar into the virtual setting." Designated days for staff development and collaboration enhance instructional practices. District-wide support was provided through curriculum coaches, instructional assistants, and specialists. However, the interviewees repeatedly noted a need for additional professional development and support to help teachers effectively adapt the curriculum.

Modes of Instructional Delivery

Instructional delivery methods vary across grade levels in virtual schools. Elementary schools primarily focus on synchronous instruction, where real-time interaction between teachers and students takes place. This approach allows core subjects to be taught before lunch, followed by dedicated time for intervention, office hours, and small group activities. Principals observed positive outcomes from live direct instruction for elementary students.

In contrast, middle and high schools combine synchronous and asynchronous learning methods. While synchronous instruction remains integral, allowing for direct interaction and engagement, asynchronous learning is also incorporated to provide flexibility. This flexibility accommodates the personal schedules and family obligations of older students. Schools with limited teacher resources find asynchronous learning helpful in providing a comprehensive curriculum.

Flexibility is a recurring theme in virtual schools. To address the needs of struggling students and promote academic growth, six principals reported allocating additional time for core classes, allowing for targeted support and intervention. Additionally, schools provide opportunities for students to explore off-grade-level topics, expanding their knowledge and stimulating their curiosity.

Digital Instructional Content

The survey results indicate that digital content is widely utilized in virtual school teaching practices. Schools utilize a variety of digital resources, including ebooks, free online content, instructional videos, personalized learning applications, and publisher-created or subscription-based materials. However, managing multiple platforms and navigating through different learning management systems (LMS) emerged as a significant challenge for principals. Supporting students adjusting to self-paced learning is also crucial for effectively utilizing digital instructional content.

Specific Curriculum Challenges and Adaptations

Virtual schools face specific challenges in curriculum implementation, particularly in certain subject areas. Math instruction was identified as a weakness for several schools, with concerns raised about students relying too heavily on internet searches for answers. Finding math problems that are not easily searchable online presented a persistent struggle for virtual schools.

Elementary reading curriculum also posed challenges, requiring extensive preparation compared to traditional brick-and-mortar classrooms. While there were signs of growth in reading proficiency among students, principals acknowledged the ongoing need for improvement in this area.

Science instruction emerged as a consistently identified challenge across schools. Replicating hands-on experiences and observations in science labs proved difficult in the virtual setting. Principals discussed their efforts to address this challenge by sending materials like scales and anatomical models to students' homes to provide tangible experiences. Integrating technology effectively presented obstacles, especially in subjects like middle school science with virtual dissections and artificial intelligence components. Memorization-based subjects like biology were particularly challenging, as the lack of in-person accountability made it difficult to ensure students' memorization and recall of essential information. Principals recognized the need to find effective strategies to foster proficiency in science for virtual school students.

Assessments

Assessment in virtual schools presents unique challenges, as evident from the survey results and principal interviews. While all eleven principals reported conducting testing both virtually and on-site, ensuring secure spaces and student participation in face-to-face testing remains a concern reported by five principals, particularly with state-mandated accountability testing having in-person requirements. Balancing flexibility and accountability is a continuous effort for virtual schools. Principals expressed the need for accountability frameworks that consider the unique circumstances of virtual education, such as transportation challenges and limited resources.

Socialization and Enrichment Activities

Eight of principal interviews included thoughts on the socialization of students. Principals reported that their virtual schools organized in-person events, such as field trips, clubs, and social gatherings, where students could interact with one another outside of the virtual classroom setting. One principal mentioned, "We try to mimic what in-person schools would do even in the virtual space because we believe in providing equitable opportunities." Virtual schools also provide virtual clubs and activities that cater to students' interests and passions, allowing them to connect with like-minded peers.

Teacher and Administrator Characteristics and Experiences

Trends and issues that emerged in the teacher and administrator characteristics and experiences design principle included teaching staff characteristics, challenges faced by virtual school teachers and principals, and benefits and opportunities for virtual school teachers and principals.

Teaching Staff Characteristics

The survey data provided insights into various aspects of the teaching staff in the participant schools. The number of full-time teachers employed varied significantly, with four schools having more than 30 full-time teachers and three having fewer than seven. Part-time teachers were less common, with only one school reporting more than ten part-time teachers, all of whom also taught in brick-and-mortar schools. The survey revealed the presence of certified support staff in schools, including counselors, special education teachers, social workers, academically/intellectually gifted teachers, instructional coaches, technology facilitators, English language learners teachers, and media specialists. However, the availability of these support staff varied across schools.

During the principal interviews, characteristics of the teachers in virtual schools were discussed. Teachers were described as "master teachers" with years of experience, showing expertise in the field. They were praised for their innovation and willingness to embrace new technology tools and methods. Principals highlighted the teachers' adaptability to technology and their commitment to student support and engagement. The presence of counselors in virtual schools was also mentioned, emphasizing their role in supporting both engaged and disengaged students of all ages.

Challenges Faced by Virtual School Teachers

Principals identified virtual school teachers' challenges, including isolation and limited collaboration opportunities. The lack of shared teaching experiences hindered collaboration and the exchange of ideas. Efforts were made to connect virtual school teachers with peers from other schools to foster collaboration. The physical distance between teachers in virtual schools also posed a challenge to creating a sense of connectedness. The initial lack of technological proficiency among teachers placed in virtual schools for health reasons was highlighted, and the need for specialized training in virtual instruction was emphasized. Principals acknowledged the importance of providing professional development opportunities focused on virtual instruction to enhance teacher competencies.

Benefits and Opportunities for Virtual School Teachers

Principals discussed the benefits and opportunities enjoyed by teachers in the virtual school setting. Flexibility and autonomy were highlighted, allowing teachers to customize the curriculum and work from home. Reduced stress and improved work-life balance were also emphasized. Professional development and collaboration opportunities were seen as crucial, with a desire for ongoing training specific to remote instructional practices and the formation of collaborative networks. Virtual platforms afford instructional opportunities such as virtual field trips and immersive learning experiences.

Principal Challenges and Opportunities

Principals also shared their own challenges and experiences in virtual school administration. The sense of isolation and the lack of peers who fully understand the unique demands of virtual school administration were mentioned. The principals faced the responsibility of overseeing all aspects of the virtual school, which sometimes led to exhaustion. District-level discussions and policies geared towards face-to-face instruction posed challenges in addressing the specific needs of virtual schools. However, the principals recognized virtual school administration's valuable experiences and opportunities, including knowledge and expertise gained, flexibility, autonomy, and a sense of fulfillment from being part of an innovative educational approach.

Organizational Development

Trends and Issues that emerged in the organizational development design principle included enrollment variation, staffing, school improvement plans, school schedules, teacher professional development, and school branding.

Enrollment Variation

Enrollment in the virtual schools surveyed varied regarding their establishment and growth. One school began serving students as early as the 2017 school year, while the other 13 started in 2020, 2021, or the 2020-2021 academic year. Grade spans also differed, with seven schools serving students in grades K-12 and two serving grades 6-12. The remaining schools catered to various grade spans, including K-5, K-8, 1-8, 3-8, and 3-12. Enrollment numbers ranged from 34 to 664 students, averaging 295 students per school. Four administrators recognized the need to increase enrollment in virtual schools, with one administrator noting, "We're a little under where we would like to be right now, but I think we have a good set of students where this is the best place for them." Enrollment challenges were significant factors affecting virtual schools. One administrator expressed

concerns about decreased enrollment due to district-imposed caps and limited enrollment windows in the previous academic year, stating, "Our numbers have drastically decreased, and I believe that part of that was driven by the district."

Staffing

Staffing was a critical aspect of organizational development in virtual schools, particularly in accommodating the fluctuating numbers of students. Most administrators were tasked with building the virtual school from scratch and handling hiring processes. Principals acknowledged the need to expand staffing to meet demands and enhance educational offerings. However, challenges arose in specific areas, such as providing specialized classes due to limitations in staffing resources. For example, one principal mentioned the limited staffing resources in providing specialized classes to elementary students. While teachers handled core instruction, the lack of available personnel restricted the ability to offer a full range of electives in some grades. Furthermore, staffing needs extend beyond instructional roles. Principals recognized the necessity of additional personnel to address challenges unique to virtual settings, such as tracking student attendance and engagement. One principal wanted a classified person to monitor student attendance and relieve the burden on teachers and guidance counselors. Two principals stated that people not in virtual schools had the misconception that virtual schools required fewer personnel and did not understand the multifaceted nature of staffing requirements in virtual education.

Funding issues were also raised, as two virtual school principals noted their schools were not eligible for Title I funding despite having similar needs to traditional schools. One administrator emphasized the need for equitable funding, stating, "I hope that changes soon...We don't qualify for child nutrition...So those are different needs that we have that people may not consider."

School Improvement Plans

The status of school improvement plans varied among the survey respondents. Four respondents noted that their school was still in the early stages of development but needed more work. They recognized the importance of refining their plans to address specific challenges and opportunities. On the other hand, nine respondents reported that their school's plan was already in place and making a difference in improving the schools' operations and performance. These schools had established comprehensive improvement plans and had seen positive outcomes. Additionally, one respondent mentioned that the plan was well-established and constantly updated, reflecting a commitment to continuous improvement.

Teacher Professional Development

Teachers working in these virtual academies received a range of professional development opportunities. This included training on using technology tools like Doc Cams and training for using Zoom. Four schools had provided training from external organizations such as Quality Matters (QM) in K-12 Teaching Online, which covers course design, faculty training, and program review. Teachers were also trained to use various Learning Management Systems (LMSs), including Canvas, Google Suites, Seesaw, PearDeck, and Nearpod. One school reported participating in a Canvas Certification Course. Other virtual academy teachers had received training on third-party technologies, including Edmentum, Zearn Math, Heggerty, mClass, Mastery Connect, CommonLit, and Freckle Math. Teachers had also received professional development training from various organizations and settings, including the state's department of public instruction, educational innovation institutes, and virtual school networks. District-level training had been available on various topics, including required curriculum and content areas. Administrators had provided coaching for teachers, and weekly sharing sessions among teachers had been used as a means of professional development. In addition, teachers had received training from school personnel and certified instructional technology facilitators from their corresponding districts. On-the-job training had been common during the pandemic as teachers had to adapt to virtual and hybrid learning environments. Three respondents indicated that their teachers had not received specialized training or professional development.

Evaluation

The data indicated that various personnel in the school system evaluated the principal. The superintendent was the most common evaluator, mentioned four times, followed by the area superintendent (mentioned three times). Other evaluators included the assistant superintendent, director of advanced learning and innovation, executive director of student support services, principal supervisor, and secondary director. Each virtual school's teacher was evaluated by their school's principal.

Parent and Community Engagement

Trends and issues that emerged in parent and community engagement included communication methods, communication partners, continued engagement, and engaging the greater community.

Communication Methods

Survey data from the 14 participant schools highlight the priority of clear and consistent communication with parents. The most commonly reported method was email, used by all 14 respondents. Face-to-face communication

is also heavily utilized, with 11 responses. Other approaches to parent communication reported in the survey include social media such as Twitter and Facebook (12 responses), Online Synchronous tools (12 responses), Newsletters (9 responses), and Blackboard (3 responses). Class Dojo, Talking Points, and the Remind App were mentioned twice. Other approaches for communicating with parents include Parent Link phone messages, phone messages, district applications, PowerSchool, and the school website. Five principals suggested the potential for using videos or advertisements to promote the virtual school and its requirements better.

Communication Partners

According to the data, virtual schools usually communicate with various groups about their students. Parents were the most commonly communicated with, accounting for 14 responses. Guardians were also a significant group that the school communicated with, with 13 responses. Four schools noted they communicated with community partners, while two schools communicated with mentors and one with student siblings. Effective communication of expectations to students and families, particularly regarding attendance and creating a distraction-free learning environment, was emphasized.

Continued Engagement

Continued engagement with parents and the community was shared as a top priority for the virtual academy administrators interviewed. One administrator described their efforts, stating, "We didn't have shared avenues of communication initially...So we had to get some of those things straightened out first so that we could have a solid core identity and communication...:" Daily and weekly communications are shared with the parent and guardian community through Google forms, individual Zoom meetings, LMS announcements, and daily community meetings held prior to the start of class. Here, principals again emphasized the critical role of home learning coaches, especially for early elementary students. School communication with home learning coaches is vital in facilitating students' learning and overall progress. One administrator noted a structured method of ongoing engagement: “We send out a weekly update message, and then every Wednesday (our flex day), we ask parents to complete a weekly check-in form, to let us know how things are going at home; if there’s anything we need to be aware of.”

Engaging the Greater Community

In addition to engaging the parent community, virtual academy administrators are engaging members of the greater community, even expanding their PTAs and parent advisory councils to include community members.

Administrators we spoke with are working closely with community organizations to deliver activities for students and families. Recognizing it is the shared goal of those within the community to help support their local schools, including the virtual academies, several interviewees shared that they are partnering with museums, libraries, community centers/parks, and 4H organizations to help enrich their lessons.

LEARNER OPPORTUNITY AND CHALLENGES

Opportunities

Learner opportunities for participating in K-12 virtual learning included course options, schedule flexibility, and uninterrupted personalized support.

Course Options and Flexibility

Seven of the 11 principals noted that virtual academies offer a wide range of course options and flexibility for students, particularly students with unique circumstances or responsibilities. Students who are parents, have significant extracurricular commitments, or work full-time benefit from the flexibility provided by virtual schools. Additionally, one virtual school provides options for students who may not have a long-term interest in a particular subject and offer sections tailored to meet graduation requirements. Three virtual school principals also reported offering flexible deadlines, allowing students to work at their own pace and complete assignments from any location.

Uninterrupted Instruction and Personalized Support

One of the significant opportunities noted in principal interviews for students in virtual academies is the uninterrupted class time they receive. As one principal highlighted, "Our students have uninterrupted class time. It's not interrupted by phone calls, parent issues, or discipline problems." This uninterrupted instruction also creates more opportunities for one-on-one time and stronger relationships with teachers. Virtual schools often have built-in interventions where students can have personalized Zoom sessions with their teachers to address areas where they struggle.

Challenges

Learner challenges for participating in K-12 virtual learning included access and resources, mental health and social isolation, and engagement and motivation.

Access and Resources

One of the significant, principal-reported challenges for virtual students revolves around access and resources. Three principals noted that virtual students must have equitable access to the same opportunities as their peers in traditional schools, including the availability of advanced and AP classes. Virtual schools may face obstacles in offering such classes due to not being recognized as brick-and-mortar schools. As another principal highlighted, "The first year [we were open], we were the only school in the district that had offered AP classes. But this time around, AP did not approve us because we're not a brick-and-mortar school."

Mental Health and Social Isolation

Several school principals emphasized the critical importance of securing sufficient resources and support for mental health and counseling services in virtual schools, as virtual students often face social isolation and mental health challenges. The absence of regular social interactions and limited opportunities to engage with peers can lead to feelings of isolation and depression. One principal expressed concerns: "The mental health needs are great with our students. They can feel isolated and depressed." Recognizing the importance of social connections and emotional well-being, virtual schools have implemented various strategies. These include daily check-ins through an app, mindfulness activities, and opportunities for socialization, such as learning labs or in-person events for students who desire them.

Engagement and Motivation

Engaging and motivating virtual students is a critical challenge educators face in virtual schools. Maintaining continuous motivation can be a struggle for some students, while others may experience anxiety or lack confidence in their abilities. One principal stated, "Continuous motivation is a challenge for virtual students. Some students may be working on their own, and it's important to ensure they remain motivated." Re-engaging disengaged students is another aspect that requires attention. Virtual schools employ various methods to address these challenges, such as implementing attendance questionnaires, monitoring student responses, and providing interventions when necessary. However, motivating students and fostering engagement remains an ongoing effort, especially in the absence of face-to-face interactions.

DISCUSSION

This study sought to investigate several critical aspects of K-12 virtual public academies in a southeastern state in the United States. The insights gained provide a nuanced understanding of the evolving educational landscape.

K-12 virtual learner needs and readiness

The findings of this study provide valuable insights into why K-12 learners choose virtual schools as their educational pathway. Virtual schooling emerged as a well-suited option for specific groups of students, particularly those whose overall physical or mental well-being and safety were of paramount concern. Additionally, students with demanding schedules, such as those engaged in extracurricular activities, working full-time jobs, or parenting, discovered virtual schooling to be especially advantageous.

Within the category of individual needs, a significant subgroup comprises students with special needs who turn to virtual schooling to prioritize their physical, mental, or emotional well-being. Our participants highlighted that students requiring support beyond academic assistance presented distinct needs, often challenging to address within a virtual learning format. Previous research focusing on children with special needs or disabilities engaged in online learning during the COVID-19 pandemic unveiled a spectrum of challenges. These challenges encompassed the necessity for parental support, adjustments in daily routines, disparities in available resources, issues related to technology access, the need for accommodations, and the experience of social isolation. Tackling these challenges invariably demanded close collaboration and communication between parents and teachers (Bakaniene et al., 2023).

In addition to these insights, virtual academy leaders who participated in our study underscored the unique challenges associated with kindergarten and first-grade students engaged in K-12 virtual learning. Widikasih et al. (2021) conducted research that pinpointed several challenges experienced by elementary online learners during the pandemic, including difficulties in comprehending subject matter and struggles with motivation for learning. These challenges may be attributed to the developmental aspects of young learners, emphasizing the need for careful consideration when delivering online classes (Barbour, 2018; Johnson et al., 2022). Existing research consistently underscores the critical role of parental involvement in supporting students' needs. In K-12 virtual education, this collaborative approach involving educators and parents remains essential for ensuring students' success (Stevens & Borup, 2015).

Our study participants noted that virtual learning may not be the most suitable option when students fail to actively engage and demonstrate commitment to their education. In such cases, educators may contemplate removing these students from the virtual academy. This underscores the critical importance of student motivation and engagement as fundamental prerequisites for K-12 virtual learners (Curtis & Werth, 2015). An essential aspect highlighted by virtual academy leaders was the significance of conducting regular reviews to assess student progress (Johnson et al., 2022). This emphasis on frequent assessments of suitability emerged as a recurring theme in our study's findings.

Trends and issues different from traditional schools

In the realm of K-12 virtual education, several distinct trends and issues set it apart from traditional schooling. Technology access and utilization emerged as pivotal factors in determining learner success. Our study identified that students extensively used learning management systems and technology their respective virtual schools provided. However, reliable internet connectivity was a critical prerequisite for effective engagement in virtual learning. The study also highlighted teachers' need to acquire the skills required to develop and deliver lessons online. Disruptions arising from technology-related issues further highlighted educators' demand for technological proficiency. Johnson et al.'s (2022) systematic review of K-12 online teaching addresses these challenges comprehensively, emphasizing the importance of acknowledging the technological obstacles K-12 teachers, students, and parents face in the context of online learning and technology access. Additionally, virtual academy leaders reported challenges related to students' misuse of technology, which posed its own set of difficulties.

Another notable trend in K-12 virtual education was the diversity in curriculum approaches. Virtual academies adopted varied curriculum models, ranging from teacher-designed materials to curricula acquired from districts or vendors. Study participants underscored the need for teachers to receive additional professional development and support to adapt and implement these diverse curricular approaches effectively. Researchers echo this need, emphasizing that teachers often lack experience as instructional designers and require comprehensive support in the form of resources, professional development opportunities, and time (Archambault, Kennedy, Shelton, et al., 2016; Johnson et al., 2022).

The delivery of instruction in virtual schools exhibited significant variations, with different modalities employed, including asynchronous, synchronous, bichronous, and hybrid approaches. These modalities were utilized across various academies and grade levels, catering to the diverse needs of K-12 learners. Subject-level challenges in virtual settings included the ongoing need for proficiency in reading in English and the necessity of working with manipulatives in some subjects. Flexibility in instructional delivery was considered crucial; however, it needed to be balanced with accountability, particularly during assessment periods, which presented a unique challenge (Archambault., Kennedy, & Freidhoff, 2016).

Engagement with parents and the community emerged as a central focus for the success of virtual academies. Effective communication channels, such as email, social media platforms, newsletters, and specialized apps, were pivotal in maintaining transparent and frequent communication between virtual schools and stakeholders. While technology-enabled communication was valuable, face-to-face interactions retained their significance, underscoring the enduring importance of human interaction in the virtual

education space. This multifaceted communication strategy and sustained engagement with parents and the community were identified as critical factors in the success of K-12 virtual learners. Curtis (2013) identified key factors for parental involvement in online high school, including engagement, monitoring, mentoring, and parental motivation. Additionally, our study highlighted the vital role of home learning coaches, particularly for early elementary students, as indispensable contributors to students' academic progress. Given the instructional time constraints in virtual academies, these home learning coaches played a pivotal role in supporting students' educational journeys. Our findings also revealed that administrators actively sought partnerships with local community organizations, such as museums and libraries, to provide a holistic educational experience beyond the digital classroom. This emphasized the paramount importance of engaging with the local community in the context of K-12 virtual education.

Opportunities exist, but challenges remain

Virtual academies offer various opportunities, primarily characterized by their flexibility in course options and the provision of uninterrupted instructional time. These advantages prove particularly beneficial for students with unique life circumstances, such as those juggling full-time employment or substantial extracurricular commitments. In addition, virtual schools frequently excel in providing personalized support by integrating built-in interventions, fostering stronger teacher-student relationships (Johnson et al., 2022).

However, these advantages are accompanied by noteworthy challenges, the most prominent being the issue of equitable access to educational resources. Virtual academies often grapple with limitations when offering advanced placement courses or specialized programs, primarily due to their classification as non-traditional schools. This disparity potentially places virtual learners at a disadvantage compared to their counterparts in brick-and-mortar schools.

Another formidable challenge lies in social isolation and mental health concerns, as previously identified (Rice, 2006). This predicament is exacerbated by the absence of routine social interactions that traditional schools naturally provide (Dikkers, 2018). While two virtual academies have proactively implemented measures such as daily check-ins and mindfulness activities to address these issues, the overarching concern regarding the mental well-being of virtual learners remains. Additionally, the struggle to maintain continuous motivation and engagement within the virtual learning environment is an ongoing endeavor for educators and parents alike (Borup et al., 2020).

Virtual academies can offer distinct advantages in flexibility and personalized support, particularly catering to students with unique life circumstances. However, they face substantial challenges related to equitable access to educational resources, social isolation, and the motivation and engagement of students in the virtual setting. These complexities underscore the need for ongoing efforts to address these challenges and further enhance the virtual learning experience.

Limitations

The insights from this study offer a comprehensive look at the operations and complexities of virtual academies, employing a convergent parallel mixed-method approach in its research design. While this approach allows for a deep and wide exploration of the subject, it has limitations. The simultaneous collection and analysis of quantitative and qualitative data may introduce discrepancies, particularly when synthesizing insights from surveys and interviews, which, though complementary, could leave data gaps unaddressed. Our focus on fourteen (14) participant schools in a single state in the US raises questions about the study's generalizability across different virtual school contexts and regions. Additionally, the predominance of administrators' narratives in our data pool could result in a skewed representation, potentially missing a holistic view of the virtual school experience. It is also important to mention that the incentive structure we used to motivate participants might also affect the authenticity of their responses. Lastly, our data analysis – especially the qualitative aspect –relies heavily on open coding and is framed by the K-12 Virtual Learning Landscape conceptual framework, introducing an element of subjectivity that could influence interpretations. Moreover, the learner academic outcomes were not analyzed in this study.

Implications for Future Research and Practice

This study has implications for virtual school leaders, teachers, technologists, parents, guardians, and students. Understanding the specific needs and readiness levels of K-12 online learners will assist the community in designing and delivering effective online learning.

Given the complex landscape of K-12 virtual public academies, future research and practice must be precisely targeted. On the research side, there is an immediate need for studies that delve into equity and access to technology, the efficacy of specialized curriculum and services, the unique pedagogical competencies required for virtual teaching, and long-term outcomes for virtual learners. Specifically, further empirical data on how disparities in technology access affect student outcomes and an in-depth understanding of the relationship between school demographics and community engagement

could help formulate more inclusive policies. Future researchers should also examine learner academic outcomes in virtual academies.

Practically, policymakers and educators should prioritize equitable distribution of high-quality internet and technological resources, implement ongoing professional development programs focused on online pedagogy, and invest in comprehensive support services for students, including mental health resources.

A nuanced framework designed for virtual education's unique challenges is also urgently needed. By adopting a multi-faceted approach that considers the opportunities and limitations of virtual academies – from technology and connectivity to curriculum and teacher characteristics, as well as parent and community engagement – stakeholders can offer a more robust and equitable educational experience, thereby fulfilling the promise of virtual education as a viable alternative to traditional settings.

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APPENDIX A
INTERVIEW QUESTIONNAIRE

1. Please introduce yourself and your virtual academy.
2. What is your (school or district) vision for virtual learning? How was it created and communicated to students, parents, administrators, and other key stakeholders?
3. What is the student motivation for attending the virtual academy?
4. What are some opportunities your virtual academy affords to students and teachers?
5. What are some needs of students, teachers, and administrators in your virtual academy? How do you work with your teachers and students to determine needs/ implement needs?
6. How do you engage with the parents and community?
7. What are the technology capabilities of your students and teachers?
8. How do you adapt the curriculum to offer it in a virtual format?
9. What are some challenges encountered by students, teachers, and administrators?
10. Overall, what has been your experience being a virtual academy leader?
11. If you had to do it all over again, what would you do differently?
12. Is there anything else you would like for us to know?

APPENDIX B
VIRTUAL SCHOOL PROFILE SURVEY

Demographic Information (Open-Ended Question)

- Virtual Academy Leader Name
- Email
- School name
- District
- What was the first school year you began serving students?
- What grade levels are currently eligible to be served?
- What is the current enrollment for the 2022-2023 academic year?
- Gender percentages of students
- Race percentages of students
- % Free and reduced lunch

Please complete the following questions.

Technology and Connectivity

What best describes your primary modes of regular instructional delivery? (check all that apply):

- Online Asynchronous
- Online Synchronous
- Face-to-Face
- Other (describe)

Which learning management system (LMS) are you using? (check all that apply)

- Blackboard Classroom
- Canvas
- Google Classroom
- Itslearning
- Moodle
- PowerSchool Learning
- Schoology
- Seesaw
- Other (describe)

Which devices does your school provide to support students? (check all that apply):

- Desktop computer
- Laptop
- Tablet
- Internet
- Hot spot
- Smartboards
- Printers
- 3D printers
- Other (describe)

My students' internet connection is

- Reliable
- Somewhat reliable
- Somewhat unreliable
- Unreliable

My teachers' overall connectivity status is

- Reliable
- Somewhat reliable
- Somewhat unreliable
- Unreliable

Curriculum and Services

What best describes your school's overall approach to curriculum?

- 100% school and district designed
- Primarily school and district designed
- Partner with NC Virtual Public School as appropriate
- Primarily externally provided
- Other _____

Check all boxes of identified student services you provide beyond the regular program (check all that apply)

- Academically and Intellectually Gifted
- Exceptional Children's Program
- English Language Learner
- 504 plans
- Other _____

What best describes elective credits offered by your school?

- Offer enough elective credits to meet graduation requirements
- Some elective credits are offered
- No elective credits are offered

What type of digital content do you use? (check all that apply)

- Ebooks
- Free online content
- Instructional Videos
- Publisher created material
- Personalized learning applications
- Other _____

How do you conduct summative assessments and testing? (check all that apply)

- Virtual
- School site
- Shared District Facilities
- Other _____

What type of professional development is offered to the teachers?

Teacher Characteristics

How many full-time teachers are employed at your school?

- Less than 7
- 7-10
- 11-20
- 21-30
- More than 30

How many part-time teachers serve your school?
- 1-5
- 6-10
- More than 10

What best describes the certification of your teachers?
- Less than 80% are certified for their position
- 80-89 % are certified for their assignment
- 90-99% are certified for their assignment
- 100% are certified for their assignment
- Other _____

What is the approximate percentage of your teachers with the following years of teaching experience?
- 1-3 years
- 4-6 years
- 7-10
- 11 or more

What best describes the physical location of your teachers?
- Teach at a central location
- Teach from their home
- Teach from one or more schools
- Other (describe)

In your opinion, what best describes your current student-to-teacher ratio/ class size?
- Excellent
- Adequate
- Too high
- Too low
- Comment:

Organizational Development

What best describes the status of your current School Improvement Plan?
- Early stages of development but needs more work
- In place and making a difference in improving our school's operations and performance
- Well established and constantly being updated
- Comment

What position in the school system evaluates the principal?
- Superintendent
- Area Superintendent
- Assistant Superintendent
- Other (describe)

What type of technology support are you currently receiving from your district? (check all that apply)
- Designated Technology Support
- Designated Instructional Technology Support
- Shared Technology Support
- Shared Instructional Technology Support
- Other

Parent and Community Engagement

What tools do you use to communicate with parents?
- Online Synchronous
- Face-to-Face
- Twitter
- Facebook
- Email
- Newsletter
- Other _____

Who does your school normally engage?
- Parents
- Guardians
- Grandparents
- Siblings
- Mentors
- Community Leaders
- Community Partners

Thank you for completing this survey. Your name will be included in a random drawing for one of five $25 Amazon gift cards.