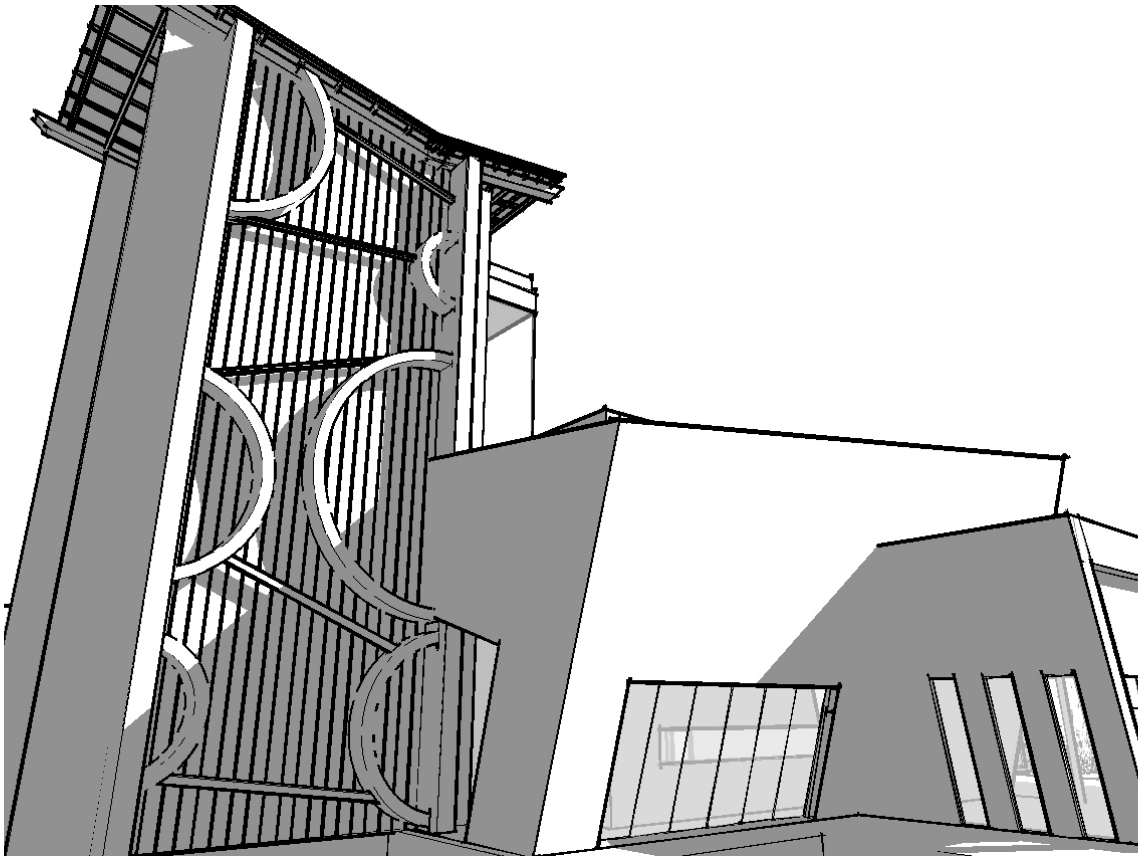
Designing the Future:

Education for a Master Planned Community in an Innovative and Choice-Filled Landscape



The Lookout School:
Conceptualized at Harvard's Graduate School of Education LEFT Conference, March , 2017
Sketch by John Prestwich, PCS Architects, Denver, CO

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PEABODY COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
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On a personal note:

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EXECUTIVE SUMMARY

The Sterling Ranch Development Company is developing 3,400 acres of land in Douglas County, Colorado. This open range along the Colorado Rocky Mountains will be home to 40,000 people and 12,000 homes at its full development. Knowing that education plays a central role in anchoring the values and cohesion of a community, the developers have sought an intentional relationship with Peabody College to inform their design for an "educational ecosystem" that will include schools, shared facilities, and community partners. The development is centered on sustainable building practices and community development that can serve as a model for responsible stewardship and technological innovation in other master planned communities. The larger education context surrounding this development encompasses a high-choice, innovative school district in the midst of an affluent, fiscally conservative community. This study is a mixed methods study, utilizing qualitative focus group interviews, a community survey, and field visits to model schools of innovation across the country.

This study seeks to address the following questions:

1. How does the high choice landscape of Douglas County influence parents' preferences, priorities, and activities regarding the education of their children?

2. What is the role of innovation in education and how is it perceived by community members?

3. Given the findings of questions 1 and 2, what models of educational innovation might inform the master plan for the educational ecosystem at Sterling Ranch?

KEY FINDINGS

Our findings are organized around two elements that are central to our context: **choice** and **innovation**. These elements serve unique functions independently as well as in relation to each other.

THE FUNCTION OF SCHOOL CHOICE IN DOUGLAS COUNTY

1. School choice is a primary value for parents and empowers them as decision makers and customers in a market-based system.
2. In the high choice landscape of Douglas County, affluence, high academic performance, and a strong regional reputation have created a broad safety net of options.

3. Parents are active decision makers who use personal preferences, student interests, and social networks to discern among options.

4. Parent educational preferences and choices reflect a wide range of educational preferences, expectations for the role of schools, and definitions of school quality.

THE APPROACH TO INNOVATION IN DOUGLAS COUNTY SCHOOLS

5. Douglas County Schools are consistently engaged in education practices that are widely considered to be innovative.

6. Innovative education practices serve as a mechanism that facilitates product differentiation in the high choice market-driven landscape.

7. Charter schools in Douglas County practice traditional education philosophies as a direct response to the market of innovation found in the district schools.

LESSONS FROM INNOVATIVE SCHOOL EXEMPLARS

8. Innovative school exemplars begin with clear, foundational principles around student learning and choose innovative practices as a means of supporting those principles.

9. Innovative school exemplars consistently maintain a broad view of learning and a redefinition of essential competencies for the future.

RECOMMENDATIONS

From these findings and existing scholarly work in school choice, innovation, and school design, we recommend that Sterling Ranch:

1. Opens its first schools as public charter schools.

2. Embraces innovative educational values and practices that build upon and expand the boundaries of the practices that already exist within the district.

3. Seeks school developers that are committed to emphasizing and embrace the unique context of their own development through a P3BL signature pedagogical approach.

4. Plans small schools that maximize efficient land use, allow for long-term flexible usage, and allow for shared community usage.

5. Conducts a widespread, national search through a for a school developer through a formal Request for Expression of Interest (RFEI) process.

6. Engages in a series of structured and facilitated community dialogues intended to collaborate with the Highlands Ranch community around principles of school design and community partnerships.

We conclude with a vision for the first school that encompasses our recommendations and may serve as a model for possibility in the design and planning process.

INTRODUCTION

Sterling Ranch Development project exists in a moment of pure potential. As the developers peer across an open range at the foot of the Colorado Rockies, the possibilities for their community are endless. Over the next 20 years, they will develop 3,400 acres of open pasture, transforming it into a mixed-use community of 40,000 people and 12,000 homes, focusing on sustainability and environmental stewardship as they model building practices for community development of the future.

From the very beginning, this group has recognized the significant role that education plays in every community. Education is where a community grows, transmits values, and invests in its most valuable of all resources: its people. For these reasons, the developers have asked Peabody College to partner with them as they envision and build a world-class education system for their community.

This project is an investigation of an opportunity and, specifically, seeks to evaluate the values, preferences, and priorities of the larger Douglas County community in order to consider the opportunities for education that best fit the vision and values of the future Sterling Ranch development. Sterling Ranch has robustly and intentionally engaged in the research, development, and implementation of sustainable building practices and technology.

As the world's population continues to skyrocket, the issues of density, urban and suburban planning and development, and the stewardship of natural resources become more salient and urgent. Sterling Ranch seeks to lead the world in modeling successful and responsible practices that can provide a healthy, sustainable environment in a fast-changing context. Sterling Ranch homes will be outfitted with a state-of-the-art STEWARD system (co-designed by Sterling Ranch and Siemens) that allows residents to track and manage their energy and water usage through smart technology and voice activation. Homeowners will also have the option of sharing their their home utility data to understand their home's environmental impact.

The schools at Sterling Ranch will exist as part of the larger Douglas County School District (DCSD), a leader in innovative education practices and school choice. At a time when federal education policy is encouraging more choice and the privatization of public education as a pathway for improving the American education system, the work of Douglas County Schools is being heralded as a model for the rest of the country. As the world transitions to a post-industrial, globalized society, expectations and outcomes for school are also rapidly changing.

The opportunities for Sterling Ranch schools to continue the tradition of excellence in DCSD and build on the forward thinking attentiveness toward sustainability postures this community to create an unprecedented education system that can lead the way for many.

This study seeks to address the following questions:

1. How does the high choice landscape of Douglas County influence parents preferences, priorities, and behaviors regarding the education of their children?

2. What is the role of innovation in education and how is it perceived by community members?

3. Given the findings of questions 1 and 2, what models of educational innovation might inform the master plan for schools in Sterling Ranch?

CONTEXT

As we consider the context of this study, we begin with a deep look at the Sterling Ranch development itself and then expand our view outward, considering also the larger regional and statewide contexts as well as the education landscape that surrounds these regions.

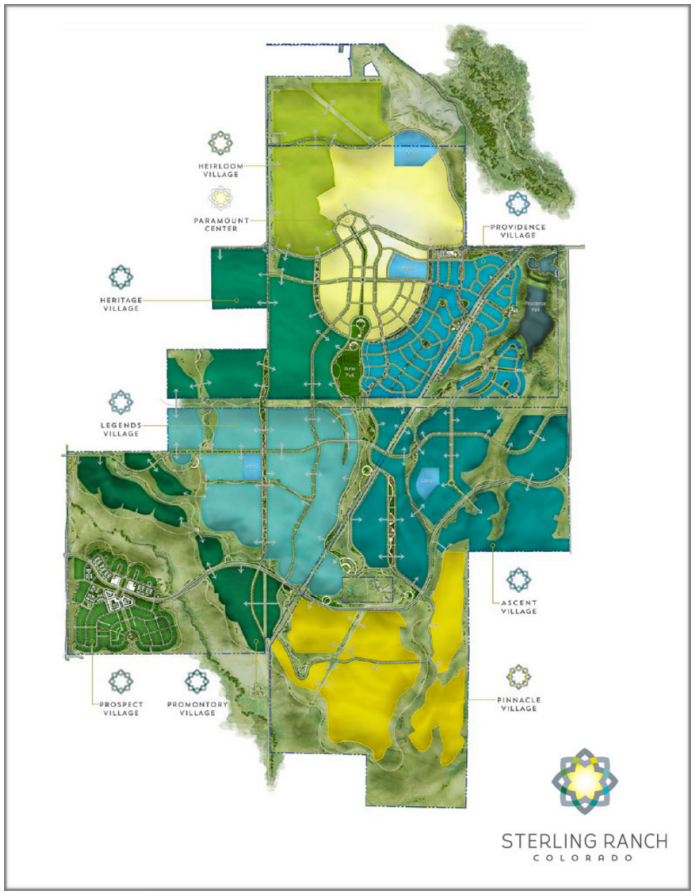
STERLING RANCH

Sterling Ranch is a 3,400 acre master planned community development project south of Denver, Colorado. Currently in the first stages of construction and growth, this mixed-use community will be home to around 40,000 people and 12,000 homes at its full development. Conceived and founded on the belief that sustainable community development practices are crucial for future growth, this development will be home to the most innovative practices for energy monitoring and consumption, responsible building practices, and progressive "new urban" density designs (Congress for New Urbanism). Designed in partnership with a variety of technology and community partners, Sterling Ranch will have the fastest internet connectivity, water-wise landscaping designs, "smart" technology for enhanced energy efficiency, and a variety of other amenities designed to maintain a high quality of living while also caring for the environment.

This community, developed by the Colorado-native Harold Smethills and his family, highlights its 10 guiding principles as education, water, outdoors, health, lifestyle, energy, technology, homes, safety, and time (Sterling Ranch Development Company, 2017). These guiding principles have informed each step of the development's progress and permeate each aspect of its design.

The Sterling Ranch Development Company has fostered a deep commitment to community partnerships and forward thinking innovations. One of the most significant partnerships is with Siemens Technologies to research and develop state-of-the-art hardware and software systems that will not only be used in Sterling Ranch but will also facilitate the development of other future "Smart Cities" around the world. While there are a variety of interpretations of "smart technology," it is commonly held that smart technologies are mechanisms that collect data and respond by modifying behavior or usage toward a desired outcome, usually more efficient or sustainable practices. A smart city, then,

Figure 1



Rendering of Sterling Ranch

would be comprised of many levels of smart technology and would responsively coordinate to maximize resource efficiency. There is an entire laboratory in the Douglas County Siemens office dedicated to the development of Sterling Ranch technology, designing a variety of smart and innovative technologies. There are devices in all homes that monitor water and energy usage, allowing homeowners to program settings, preferences, and conservation practices remotely. Home analytics systems give families information about their consumption and help manage and encourage environmentally sustainable practices. Community infrastructure is designed with innovation and futuristic advancements in mind. Siemens is developing street lights that will monitor motion, change brightness during emergencies, and illuminate specific pathways for emergency response vehicles. Each of these technologies represents Sterling Ranch's commitment to innovation, technological advancement, and sustainability and illuminates the attributes and values that might define future residents.

Another progressive partnership is their work with Vanderbilt University, engaging in a Trans-Institutional Program in conjunction with the College of Engineering, Peabody College, and the College of Arts and Sciences to conduct multi-disciplinary collaborative research. A variety of students and faculty from each of these schools are engaged in the study, and the cross-disciplinary design offers a more integrated, thorough perspective to solving problems and imagining possibilities. This type of collaboration is a hallmark of innovative and progressive education environments, recognizing the changing nature of learning, workplaces, and the challenges of the future.

Nestled at the foothills of the Red Rocks and Colorado Rocky Mountains, Sterling Ranch offers a unique environmental context. It is surrounded by preserved open space and offers convenient access to nearby parks and

recreational space. The development sits just south of Chatfield State Park and east of Roxborough State Park and is surrounded by hiking trails, a bird conservancy, and other attractions for outdoor enthusiasts. It is home to wooly mammoth burial grounds, a rare owl species, and is part of an elk migration pathway.

DOUGLAS COUNTY

The Sterling Ranch development sits on the east side of Douglas County, a booming suburban county that is home to over 285,000 people, including 45,000 families with children ages 18 or under (U.S. Census, 2015). The median household income is $102,964, the highest in the state, and the highest of any county west of the Mississippi River, and the 9th highest in the nation. This compares to a statewide median household income of $60,629 in Colorado and a national median income of $53,889 (U.S. Census, 2015).
The community holds a high education attainment relative to its surrounding areas. In Douglas County 97.7% of residents have earned a high school diploma, compared to 86.1% of residents in Denver County, and 86.7 % of the population nationwide (U.S. Census, 2015). Douglas County also leads in post-secondary attainment, with 56.6% of residents having earned a bachelor's degree, compared with 45% in Denver County and 29.8% nationwide (U.S. Census, 2015).

Industry and economic development in Douglas County have grown significantly in the past few years. In 2010, CNN Money Magazine ranked it as one of the top 10 fastest growing counties in the nation, experiencing a 64% growth in the previous decade. In 2014, the county had the second highest job-growth rate in the nation (Bureau of Labor Statistics, 2014). From 2015 to 2016, home prices grew by 14.1% (Douglas County Department of Community Development, 2016), and in February 2017 the median home sales price was $464,900 and the average home sales price was $523,163 (Colorado Association of Realtors, 2017). Douglas County currently holds the lowest unemployment rate in the Metro Denver area at 2.5% (Colorado Department of Labor and Employment, 2016).

The region is a hub for several major industries. It is the second largest aerospace economy in the nation and the third highest concentration of high-tech workers in the country (Douglas County Government, 2017) with a major corporate presence for groups including Lockheed Martin, Siemens, and the National Renewable Energy Labs (NREL). Healthcare is also a major economic industry in the region and is expected to be one of the fastest growing sectors in the next five years throughout the Metro Denver region (Douglas County Government, 2017) and major financial service hubs have been drawn to the region in the recent past.

COLORADO

As a state, Colorado is experiencing significant population and economic growth and maintains one of the highest education levels nationwide. Population in the state has risen steadily since 2010, making it the second fastest growing state in the nation from July 2014 to July 2015, and the the seventh fastest growing state from July 2015 to July 2016. (U.S. Census, 2016). Colorado ranks second in the nation for its percentage of residents with a bachelor's degree and seventh in the nation for residents with an advanced degree (U.S. Census, 2016). It holds the third lowest unemployment rate at 2.9% (Bureau of Labor Statistics, 2017). However, Colorado is also experiencing what has been termed the "Colorado Paradox" (Deruy, 2016). While the job opportunities are plentiful, many require an education credential that exceeds its local residents' level of attainment. Instead, people with higher degrees of education attainment are relocating to the area to fill these open positions. Over 50% of Colorado residents who have relocated to the area have a college degree, but less than one-third of the native-born residents hold a postsecondary credential. This places a tremendous expectation on the local education systems to "educate up" their residents as well as a burden to attract new residents with adequate experience and education who can meet the demands of the employment market. Colorado, with its abundant outdoor recreation opportunities, is known for its population's health and active lifestyle.

The United Health Foundation recently ranked Colorado as the least obese state in the nation, the second lowest in diabetes, and the highest ranking in physical activity (2016). Its Rocky Mountain National Park is the fourth most visited national park (National Parks Service, 2016).

Table 1

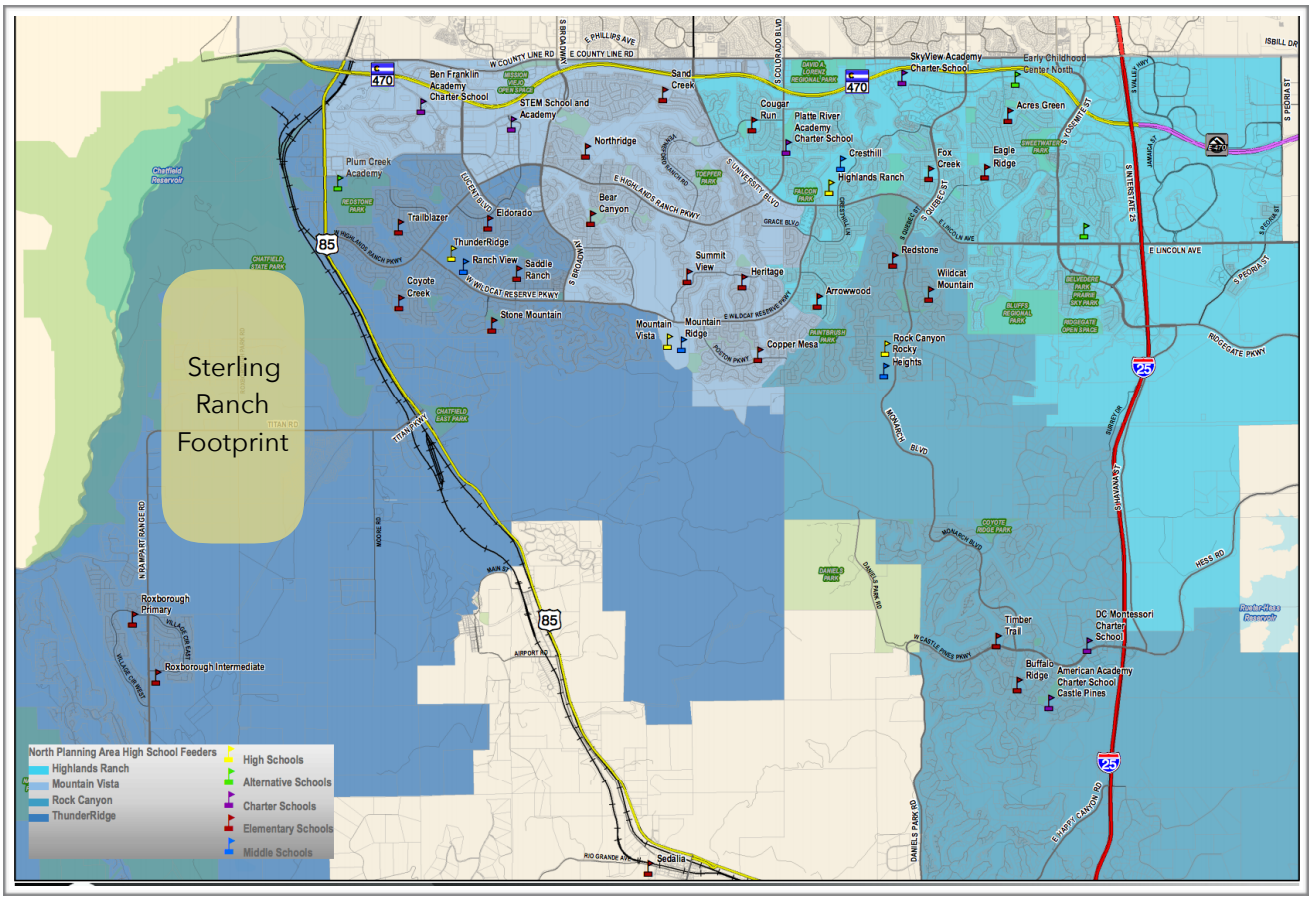
OCCUPATION	2010 jobs	2020 jobs	Growth rate (%)
Managerial and Professional Office	412,150	501,640	22
STEM	152,490	172,560	13
Social Sciences	14,900	18,550	24
Community Services and Arts	131,520	160,860	22
Education	130,010	158,150	22
Healthcare Professional and Technical	106,190	133,130	25
Healthcare Support	48,410	64,790	34
Food and Personal Services	396,600	491,550	24
Sales and Office Support	692,460	780,970	13
Blue Collar	451,590	477,430	6
TOTAL	**2,536,320**	**2,959,620**	**17**

"Job Growth and Education Requirements through 2020"; Georgetown Public Policy Institute; Center on Education and the Workforce.

EDUCATION CONTEXT

Colorado has one of the most open school choice policies throughout the nation. The Public School Choice Act was passed in Colorado in 1990, allowing students to enroll in any school throughout the state, paving the way for

Figure 2



Map of Douglas County district schools, north county planning

interdistrict and intradistrict school choice. The open enrollment policy opens the doors to essentially any public school provided students have transportation, there is room at the school, and the transfer does not interfere with desegregation efforts.

The first interdistrict open-enrollment policy legislation was passed in Minnesota in 1988. This policy set a precedent that other states would follow within the next few years. Open-enrollment policies, which now exist in 46 states plus the District of Columbia (ECS, 2017), allow students to transfer from one public school to another of their choice.

Each state with an open-enrollment policy has its own unique approach to the practice, including combinations of voluntary, mandatory, interdistrict, and intradistrict parameters. Prior to open-enrollment policies, students were assigned public schools through a "zoning" process with forced bussing when necessary to meet local desegregation orders. During this time, parent residential choices were the only way to impact school assignment without pulling students out of the public system completely (Ozek, 2009). According to a 2017 policy analysis by the Education Commission of the States, open-

enrollment policies are thought to create a "best-of-both-worlds" scenario in which parents are empowered to make choices in the best interests of their children, while at the same time staying within the public school system (ECS, 2017)

"Different pupils learn differently."
-The Colorado Charter School Act

The issue of school choice has experienced a spike in attention on the national stage, crescendoing with the appointment of pro-choice advocate Betsy DeVos to the position of U.S. Secretary of Education. At its core, this debate has centered around the question of whether education a public or private good. School choice proponents argue that parents know what is best for their children and that they, as taxpaying citizens, should be able to choose which schools their children attend. Opponents of school choice argue that that public neighborhood schools are the foundation of a healthy, democratic, pluralistic society and that their role in social cohesion is central to sustaining this self-governing nation.

COLORADO CHARTER SCHOOL POLICY

The first charter schools in Colorado opened in 1993 after the passage of the Colorado Charter School Act (Colorado Department of Education, 2017). The act requires that charter schools be authorized by the local district or the Charter School Institute, a statewide independent authorizer created in 2004. Although there was some initial public resistance in various locations throughout the state, by 1998 the state had approved the maximum 60 charter schools permitted in the original Act.

In the 2015-2016 school year, the state of Colorado enrolled 899,112 students in 1,854 public schools. Of these schools, 226 are charter schools serving 108,793 students, just over 12% of the state's total student population (Colorado Department of Education, 2016). Additionally, Colorado passed the Innovation Schools Act in 2008 that allowed public schools and districts more autonomy and flexibility, similar to a charter school model. There are currently 58 innovation schools serving 38,285 students and 9 innovation schools serving 171,433 students (Colorado Department of Education, 2016).

COLORADO SCHOOL FUNDING

Colorado tends to be a "purple" state with representation for both traditionally left and right leaning policies. However, Colorado tends to be highly fiscally conservative, even in education spending. In 2014, Colorado was ranked 39th of 50 in the nation in Per Pupil Revenue and 47th of 50 in the nation in expenditures per million $ of personal expenditures (U.S. Census Bureau, 2014).

In 1992, the state constitution was amended to include the Taxpayer's Bill of Rights, more commonly known as

"TABOR" (Colorado Department of the Treasury, 2016). This policy requires voter approval on any tax increases and prohibits government entities from spending any revenue raised above the rates of inflation and population growth. For K-12 education systems, this means that any new initiatives, including school capital investments, must be relegated to a vote of the people for approval. Furthermore, tax revenue is capped, requiring that any tax revenue raised above that cap be refunded to taxpayers. TABOR significantly impacted K-12 education funding, leading the state to pass Amendment 23 in 2000 to guarantee a basic per pupil expenditure that would keep pace with inflation (Colorado Department of the Treasury, 2016).

Under these conservative policies and tax-averse public opinions, new school construction becomes an uphill battle. Most new public schools require a bond issue that goes to a mill levy. Across the state, only about 50% of attempted bond issues are approved by voters, and even fewer are approved in strongly conservative areas such as Douglas County (Whaley, 2016). Sterling Ranch is not immune to this controversy; public debate over the funding for the construction of new schools in the development has very recently escalated. The issue gained attention in recently authored local newspaper editorials that highlight opposing views from the local school board and from the local home builders' association (Geddes, 2017; Smith, 2017). Charter schools, having more autonomy in governance, have been able to find alternative pathways toward funding new school construction such as venture capital investment or re-allocation of per-pupil expenditures, but these options are not available to district-operated public schools.

DOUGLAS COUNTY SCHOOL DISTRICT

Douglas County School District is the public school system for Douglas County residents. It is the third largest school district in the state with 67,000 students and 87 schools. It has a long history of high performance on standardized tests, strong college acceptance rates, and innovative education opportunities. There are 66 neighborhood schools, 15 charters, 2 magnet schools, and 5 alternative schools in the Douglas County School District, all authorized by the Douglas County School Board. Unlike other regions in which charters operate completely outside of the district jurisdiction, charters in Douglas County are authorized and held accountable by the district itself but have autonomy to govern and operate the school as they desire.

There are currently 15 active charter schools in Douglas County serving approximately 8,500 students, around 14% of the total district population. Of these charter schools, 10 classify themselves as Core Knowledge charter schools, one is a Montessori school, one is a STEM based Project Based Learning school, one is a STEAM based school, one is an online school, and one is a World Languages Immersion school. There are

33 private schools in Douglas County, but the large majority of these schools are exclusively preschools (Private School Review, 2016). There are eight private schools that serve students beyond kindergarten and only three private high schools in the county, and all but one of these is religiously affiliated. Approximately 3,000 K-12 students attend these private schools (Private School Review, 2016), representing around 4.3% of the student population in Douglas County. Nationwide, 10% of students attend private schools, making Douglas County's ratios significantly smaller in comparison (National Center for Education Statistics, 2017).

The district was the first in the nation to create a voucher policy, the Choice Scholarship Program, that would have allowed the use of school vouchers to pay for private school tuition regardless of a student's family income or socioeconomic status (Douglas County School District, 2017). This was a contentious policy, created in 2011, and it was quickly blocked and tied up in a four year court battle that halted its implementation. It was ultimately heard by the Colorado Supreme Court, which ruled against the use of the funds for religious private schools in accordance with the Blaine Amendment. The school board attempted to reinstate the policy in June 2016 but the reinstatement was also blocked by a federal judge. The district is currently waiting for the U.S. Supreme Court to grant a writ of certiorari.

The district has experienced significant controversy and transition in leadership over the past few years. The former district superintendent, Dr. Liz Fagen, brought about many significant and progressive changes to the district. They implemented a market-based pay system that compensated educators based on the supply and demand of their position as well as their individual teacher performance. This and other policies that Dr. Fagen initiated, such as the voucher plan, were met with significant community and parent resistance. Her controversial policies and attendant negative reactions coalesced and escalated throughout 2015 and 2016, culminating in substantial public parent celebration upon the announcement of her departure in the summer of 2016 (Hernandez, 2016).
In the elections of 2015, the school board transitioned from a cohesive, "pro-reform" group that supported many of Dr. Fagen's initiatives, to a divided 4-3 pro-reform majority when three board members lost their seats to three "anti-reform" candidates. In August 2016, another pro-reform member resigned and the school board was stuck in gridlock over their appointment for a replacement (Aguilar, 2016). After passing the 60-day full-board appointment period, the responsibility was relegated to the board president who appointed a seventh member in November. The board selected Erin Kane, former founder and director of American Academy, a Douglas County Core Knowledge charter school, as Interim Superintendent for a one-year contract beginning in September 2016.

Controversy continues to surround the district's process and timeline for appointing a permanent district leader. The newest appointed board member publicly called for a delay in the search, asking that Kane remain in place until after the next round of school board elections so that the new board can work together through the selection process (Peck, 2016).

CONTEXT INFORMS DESIGN

This unique Sterling Ranch and Douglas County context offers an opportunity for designing an innovative and unique capstone project. Rather than explicating a problem of policy or practice, we will investigate opportunities for a community and education system that do not yet exist. While this project assumes a visionary nature and the students, families, and education organizations do not yet exist, it will be important to inform these opportunities with a deep and thorough understanding of the surrounding context: the social environments, neighboring education systems, political structures, and values of the development itself. It is from these contextual considerations that we have rooted and designed this study and its methodology.

DESIGN AND METHODS

The study relied on a mixed-methods approach, utilizing both quantitative and qualitative research methods. This is an exploratory study, examining the unique context of designing education systems within a master planned community, an opportunity that holds very little constraint and a focused desire to push the boundaries of innovation, technology, and excellence.

We primarily utilized qualitative methods through focus group and individual,interviews, field observations, and a deep review of site data, Sterling Ranch project and school district documents, and artifacts from online resources. To support and refine these qualitative findings, we conducted an online survey with individuals who have expressed an interest in the Sterling Ranch development.

To answer the third research question, we engaged in a review of innovative education practices in the United States and internationally. We made a site visit to a region widely considered a hub for education innovation in the U.S.: the San Francisco Bay Area. We selected schools for observational field studies in this region that are well known for their work in at least one of the following areas of education practice and policy: learning designs, governance structures, integrative partnerships, structural designs, and human capital strategies.

The qualitative data collection began with an initial visit to Douglas County in January 2016. During this visit, we engaged in introductory learning sessions with the larger Peabody Research Team, listening to various community leaders, government officials, experts and industry representatives, and the Sterling Ranch developers themselves. We toured

a local charter school and met with school leaders, teachers, and students.

Focus group interviews were conducted in the summer of 2016 targeting stakeholders from the Douglas County community. See Appendix B for the interview protocol. These focus group interviews were comprised of local employers and community groups, specifically targeting people within those organizations who have or will have school age children in the next few years. The director of the Northwest Douglas County Economic Development Corporation (EDC) assisted in coordinating these interviews. The focus groups lasted approximately 45 minutes and followed an interview protocol designed to gauge community member preferences and priorities in five educational areas of education practice and policy: learning designs, governance structures, integrative partnerships, structural alignment, and human capital investment strategies. In all, 99 individuals were interviewed in 25 focus groups. These interviews were conducted by undergraduate Peabody Scholars, participants in the larger TIPS grant, who then wrote analytic memos that were sent to the doctoral student researchers and principal investigator for the grant. We then coded the audio recordings and analytic memos into a matrix aligned with the original focus areas.

In addition to the summer focus group interviews, we conducted interviews in early fall 2016 with 6 groups (totaling 23 individuals) from the local education community, health care industry, and the homebuilders who are partnering with Sterling Ranch to develop the community. The education interviews consisted of teacher groups, school administrators, district administrators and communication specialists. We toured two schools: one during a school day, meeting students, faculty and administrators, and another during the summer break, touring the facility and meeting with the school principal. We attended a summer professional development event and student work showcase hosted by Douglas County School District. Field notes were taken throughout the visits and documents were collected for review. We also met with neighboring leaders from school districts including a Denver Public Schools principal, a representative from the Denver School of Science and Technology charter management group, and representatives from the St. Vrain Valley

Table 2

Sector	People
Education	29
Construction/real estate	36
Public Service	18
Community development	16
Technology	10
Healthcare	10
Finance	9
Other	5
Total	**133**

Douglas County Interview Counts

Innovation Center. In addition, we watched local school board meetings archived online, read local newspaper articles, and reviewed school websites and social media accounts.

To corroborate the qualitative data, we designed a survey to send to individuals who had expressed interest in learning more about the Sterling Ranch development. The Sterling Ranch Development Office has partnered with a marketing firm to manage their public relations. This firm created a website that has been "live" for approximately two years. As the development has grown in prominence and has gained attention from the surrounding community, interested individuals have been able to sign up to an email database where relevant updates and notifications can be distributed. This email database houses contact information for around 1,500 unique individuals and has been cultivated over two years. We coordinated with the marketing firm and distributed our survey to this audience. The survey was sent to the entire distribution list and was also listed as a link on the Sterling Ranch education information website. The survey focused on considerations of community readiness for various innovative education approaches, preferences on school choice, and overall priorities for K-12 education. The topics of exploration were informed by the initial focus group interviews, focusing on the areas of learning designs, governance structures, integrative partnerships, structural designs and human capital strategies, and sought to corroborate the findings from those initial interviews. See Appendix C for survey questions.

We had 269 respondents, yielding an 18% response rate. Of those respondents, 74% currently live in Douglas County, 90% have children, and 77% have children currently in school. These characteristics align with the overall demographic expectations for the Sterling Ranch community. For this reason, even with the relatively small response rate, the results are of sufficient size and demographics to be considered a representative sample of the larger population. The survey was designed to deepen our awareness of these stakeholders' preferences, priorities, and perspectives on various education designs.

In addition to the data collected in Douglas County, we sought a thorough review of innovative education practices unfolding outside of the Colorado region that might inform opportunities and designs for Sterling Ranch. We conducted a multi-site visit to the San Francisco Bay area to examine several models of innovation in education up-close. The purpose of this trip was to observe "real life" examples of some key innovations that are commonly discussed in scholarly education literature, including project-based learning, problem-based learning, maker spaces, corporate partnerships, and STEM education. In the fall of 2016, the research team travelled to San Francisco and surrounding cities (Palo Alto, San Jose, Novato). The school visits included a public elementary school in San Jose; a private prek-12 school in the

heart of San Francisco; and a public high school in Novato, about 30 miles north of San Francisco. The research team was also able to meet with a member of the Oracle Education Foundation Board of Directors. This meeting was intended to illuminate some of the "ingredients" that are essential to successful public-private partnerships. In the winter of 2017, one of the research team members visited two schools in Tucson, AZ with the specific intention of understanding how schools integrate "maker spaces" into their daily approach to teaching and learning

INNOVATION DEFINED

For the purposes of this study, innovation is defined in terms of Rogers's framework (2003). Innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption." With this in mind, we have chosen not to quibble over whether or not various educational practices are "actually" innovative or if they have been implemented previously in other contexts, and we will refrain from codifying an explicit or comprehensive list of innovation in education. Instead, we will allow innovation to be relatively defined as practices that are considered new within the context under evaluation. In this capstone report, we measure, evaluate, and discuss innovation in the context of Douglas County, and at other times we widen the lens to consider practices that are innovative on a larger scale or for a larger audience.

FINDINGS

We have grouped the findings by project questions. The first set of findings specifically addresses the high choice landscape, the second group addresses the role of innovation, and the final group evaluates the models of innovation that might inform Sterling Ranch's designs.

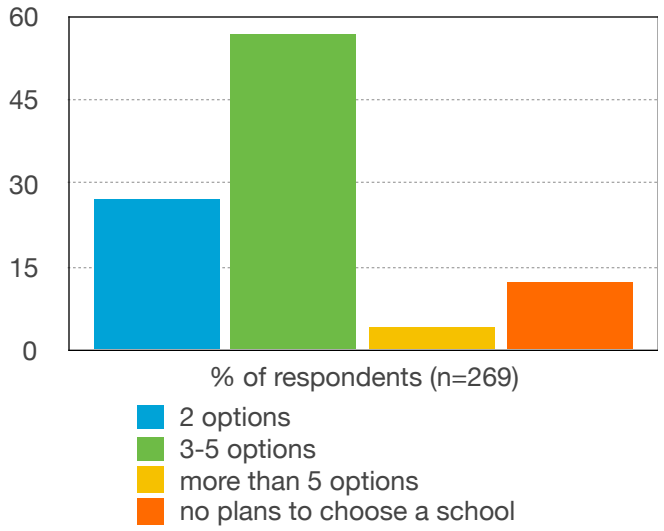
A HIGH-CHOICE LANDSCAPE

FINDING #1
School choice is a primary value for parents and empowers them as decision makers and customers in a market-based system.

Choice is an abundant and signature characteristic of the Douglas County education community. Beyond the initial choice to moved to the affluent, high performing Douglas County area, parents also have the opportunity to enroll their children in any public school that has seating capacity available. This open enrollment policy has become an attractive and valued option for parents and allows them to be active decision-makers for their students' education. Open choice postures the parent as a powerful consumer with "buying power" in a market-based education landscape, and parents exercise this option frequently. In the 2016-2017 school year, 5,300 students were open-enrolled at neighborhood schools that were not their own, and 8,500 students were enrolled in charter schools. This represents 20% of

school-age children attending schools that their parents had actively chosen for them. Additionally, another 1,673 students are currently on waiting lists for one or more neighborhood or charter schools within the district. In our survey, 56.75% of parents responded that they prefer to have 3-5 options when choosing a school, compared to 26.98% who responded that they prefer only 2 options.

Figure 3
Desired Number of Options when Choosing a School



DCSD has responded to this market-driven environment by positioning itself as the central clearinghouse of information for all of the schools (neighborhood and charter) within its boundaries. The Douglas County School District's website section on choice programming states: "The Douglas County School District embraces parent and student choice by offering a wide variety of pathways to learning, including neighborhood schools, charter, magnet, and online schools and home education options." The website also includes a link to a search engine titled "EmpowerEd Choices: Finding the Right Match," which allows parents to enter a wide variety of information about such characteristics as a child's learning needs, if they prefer a charter or a neighborhood school, what curricular focus they prefer, and whether or not the school has a dress code. After all preferences are indicated, the tool provides a list of "best fits" that parents can then more deeply explore. Each of the district's 87 schools, including its 16 charters, are included in the EmpowerEd tool.

This high-choice landscape is a value to the community and parents and elevates their voice. Parents' preferences and priorities within the school are not simply desires; instead, parents are powerful customers of the school system with the option to express their choices and "vote with their feet." One local municipality employee said "It's been nice to be able to choose the school that you want to take your kids to and not be forced to go to your [neighborhood] school when that school is at a disadvantage compared to other schools in the area. It's nice to have the option to enroll in some of these other schools."

Schools are the providers or "sellers" in this market-driven economy, responding to the various needs and interests of their consumer. As a result, district leaders are expected to consider and prioritize community needs and interests as schools grow and evolve. As a district-level administrator explained

"[New school principals] base their vision, hopefully--if they do it right, on the needs of the community. We have elementary schools that are fairly traditional in nature versus some that are very very innovative versus some that have pockets of each. So depending on what their community is wanting and what they support. [DCSD has schools in] all different shapes and sizes, which is unlike any district I've ever worked in." While parents hold a wide variety of opinions about the different schools, they respect the fundamental right to choose and the agency that it gives to all parents. A district administrator said, "[Parents] may be completely opposed to a philosophy at a charter school, but they appreciate the charter school being there."

"Douglas County's open enrollment program… allows for that opportunity, that if I want to enroll my kids in x school I can do that. If I like the IB program at such and such school, if I like artful learning, I can take them to a different school. You know, if I like the Outward Bound model I can go to a certain school. The school district already allows for these opportunities…"
-DCSD parent and local design firm employee

FINDING #2

In the high choice landscape of Douglas County, affluence, high academic performance, and a strong regional reputation have created a broad safety net of options.

Home prices in Douglas County are above the state market average, with median home sales price of $464,900 in February 2017 (Colorado Association of Realtors, 2017). In Douglas County, only 12% of students qualify for free or reduced lunch, compared to 68% of neighboring Denver Public School district and 42% of students statewide (datacenter.kidscount.org). As a result of DCSD's level of affluence, the district opted out of the National School Lunch Program entirely in 2014.

In line with historic and national trends, Douglas County's affluence has also been associated with relatively high academic achievement, and graduation rates have risen steadily over the past decade with a 90.1% graduation rate in 2016. DCSD received a rating of "accredited" for the 2015-2016 school year and met the proficiency standards for English Language Arts, Math, and Science for all grade levels. It is important to note here that most recently reported participation rates on statewide standardized tests are below 85%, making inference difficult, according to the Colorado Department of Education district dashboard. Despite the challenges this presents for making reasonable

claims about performance on state-mandated accountability tests, the district does maintain a 95% participation rate on the ACT. In this assessment, DCSD students are outperforming their statewide peers. It is safe to say that no child in the district is at risk of attending a "failing" school by attending their zoned neighborhood school, therefore school choice has created a landscape of nuanced choices and preferences rather than choices between failure or success.

Many of the parent interviewees described their choice to live in Douglas County as "all about the schools." The school district's strong reputation draws parents to the region as a whole, with parents describing their interest in the overall school district rather than a handful of specific schools within the district. Parents frequently stated that the area is "known" for its schools and that education options are an important consideration when choosing where to live and raise a family.

Parents also expressed some degree of awareness regarding the unique privileges that come with living in a relatively homogenous affluent area and perceive that the problems students face in Douglas County are distinct from problems of urban school districts, offering opportunity to focus on other, higher order needs than fundamental human service concerns. One Douglas County parent expressed "[Douglas County] … is more of a privileged situation versus Denver that has more survival stuff. Some of the schools in Denver are challenged with things that a school shouldn't have to deal with. It is a blessing to not be dealing with basic social welfare issues."

District administrators share this view when they compare the levels of involvement and participation they experience from parents in the community. A district administrator agreed: "we have a unique aspect with our socioeconomic status in that you know we have a lot of parents that are probably a lot more involved in that way than some districts that don't have that socioeconomic benefits."

"I don't want to say the word 'too privileged', but I think Douglas County is such a nice area and there is such high quality of living and education and the school system, that I think that they do nitpick …whereas if you went to Denver Public Schools they have much bigger problems to deal with. "

-DCSD graduate and current Douglas County employee

FINDING #3

Parents are active decision makers who use personal preferences, student interests, and social networks to discern among options.

As parents are making decisions about where to send their children, certain values and processes consistently rise to the top. Parents, positioned as informed consumers in the market-based school landscape full of "safe" choices, have the luxury of advocating on behalf of the unique needs of their individual children. Ultimately, the various learning styles, interests, and preferences of their children become significant decision making criteria. Parents consider the learning styles and specific needs of their children looking for what is commonly referred to as a "good fit" school. A parent who viewed their child as "really into" science might decide to send her to the STEM charter school, while another parent talked about valuing schools with bean bags and flexible classroom seating furniture that could support the needs of their child with ADHD. Other parents talked about wanting a school where their child was able to participate in expeditionary learning and maximize the outdoor environment.

Parents use a variety of sources to inform their decision-making. Social networks are viewed, by parents, as dependable sources of information for discerning the quality of the various school choices. Parents consistently refer to other parents and neighbors as important referrals for insight into the school experience. Neighbors and community members who have children in a particular school become trusted, valid evaluators of the experience and quality of those schools. Parents seek out these experienced "guides" as they are considering where to send their own children. These parents may be friends from church groups, neighbors in their subdivision, or co-workers who have sent their own children to a particular school. Parents then inquire, often informally or casually, about their experiences in the schools asking questions about their

"I find the ratings frustrating because our two elementary schools here are getting bad ratings right now. I guess it's probably from the standardized testing. But the staff are amazing. The volunteerism from the parents is huge. So the kids are getting a decent education. And the PTIC [parent group] raises over $100,000 a year so they all have smart boards, they have computers and iPads and all the equipment they need, and yet, they're not getting great ratings. So I encourage people to come to the area and see the schools."

-Douglas County parent, real estate representative

teachers, the administrators, and their overall level of satisfaction with the school. This can take place across a variety of platforms from casual happenstance conversation at a barbeque or church gathering to a more direct email or social media inquiry specifically seeking insight about education options.

Achievement data and test scores were occasionally mentioned by parents as factors for consideration, but did not play as significant of a role as the word of mouth, personal experience, and community reputation of the school itself. Parents also hold conflicting views about the importance of "the test" and frequently prioritize the validity of others' perceptions or their personal priorities over the data itself.

FINDING #4:
Parent educational preferences and choices reflect a wide range of educational preferences, expectations for the role of schools, and definitions of school quality.

Despite the socioeconomic and racial homogeneity of Douglas County residents, parental preferences and values for education are highly varied. Parents in Douglas County do not all want the same thing, nor do they hold common expectations for the role and responsibilities of the schooling systems. Their preferences are wide-ranging across a multitude of topics. In a survey question designed to gauge parent perspectives regarding the various obligations that schools have, parents stated that schools have a wide range of responsibilities when it comes to areas of curricular emphasis.

Expectations for post-secondary options and preparedness vary widely. The region holds a significantly higher bachelor's degree completion rate and some parents mentioned the impact of college degrees on potential earnings and employment opportunities. In the survey, 93% of respondents stated that they expect their children to go to college and many parent interviewees expressed the importance of college matriculation and the school's role in helping students gain access to 4-year colleges and universities. Other parents emphasized the importance of trade school pathways and general career readiness for students who may not benefit from college study. Some community members described the wastefulness of college degrees and student debt, emphasizing the irrelevance of many degrees in the "real world" and asserting that schools need to restore the woodshop and machine shop offerings that existed during their own schooling experiences. Still others described the importance of a college education, citing the difference in earnings potential for college graduates and people without college degrees.

Many interviewees said that schools are responsible for preparing students for life skills like balancing a checkbook, time management, and interpersonal communication. Most groups saw the importance of internships

"

FIRST PARENT: I hate, hate, hate, that my son is required to do his homework on a computer at night. It's mandatory and he does his math on a computer. We have very limited technology time at home because we have very few hours at home as a family. I don't want to spend them looking at a computer screen.

"

SECOND PARENT: I guess I feel very differently about that. Technology is pervasive and that's the world now. The homework they're doing is like work, and your family time has to be separate.

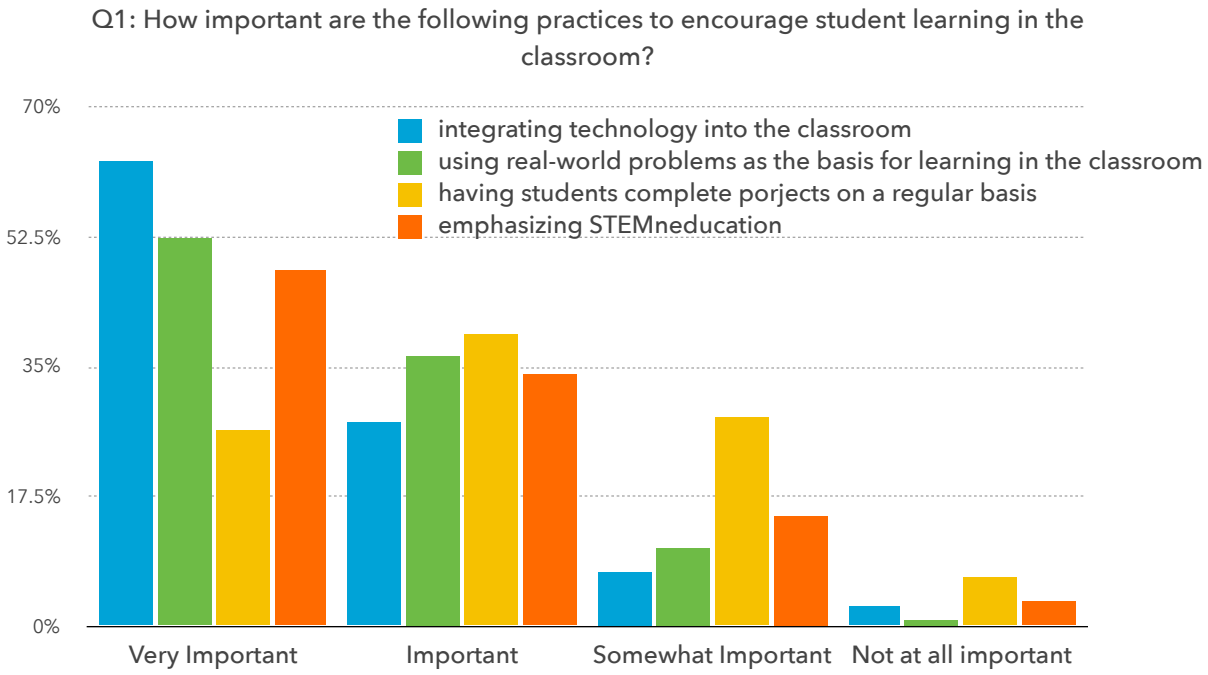
-Communications Technology Focus Group

and apprenticeships, but held differing views on their outcomes. Some saw these types of opportunities as pathways for discerning among various careers and college focus areas, while others saw them as important jobs pathways for students who may not be a good fit for a four-year university. All of these findings illuminate the vast array of opinions that Douglas County parents hold with regards to the expected outcomes and overall purpose of education.

Parent views of technology are equally as varied. Some parents desire ubiquitous school technology usage as a pathway for "life preparation" and an essential competency in a 21st century context. They note the prevalence of technology in their own workplaces and the impact of technology proficiencies on employment opportunities. Others view technology as hyper-stimulating and harmful to students' social skills and interpersonal competencies. These stakeholders often described students as having too much screen time and the limitations of learning through a device rather than from an "actual" teacher. Some parents expressed concerns about the impact that technology may have on encouraging good handwriting while others felt that technology now meant students no longer needed to learn handwriting in school altogether. Some interviewees for this project cautioned against what they perceive to be a narrow approach that exists in tailored STEM schools or programs, making a strong call for more arts integration, an emphasis on social-emotional learning, and greater access to internships and job-based technical skills.

In one interview group, parents described an appreciation for school philosophies that maximize student "voice and choice" during the day and how

Figure 4



teachers encourage kids to personalize and inform their own instructional pathways. Parents viewed this approach as centered on the "whole child", allowing students to gain deeper self-awareness, motivation for learning, and authentic independence as learners. Within that same focus group, another parent forcefully countered these "non-traditional" approaches to teaching, expressing concern for how these practices lead to "entitled" children with weakened work ethics who only learn when they "feel like it."

Even nuanced and seemingly small components of a school's varied responsibilities are areas of significance to some groups of parents. Issues as far-reaching as dress code, cursive writing, time management skills, and the options for world languages drew substantial debate and differences of perspective among interview groups.

Consistent among these various preferences is a desire among parents that children are known well and that there is a strong sense of community and personal safety within their schools. Despite the wide-ranging perspectives, values, and priorities regarding curricular and pedagogical foci, parents expressed common desires for caring school communities that cultivate a sense belonging for their children.

One parent in a local chamber of commerce focus group interview stated simply: "Kids need attention to what their needs are."

Parents frequently described the importance of guidance counselors.

These additional school support personnel were viewed as critical guides

for discerning college and career pathways in upper grades, but they were also viewed as an essential part of a school's efforts toward caring for and attending to the "whole child." In one focus group, parents described the importance of having a consistent person who "sticks with" the same group of kids throughout their time in the school and is available for help with academic issues, family issues, or concerns about life altogether. 46% of survey respondents said that a "caring personality" was among their most preferred qualities of a teacher.

A strong preference for small class and school size was also prominent in both the focus groups and the survey responses. Parents in some focus groups described elementary schools with as few as three or four sections per grade level as "far too big." In response to an open-ended question about school factors that are most important, respondents frequently mentioned "teacher-student ratios" and "class size". Parents also expressed that they want an active relationship with the school, consistent communication regarding their students' needs, and to be seen as partners with teachers in caring for their child. One parent described, at length, the appreciation her family had for the way that their son's ADHD needs were met by the whole school community and the ways that everyone knew and cared for his unique needs. Another parent highlighted the ESL services that her child received and the one-on-one attention that she was given.

Additionally, parents highlighted impersonal treatment and the sense that their child was invisible or slipping through the cracks as reasons to leave a school altogether. One married couple that participated in a focus group described a troubling school discipline issue with their child in which the school had assigned a formulaic punishment to their child. Their concern with this practice was not that their child received a punishment, but rather with the way it was handled, which felt "cold and disconnected from their child's unique situation." Another stakeholder described the harm done by the "factory model" of education that just moves all the students through at the same pace without regard to their individual needs and development.

INNOVATION IN DCSD

FINDING #5
Douglas County Schools are consistently engaged in education practices that are widely considered to be innovative.

Innovative education practices are widespread across the school district. Although the district prioritizes the needs of the community and its "market demand" for educational decisions, they have found and cultivated a community readiness for many practices that are considered to be on the cutting-edge of innovation in education.

The focus on creative programming and unconventional instructional approaches is elevated as the standard and model of excellence district-wide. The district has identified "innovation" as one of its four central traditions and has prioritized it as a strategic focal point for the direction of progress in all schools. Furthermore, the district's strategic plan for 2014-2017 highlights the extreme ambition of this value, stating that DCSD is aiming to "Reinvent American Education; Reshape the Future." The district's website describes various education leaders who have inspired their work, most of whom are considered progressive educators embracing innovative approaches to teaching and learning and a focus on the demands of an evolving, rapidly changing world.

The district prioritizes innovation in their professional development efforts. An annual district-wide summer "think tank" for innovation titled "Create Something Great" serves as a convening and empowering event, offering teachers and school leaders the opportunity to bring together ideas and experiences from across the district and to empower teachers to try new approaches in their classrooms. The featured speakers at the 2016 conference are national leaders of education innovation including Tony Wagner, Expert In Residence at Harvard University's Innovation Lab, and Yong Zhou, a scholar on the education and globalization. Smaller breakout sessions are led by teachers and administrators from within Douglas County, showcasing their work and disseminating innovative ideas across the county.

The Student Innovation Expo that serves as a kick-off to the conference, is filled with students from all ages showcasing their work in designing creative products and initiatives across a wide array of needs and interests. Students presented myriad projects such as a robot designed by a 6th grader to assist visually impaired classmates with navigating unfamiliar terrain; programs created by high school students that the local government might use to address homelessness for adolescents; and water purification systems designed by 1st graders.

This degree of district-wide innovation doesn't mean that the district has created a "free for all" culture of haphazard experimentation. As one district administrator observed, "Innovation does not mean chaos. Innovation does not mean a free for all, that you go do whatever you want. It needs to be planned well…so that you are making sure there is progress monitoring and the knowledge and skills are being addressed in whatever you do." Instead, innovation in Douglas County School District is carefully grounded in unifying expectations that are thoughtfully and intentionally implemented. A core curriculum, developed at the district level and informed by state standards, anchors the expectations for student outcomes. This curriculum, known as the 'Guaranteed and Viable Curriculum' outlines what students should know and be able to do and underlying competencies expected

of all students across the various disciplines. Major components of this curricular framework are 21st century skills, including social-emotional learning competencies such as problem solving, resiliency, civic responsibility, and system thinking.

Providing clear guidelines around broad principles rather than mandating specific content-related details and pedagogical practices promotes a sense of organization and cohesion and simultaneously frees educators to exert professional judgment within the larger creative space to choose unique areas of emphasis for their schools. As one DCSD administrator explained, "Innovation means something different to everyone. But core principles? It's making sure kids have a voice and choice in what they are doing." When a new principal is appointed to a school, district leaders meet with the principal to identify the overarching mission and vision and the desires of the surrounding community. From there, the district views its role as to "get out of the way" and support that school with a high degree of autonomy and flexibility. Consequently, teachers within the district feel a tremendous sense of autonomy in implementing innovative practices. They view the autonomy as opportunity to do what is best for their students, and are buoyed by the parents' ability to choose a different school if they prefer alternative approaches. Schools support teachers; a degree of freedom and autonomy to adopt the practices that they see as most beneficial to the learning and development of their own children and teachers are well supported in implementing these practices.

From district-level support for professional learning to school-level autonomy to implement and evaluate, the teachers are empowered to try new practices and implement creative models in their classrooms. One veteran teacher at a DCSD primary school noted, "We have autonomy - doors keep opening for me. I get to go to conferences all summer rather than being told 'you will do this' even if it may not be good for students or teachers. We have support and freedom. Whatever we need here, we're going to get."

FINDING #6
Innovation serves as a mechanism that facilitates product differentiation in the high choice, market-driven landscape.

As Douglas County has grown and added more schools over the past couple decades, innovative practices have become a way for schools to differentiate themselves from one another within the high choice market. Schools have the autonomy to endeavor wholly into various instructional approaches or unique niches so long as there is a community response that supports the educational change. Some schools within the district have implemented high levels of personalized learning, while others have emphasized more thematic approaches such as

International Baccalaureate programs. Still other schools embrace an emphasis on project based learning or an emphasis on design thinking. These various innovative "identities" allow families greater distinction in their array of school choices.

As described earlier, the "Choice Programming" section of the DCSD website promotes the district level value for choice and positions the various school models as pathways to assist in school choices. There are three rotating images on the Choice Programming section of the website, each with corresponding text:

IMAGE 1 (photo of a student on top of a rock formation, writing in a notebook): Some students learn best on a mountaintop, while others prefer the science lab. The Douglas County School District offers a variety of options and supports families in finding an educational program that best fits their child.

IMAGE 2 (photo of a group of young students in a huddle): Every student learns differently, which is why the Douglas County School District provides parents and students with many different educational choice options.

IMAGE 3 (photo of a team of students presenting to a group of other students and adults): The Douglas County School District offers a variety of programming options, from schools that focus on sustainability to expeditionary learning. Find the school that best fits your student's needs today.

While the trend in most of the country is that parents exercise choice to leave a school district, DCSD sees choice as a means of compelling parents to stay. Randy Barber, Chief Communications Officer, echoed this. He described DCSD as an "unusual school district in which choice and excellence are both key." His sense is that, in general, parents believe that they have excellent choices, and that this may be why there are not the same "hard feelings" about charter schools that exist in other contexts. "We believe in choice in DCSD because we know that students learn in different ways."

FINDING #7
Charter schools in Douglas County practice traditional education philosophies as a direct response to the market of innovation found in the district schools.

Some families have resisted the district-wide emphasis and value for non-traditional education practices. In response, charter schools rooted in more traditional teaching methods and education approaches have arisen throughout the county. These charter schools deliver "core knowledge" curriculum, an educational philosophy that centers on the work of E. D. Hirsch and focuses on a rigidly sequenced, discrete core of subject knowledge that students should acquire at each grade throughout their schooling experiences. The district currently authorizes 16 charter

"…there was some talk about iPads and how kids can create their own curriculum and be creative and they get to choose what their class setting is like and I don't agree with that. Society, and this may just be bias, but I feel like kids nowadays are getting too many options and they're being empowered to make them these little egotistical [people] and 'the world revolves around me' and 'I don't have to work that hard because the world is going to work for me'. So I lean more toward the traditional base."

-District Parent, Health Care Administrator

schools, of which 10 identify as core knowledge charter schools. These charter schools are options that tend to be selected by parents who prefer a more structured and traditional approach and highlight their students' academic performance on state standardized tests as they emphasize their higher achievement scores relative to the other DCSD schools.

Charter schools are, as a whole, outperforming district schools on state standardized tests. Their enrollment has grown dramatically in the past decade, often alleviating the district schools who are burdened by growing population in the county but restricted by a tax-averse community that is reluctant to fund new school construction. Several charter schools describe their small beginnings, often organized by a group of parents, and their rapid rise in enrollment. Students are able to attend charter schools through a lottery system, with many charter schools reaching capacity enrollment in the first few years in which they are open.

Promotional videos on these schools' websites highlight traditional education values and approaches. One school's video opens with a very young child running into the school building to start the day and the principal gently corrects the student with a reminder of "Slow down! Slow down!" and then segues into a principal interview describing the importance of manners and 'proper behavior' in the school. The core knowledge schools emphasize the importance of ability grouping, a controversial practice, as a way to allow teachers to offer one lesson and not need to differentiate for the a wide range of needs in a classroom.

Another school's promotional video includes footage of a large student awards school assembly where citizenship awards and academic performance trophies are given to a small number of students. The administrators talk about these awards as "earned," juxtaposing them with generic participation trophies that weaken student performance and competition.

EXEMPLARS OF INNOVATION

FINDING #8
Innovative school exemplars begin with clear, foundational principles around student learning before selecting innovative practices as a means of supporting those principles.

None of the exemplar schools that we visited started by first committing to project-based learning building or building a makerspace. Instead, these selections were informed by and discerned through a collaborative process intended to codify the school's beliefs and values around teaching and learning. Katherine Smith (KS), an elementary school in Palo Alto, CA is a member school of the New Tech Network and has been identified as a "21st Century Exemplar School" by the Partnership for 21st Century Learning (P21, 2017). According to the school's website, KS "embarked on a three- year plan in 2012 to reinvent our school with the future in mind. We want the most engaging and excellent education for our children – an education to serve them in the 21st Century where we all need to communicate, think critically, collaborate, and be innovative." One outcome of the three-year plan was the development of the school's "Habits of the K. Smith Mind" that prepare each student to: think, learn, work, collaborate, communicate, and contribute. Every teacher at Katherine Smith is expected to employ Project-Based Learning (PBL) practices school wide and has had formal training in PBL. The students ambassadors, who served as guides for our visit, articulately described their experiences with PBL across each grade level and subject matter. We visited first, third, fourth and sixth grades and spoke with students in each classroom. Every student we talked with was able to share the "driving questions" and "need to know" concepts for the unit under study.

There is also a strong emphasis on social-emotional learning at Katherine Smith. The students tour guides were not only articulate, but extremely self-possessed and aware of the leadership skills they were developing as student guides. Aaron Brengard, principal of Katherine Smith Elementary School, is quoted on the website as saying "Over the past few years, we've gone through some challenges making meaning of words we throw around in education like 'critical thinking.' It seems that we all pretend to know what these complex terms mean. But do we? Like we expect of our students, we [staff] engaged in an inquiry process through our professional learning that helped us define what educational jargon looks like in practice." The rigorous and reflective approach to developing schoolwide norms around innovation are what led to the culture that now exists at Katherine Smith.

LEARNING HAPPENS ANYWHERE

Brightworks School, a small private K-12 school in Northern California is based on ideas that were developed and

tested in summer camps by Gever Tulley, an expert on tinkering and early elementary education. Tulley, a former tech industry executive, grew increasingly frustrated by the new, young employees entering his company from local schools. They were largely risk-averse and overly concerned with the approval of their managers. He wanted to create a learning environment where students were encouraged to try new things and embrace mistakes as learning opportunities.

The underlying principle of Brightworks is that "everything is interesting" when students are allowed to follow their own curiosities, develop habits of inquiry, and learn from a wide range of experts. These principles became the foundation for the school and permeate through its practice and facility, which resembles a mix between a warehouse and a woodshop in the Mission District in downtown San Francisco. For students to be able to pursue and develop their curiosities, according to Karen Dwyer-Meadow, co-director, they need flexibility in terms of time, access to tools and materials, and adults to collaborate with. The material and supply-rich atmosphere of Brightworks is a direct response to the principles of learning that the founders wanted to cultivate in their students.

LEARNING HAPPENS ANY TIME

The No-Bells Institute at Novato High School, scheduled to open in the Fall of 2107, will, again, be a school deeply rooted in principles of autonomy, motivation, and critical thinking skills. The desire to create a student-driven project-based learning environment did not come about as a function of wanting to do what other innovative school were doing for the sake of following suit, but rather as a means of cultivating certain critical habits and dispositions in their students.

PURPOSEFUL MAKERSPACES

Salpointe Catholic School, Tucson AZ, is another example of how a commitment to specific principles of learning and outcomes can drive effective and innovative learning spaces. While Salpointe has not adopted a schoolwide approach to innovative practices, the school has developed a robust 9-12 STEM program that, according to the school's website: "prepares students to be effective critical thinkers, problem solvers, collaborators and communicators. Using project-based learning and a collegiate-level facility, students design, fabricate, assemble, research and refine their innovations. Salpointe's STEM program creates a pipeline of future innovators and an educated workforce to meet the growing needs of STEM employers in Southern Arizona and the nation." Salpointe students interested in STEM learning commit to a four year program that begins with simple computer programming and an orientation to the various tools available in the innovation lab. By the time students are seniors, they are developing useable solutions to real problems by collaborating with experts in the field. One team of students had collaborated with a local solar power

energy company to design small solar-powered water heaters for use at a University of Arizona astronomy field station.

MAKERSPACES LACKING PURPOSE

It is helpful here to consider a contrasting model that has created an innovative facility without cultivating a deep, schoolwide approach to innovation. The Gregory School, in Tucson AZ, is a college-preparatory K-12 independent school with a strong reputation in academics and college admissions. Recently, the Gregory School added a "makerspace" to its campus as a means of rounding out its curriculum and offering opportunities for students to engage in hands on learning. The "MIT Fab Lab" at the Gregory School is well-outfitted, with 3-D printers, laser cutters, power tools, and large drafting-style work tables. It is a place, according to the two Fab Lab coordinators, for students and teachers to engage in cross-disciplinary collaboration; to solve practical problems; and to tinker. But without a schoolwide, programmatic commitment to the Fab Lab, the facility seems to be limited in its scope and is strictly a place for tinkerers. Individual students come and go as they work on their individual projects, but there does not appear to be a deeper function of the Fab Lab from a school culture standpoint. Students learn to use the 3D printers and laser cutters, but the piles of plastic, half-finished dinosaurs, game pieces and miniature flip-flops suggest a lack of purpose as compared to the finished products of the Salpointe students. The coordinators shared their concerns around not having more teachers wanting to come to the Fab Lab because they don't always see curricular connections to what they are teaching in class. The Fab Lab, therefore, is seen as an "add on" for many of the teachers at The Gregory School. The coordinators agreed that they would like the Fab Lab to serve a more important, purposeful function at their school, and they recognize that this will only happen when the Fab Lab is seen as an essential element of instruction by teachers.

FINDING #9
Innovative school exemplars consistently maintain a broad view of learning and a redefinition of essential competencies for the future.

The innovative school exemplars that we visited were highly varied in terms of the populations they served and their curricular approaches. However, they all consistently created a significant re-visioning of boundaries and restrictions traditionally associated with schooling, learning, and the fundamental expectations for "going to school". Schedules, teachers, and classrooms, all foundational to the schooling experience, are re-imagined and flexed in highly innovative schools so that student learning and engagement are the top priorities at all times.

COMMUNITY PARTNERSHIPS FOR PIPELINE DEVELOPMENT

Ray Pecheone, a member of the Oracle Education Foundation Board of Directors, was instrumental in forging the partnership between Oracle, a leading technology and software firm in the US, and the San Mateo Unified School District in order to develop Design Tech High School, otherwise known as "d.tech." At the time of the partnership, Oracle was becoming increasingly concerned that the "pipeline" of local employable applicants were lacking the technical skills that would make them qualified Oracle employees and that they lacked the competencies, such as design thinking, necessary for working in a rapidly evolving technology industry. According to Dr. Pecheone, the partnership between Oracle and d.tech was a logical choice. The high school partnership was an attempt to infuse the surrounding area with more skilled workers and to more directly support the learning processes happening in K-12 schools. The board was unanimous in its approval of the partnership and committed sizeable monetary resources to the building of a new high school directly on the campus of their corporate headquarters. The facility will provide a new LEED certified, state-of-the-art school building, as well as human resources in the form of guest instructors, mentors, and collaborators who work for Oracle but spend a portion of their time at the d.tech school. D.tech's facility is owned by and shared with Oracle and d.tech's teachers include professional software designers as well as California State certified educators.

The St. Vrain Innovation Zone in St. Vrain Valley also embodies the use of collaborative partnerships in learning environments. Students run an Apple Help Desk in the district's Innovation Zone, allowing teaching experiences from certified Apple Geniuses and local technology industry specialists to lead student learning. Students enrolled in the program take STEM courses that root their learning experiences in real-world problems and ultimately lead to their certification as Apple technicians. These students then staff the school's own Apple Help Desk, a service center open to the local community, which also provides students with job skills that can assist their transition to postsecondary college and career options. The district, through the awarding of a Race to the Top Innovation grant, dedicated significant physical space to this partnership, prioritizing the integration of local community partners as essential components to the success of these learning experiences.

REDEFINING THE GOALS OF LEARNING

Brightworks also pushes the boundaries of the where, when, and whom of schooling. Brightworks was featured in a 2015 Business Insider's article titled "The 13 Most Innovative Schools in the World" and occupies an expansive warehouse that is filled with construction projects and artwork, all generated and directed by students. As a private school with relatively few students, Brightworks is free from the constraints of a state mandated accountability system

and represents innovation on the extreme end of the spectrum. Rather than learn core content through the traditional unit approach, students at BrightWorks move through a diverse course of study emphasizing depth over breadth that integrates and contextualizes the development of skills and content knowledge. All studies follow a three-phase "arc of learning" that includes exploration, expression, and exposition. Each day, students learn from community "collaborators" through field-based experiences or activities offered at the school. No one at Brightworks is called teacher and, in many respects, the entire city has become the school. Students are required to keep their public transportation passes active as any day may, somewhat spontaneously, require travel into the city for a more authentic and in-depth understanding of any particular subject. The Brightworks school also modeled creative use of space that maximized efficiency and learning environments. Classrooms existed on external portions of the school buildings and larger shared-use environments such as kitchens, art spaces, and tinker zones, existed in the adjacencies, encouraging more collaboration and space utilization. A large gathering area with a small stage provided the opportunity for the whole school to gather as the morning was getting started, an opportunity that is dependent on sufficient open space in the building.

STUDENTS IN THE DRIVERS SEAT

Up the coast north of San Francisco is Novato High School, a public school of 1300 students in Marin County. In the fall of 2017, Novato is going to open a new school-within-a-school, tentatively called the "No Bells Institute." Glenn Corey, one of the design teachers at NHS who runs their makerspace, and Rob Lippincott, an educational consultant working on the new school project are seasoned educators who have deep knowledge and experience with innovative school practices and are very excited about this new endeavor. Both Rob and Glenn have had extensive experience in the project-based learning (PBL) approach that Katherine Smith has adopted. The issue they see with PBL is that it is, ultimately, driven by the teacher who begins each unit with the "driving question". What the No Bells Institute will do, effectively, is reorient the leader of the PBL experience and allow students to become to drivers of all inquiry and associated project work. The teachers will be on hand to support and guide students as they pursue their areas of inquiry, but each student will be working autonomously and in small, self-organized learning communities of collaboration. This approach is a move toward radical personalization of learning processes that is intended to deepen motivation and cultivate the "soft skills" such as initiative, creativity, and collaboration necessary for success in the 21st century. The challenge of course will be to make sure that all students are still meeting state standards. As in the d.tech and BrightWorks models, students will

dictate their own learning and collaborate with mentors in the community when necessary. The No Bells Institute in its concept form represents a highly assertive push against the limits of state mandated accountability systems.

DISCUSSION

As mentioned in the introduction, while the conversation around school choice has always been a part of the American education landscape, it has gained a new level of prominence in the past few decades. Questions surrounding the role of government in education, the effectiveness of any public-run endeavor, and the various pathways for continued education improvement all point back to the debate and dilemma that surrounds school choice. Douglas County Colorado is no exception, with school choice playing out center stage in the midst of efforts aimed at progress in education. While school vouchers and private schools are elements of the Douglas County and larger Colorado education landscape, they are far less prominent and are less relevant to this study than the elements of choice exercised through open enrollment policies, charter schools, and housing choices. For these reasons, we will limit our discussion of school choice to these areas.

MARKET DYNAMICS

At the most fundamental level, school choice is intended to generate market dynamics within the education landscape, preferencing a consumer-driven approach over what has historically been viewed and executed as a government controlled enterprise (Friedman, 1962). These market dynamics replace government monopolies, positioning schools as "sellers" and parents as "buyers" in a landscape that fosters competition for students and, theoretically, innovation that improves practice. This market-driven system is, in many settings, an attempt toward enhancing the consumer experience by providing an increase in the variety of schooling options (Chubb & Moe, 1990; Levin & Belfield, 2003). These diverse options are able to more deftly respond to the needs of their community and are driven by the competition for students that sustains their existence. Parents who become unsatisfied with the experience at their child's school can vote with their feet and exercising significant power by going elsewhere. Schools are then incentivized to attract these parents and to respond to the power that they have been given.

Douglas County has established an education ecosystem that runs on market dynamics. The open enrollment policies within and between school districts throughout the region creates a high-choice landscape, establishing a significant degree of competition amongst schools and reinforcing the role of parents as consumers with substantial buying power. No school is guaranteed the enrollment of its zoned students, requiring it to compete with surrounding schools and implement various ways of attracting students. The availability of charter schools further reinforces this dynamic, allowing schools to operate

outside of the district's established parameters, providing a proliferation of schooling options throughout the region.

The Center for Evaluation of Educational Policy describes open enrollment policies as "intended to enhance student achievement outcomes and spur innovation through the introduction of competitive market forces in the educational system and satisfy parent desire for a greater say in their children's education" (CEEP, 2009). Indeed, the parents we spoke with demonstrated high levels of satisfaction with their children's schools and were, along with the teachers and district leaders, able to describe several innovations in the various schools their children attended.

Within Douglas County, this high-choice landscape appears to have created somewhat of a self-reinforcing loop. As parents have more options, schools are compelled to find more ways to make themselves attractive and distinct within the market. Thus, their increased differentiation fosters greater demand for choice and consideration, as well as an increased sense of satisfaction, for families. Whether or not the high level of satisfaction and culture of innovation is a function of the high-choice landscape within the school district has not been made conclusive through our research. But the evidence is clear that within this particular market-driven choice-filled landscape, satisfaction runs high and innovation is widespread.

UNIQUENESS OF DOUGLAS COUNTY AND SCHOOL CHOICE

In the overall analysis of market-based choice dynamics, Douglas County aligns with the models, outcomes, and common conceptions of school choice and the contexts in which it will flourish. In other ways, Douglas County represents a unique and starkly different model of school choice: the proliferation of school choice despite an environment of widespread high academic performance; the limited innovation coming from charter schools; and the extreme affluence of the community.

CHOICE IN A HIGH-PERFORMANCE CONTEXT

In many contexts, school choice has represented a call for school reform, introduced as a response to chronic failure or underperformance and, fundamentally, as a result of limited choices (Coons & Sugarman, 1978; Loveless & Field, 2009). The attention of much public debate in school choice is often centered on providing options to groups of people who have limited opportunity or mechanisms for escaping their own school environments. However, Douglas County is widely considered high performing and is meeting expectations of state regulations and community members alike. Instead, in this context, school choice has become a more nuanced and dynamic process, prioritizing various interests. School choice is also a reflection of the politically conservative nature of the community, privileging the voice of the individual citizen and limiting

the power or bureaucratic nature of government entities.

COMMUNITY AFFLUENCE AND RELATIVE HOMOGENEITY

Within the body of scholarly literature on school choice, there is a preponderance of research that focuses on the segregating effects of school choice (Henig, 1990; Glazerman, 1997; Weiher & Tedin, 2002). This research challenges the argument made by choice advocates that parental education choice is not mutually exclusive of school integration (Clinchy, 1985; Glazer, 1987; Snider 1987). It is widely held that wealthy families have essentially always held "school choice" as they have the option to either choose private schools or move to an area with strong schools, even if the home prices themselves create de facto restrictions and segregation. Earlier assessments of the effects of charter schools suggest that "the price of admission to many "public" suburban schools is the ability to purchase a home with hundreds of thousands of dollars and pay real estate tax" (Nathan, 1998, p. 502). Indeed many of the interviewees included the quality of the schools as a top reason for moving to Douglas County. Just as Nathan suggests, Douglas County residents exercised a completely different form of "school choice" when they moved to Douglas County. Fundamentally, even in this high choice school policy, the housing prices that were required to live in or near this district have created a segregating effect in and of themselves (Schwartz, 2010; Lareau & Goyette, 2014). Holme (2002) further reinforces this idea in her critique of the general 'potential or pitfall' debate about school choice policies and that they tend to overlook the "unofficial choice market in which wealthy families' ability to buy into expensive neighborhoods give them access to high quality schools (Holme, 2002). Given the relative homogeneity of Douglas County the segregating effects of school choice are not likely to be as severe or noticeable. Douglas County is what Holme would describe as a "high choice/high status" educational landscape in which the residents have already made their most critical choice when they decided to move to Douglas County in the first place. What is notable in Douglas County, nevertheless, is that school choice has become the coin of the realm regardless of the relative homogeneity that exists in this context.

DISTRICT-LED INNOVATION

One of the initial calls for the creation of charter schools was an explicit focus on their ability to foster innovative learning environments, essentially serving as a research and development arm for traditional schools (Finn & Gau, 1998). Schools with fewer regulations and increased autonomy were intended to serve as incubators for many new practices and approaches (Geske, Davis, Hingle, 1997; Walberg & Bast, 2003; Preston, Goldring, Berends, Cannata, 2011). Through this lens, charter schools were often considered mechanisms for increasing school choice, elevating competition, and producing a fertile

context for innovative practices that would serve as product differentiators (Lubienski, 2003). In Douglas County, however, open enrollment policies have paved the way for choice and competition without needing charter schools to do so. The district, preferencing innovative education practices, instead opened a demand in the education marketplace for less innovative schools. The context for market responsiveness then facilitated a place for charter schools as the more traditional option for parent-consumers who sought a more specialized, traditional education product for their children.

PARADIGM OF EDUCATION AS A PUBLIC GOOD

Public schools have long been viewed as a foundational component for sustaining democracy (Dewey, 1964; Tyack, 1966; Gutmann, 1990; Barber, 1997; Goodlad & McMahon, 1997). Serving as civic, cultural, economic, and intellectual development grounds, the role of school in a diverse, pluralistic society can not be understated. But education also holds a substantial private benefit as it directly correlates to an individual's lifetime earnings, and facilitates the very liberty that democracy itself is designed to protect.

This tension between the public and private role of education plays out in Douglas County. Preference for parent and student satisfaction is upheld as one of the supreme values throughout the education community. Elmore (1986) suggests that increased choice is, fundamentally assumed to provide greater community satisfaction in that parents will, by nature, be more satisfied with schools that they have actively chosen, students will be more engaged in school when they had a role in deciding where to attend, and teachers will be more committed and, therefore happier and more successful, when they are working in settings they have chosen. Elmore goes on to point out that enhanced choice is believed to "create communities of shared values that command the loyalty of participants, that set clear expectations, and that are more likely to succeed in accomplishing common goals" (Elmore, 1986, p. 23). Although this increased satisfaction and involvement can hold significant benefit for the school community, it is also reflective of an enhanced attention to education as a private good. Schooling plays an important socially unifying role in democracy. Schools that are heterogenous encourage social interaction and values necessary for self-government of a diverse society (Wolfe, 2001; Meier, 2003). However, when we emphasize individual satisfaction and preference and elevate the varied preferences of parents-as-consumers in isolated pockets of homogeneity, we lose many of the socially unifying components of public education. "Under a market approach, schools will seek market niches through product differentiation. That is, they will compete by matching their appeal to particular educational preferences of parents rather than trying to produce a standardized educational

Figure 5

Perkins "Limiting Agendas" (2012)

ACHIEVEMENT: The exclusive emphasis on student achievement, reinforced by state and federal accountability systems (Diamond, 2012) has created what Perkins calls "the relevance gap." These environments prioritize test scores and drive instruction based on state-established standards and formulaic curriculums without consideration of student interest and motivation, or responsiveness to the needs of the new global economy.

INFORMATION: The traditional approach to teaching that involves a teacher transmitting information to students as "open vessels" has not changed much over the past 100 or so years. In the evolving context of immediate and robust access to information, Perkins argues for a new approach to teaching that emphasizes the cultivation of certain habits and dispositions rather than having students memorize information.

EXPERTISE: As students progress into higher grades, they are also expected to progress into higher level of "expertise" across the various disciplines. However, Perkins argues that this approach compromises robust, flexible, conceptual understandings that are essential for rapidly changing application expectations, instead deepening students' "specialization" into superficial levels of specific and siloed information strands that may quickly become obsolete or irrelevant.

product. The problem is that serving well a variety of different values and preferences is likely to undermine the social goal of providing a unifying education influence around social goal of providing a unifying education influence around societal institutions and values. (Levin & Belfield, 2003, p. 194). This is an ongoing risk for the racially and socioeconomically homogenous region of Douglas County and its further insistence on the primacy of the individual consumer's needs.

INNOVATION

Over the past century, the world has experienced a rapid pace of change in labor markets, access to knowledge, transportation, and technology. We have transitioned to a post-industrial society and are grappling with the rise of a knowledge-based economy that has made many job markets obsolete and prioritized a new level of career-preparation credentials. The internet has revolutionized our access to information and to each other. Transportation and telecommunication have increased our connectivity and shrunk the distance

between us (Friedman, 2007). The job market now preferences candidates with social skills along with high cognitive demands (Deming, 2015). Corporate leaders now identify problem-solving skills and a strong work ethic as the most important attributes for future employees (National Association of Colleges and Employers, 2015). In response to many of these changes, education is also reimagining its role in preparing students for a world of the future, especially when much of that world is changing faster than we can predict. Douglas County School District has identified these shifts and changes as motivation for their instructional priorities and practices, including their curriculum, standards, and student-centered practices. The models of innovation that we visited embraced these responsive worldviews as core components of their approaches.

INNOVATION IN SCHOOLING

These national and global changes have led districts like DCSD toward shifts in common competencies expected for K-12 students to master in order to be deemed "college and career ready," as well as productive members of a rapidly globalizing society. Across the nation, states and school districts are shifting away from conceptions of the "one best system" (Tyack, 1974) for educating students and are instead attempting to adapt structures and practices of education that are responsive to the evolving context (Murphy, 2006). Despite robust attempts to progress, schools in America have been stymied by three forces that limit them in the midst of this expanding, evolving global context (Perkins & Chua, 2012). These 'limiting agendas, described below, constrain the focus and goals for schools throughout the country.

Education systems that will be successful at responding to the world of the future and the shifts that have taken place will resist the force of these limiting agendas and set new ones (Robinson, 2016). These schools conceive of learning in new ways; they facilitate student-centered learning that reduces the relevance gap, they prioritize skills and competencies necessary for an evolving job market and a globally connected environment, and they focus on purposeful, conceptual learning. These characteristics are hallmarks of DCSD schools and are guiding lights for the district's goals, priorities, and pathways. DCSD administrators and educators operate with a keen awareness of these limiting agendas and are actively constructing learning environments that focus on innovative practices and real-world preparation.

STUDENT-CENTERED LEARNING

Recent neuroscience studies confirm that doesn't happen most effectively when students simply sit and listen and absorb information from a teacher (Hattie & Yates, 2014). Instead, students are active participants in their learning and co-constructors of their own knowledge pathways. Their motivation and interest are essential for deep understandings and engagement is a

prioritized, necessary component for learning.

Curricular approaches that center on project-based learning directly address the relevance gap by providing students with realistic problems to solve as they construct their own knowledge through a "need to know" process (Blumenfeld et al., 1991). These projects and problems create a more-open ended approach to learning and are generally devoid of predetermined, teacher-generated outcomes (Jones, Rasmussen, & Moffitt, 1997). Gordon (1998) illustrates the various types of challenges that students face in schools: academic challenges, scenario challenges, and real-life challenges, creating authentic contexts and situations that facilitate student interest and motivation and, as a result, work to eliminate the relevance gap. The type of student-driven project based learning discussed here was evident in the Katherine Smith School and Brightworks. Student interest informed units of study and information was sought as a means of solving problems rather than as a prescriptive outline of disparate and disconnected body of knowledge.

Technology can also be used to maximize student interest and motivation. Personalized learning approaches that integrate technology platforms provide entirely new frontiers for differentiated, student-led learning (Pane, Steiner, Baird, Hamilton, 2015). This is the approach that Novato High School is embracing, reframing the constraints of student-teacher ratios and time or space limitations, and instead expanding the nature of individualized learning agendas and approaches.

PRIORITIZATION OF ESSENTIAL SKILLS FOR THE FUTURE

In a world with rapidly expanding bodies of knowledge and unrestricted access to information, the role of content knowledge changes dramatically. Students no longer need to memorize disparate pieces of knowledge, and success is not simply predicated upon low-level cognitive competencies. The demands of the labor market elevate complex, non-routine tasks and the globalizing society prioritize social and emotional skills and competencies (Heckman, Stixrud, Urzua, 2006; Deming, 2015). These skills and competencies have a variety of manifestations and categorizations: 21st century skills, higher-order thinking, non-cognitive skills (although widely considered a misnomer), deeper learning, soft skills, design thinking, and so on. They include various outcomes as collaboration, communication, creativity, and critical thinking, and attributes such as conscientiousness, self-control, growth mindset, grit, and persistence. In an education context, they become drivers of student work, explicit instructional goals, and markers of student progress. Students spend less time in isolation working toward individual goals and instead become more connected members of a collaborative learning community that develops social-emotional competencies, design thinking, and problem solving. Maker spaces, promoting design thinking

and student-driven innovation, are a proliferating approach to creating contexts for these types of learning experiences that engage and facilitate the development of skills for the future.

These practices were central to the instructional approaches and values in the Brightworks and Oracle schools. Employers involved in developing and guiding these schools sought to develop risk-taking and confidence in their students over prescriptive abilities to recite information or process computational systems. These new skills are highly valued in their own and other workplaces (National Resource Council, 2012) and are essential components of innovative schooling models.

SHIFT TOWARD PURPOSEFUL AND CONCEPTUAL LEARNING

The emphasis on developing "expertise" in schools must be replaced with the prioritization of deep and conceptual learning that is flexible. This conceptual understanding serves as a foundational awareness that students can adapt and apply in various iterations and contexts in a rapidly changing world.

To develop this deeper conceptual understanding, students need to take part in complex, meaningful projects that require sustained engagement, collaboration, research, management of resources, and the development of an ambitious performance or product" (Hammond, p.2). College-bound students remain hyper-focused on advanced placement courses in order to optimize their chances of acceptance to selective universities and do so at the expense of a deeper more flexible understanding of content. Ted Sizer, leader of early education reform in the US believed that schools should adopt a "less is more" approach to learning that privileges deep understanding over breadth of coverage (Sizer, 1986). A 2002 report by the Committee on Programs for Advanced Study of Mathematics and Science in American High Schools confirmed this in a finding that Advanced Placement programs are fundamentally at odds with a curriculum designed to foster deep conceptual understanding (NRC, 2002). While a less is more approach to learning requires the elimination certain pieces of content, the results are powerful. The choice to develop deeper understanding at the expense of shallow coverage was observed at all of the innovative school exemplars we visited.

INNOVATIONS IN LEARNING ENVIRONMENTS

Learning organizations that prepare students for the world of tomorrow will redefine the boundaries of learning environments, maximize larger community partners, and reimagine physical structures within schools. Education does not start and stop at the doors of the school building, isn't limited to "teachers" as employees in a school building, and is directly impacted by the physical environments that constrain or maximize learning experiences.

John Dewey, in his 1938 "Experience and Education" argued for getting students out of the classroom so

that they may make more meaningful connections to their classwork which oftentimes felt remote and inauthentic to the students (Dewey, 1938). In "My Pedagogic Creed" Dewey further claims that "education must be conceived as a continuing reconstruction of experience: . . . the process and goal of education are one and the same thing" (1897, p.79). Research also suggests that fieldwork provides students inquiry-based, cognitively-rich learning experiences that result in a deeper grasp of important concepts (Oost et al., 2011). In "Searching for the American Dream: How a Sense of Place Shapes the Study of American History", the authors argue for a more effective and compelling approach to studying history that includes a "study tour" as part of each unit. They suggest that Study Tours be linked around a central theme and designed to move students not only out of their physical comfort zones, but their intellectual ones as well (Moore, 2013). The Brightworks school embodies this philosophy as students work regularly in the field learning to notice, observe, wonder, and lead their own learning in every space, at all times.

Innovative schools are not only taking (or sending) students to places outside of the school boundaries, they are removing the school boundaries altogether through creative community partnerships around space and facilities. Schools have been places of community engagement for over a century. John Dewey, in his 1902 article titled "The School as a Social Center", suggested that schools are obligated to serve as "social centers" of communities in order to allow for opportunities to learn and develop for all members of the community. As schools became more centralized and bureaucratized into the "one best system" (Tyack, 1974), they were more resistant to the needs and interests of the communities that immediately surrounded the schools and became, as a result, more cloistered. Recent educational leaders suggest a return to the "village model" of the 19th century, embracing "joint use" models that allow for public schools and non-school entities to optimize facility use while sharing costs (Vincent, 2014). Many schools have found ways to partner with private organizations or industry to create shared facilities that serve not only the students but the entire community. Joint-use partnerships involve a formal relationship between a public school (or district) and one or more other entities and involve contractual agreements that outline specific terms of sharing space. The d.tech High School in San Mateo, CA is a strong example of this approach. The school, sitting on the Oracle technology campus, maximizes the use of industry leaders as teachers, connecting students to authentic learning environments and experts. The lessons and learning environments are rooted in real-world problems through their location and integration with the larger industry partnership.

Technology also provides opportunities to re-conceive of "space" and connectivity, revolutionizing the access to physical environments without

leaving a classroom or home. Blended-learning is defined by Horn & Staker as "any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace" (2011, p.3). At its core, blended learning is a response to the traditional qualities of schooling that have privileged a one-size fits all approach with regards to the location, sequence, and pacing of curriculum delivery. One popular approach to blended learning is the "flipped classroom" in which students are completing cognitively less demanding work at home, such as watching videos, and then engaging in more challenging or collaborative work in school under the guidance of a teacher (Brame, 2012).

Regarding the physical structure of schools, innovative educators have committed as much thought and intention to the architectural qualities of their schools as to what happens inside of them. The Association for Learning Environments, a non-profit association whose sole mission is improving the places where children learn believes that facilities impact the learning, development and behavior of the facility user; and that sharing and networking improves the planning process (Association for Learning Environments, 2017). At the 2017 Learning Environments for Tomorrow conference at Harvard's Graduate School of Education, David Perkins, scholar on teaching and learning, said, "Sometimes architecture is better at getting in the way than getting out of the way. Architecture is never neutral; it is there whether we pay attention to it or not." And Jonathan Levi, renowned school architect, said "the building is not the change, but it can nudge, encourage, inspire, and assist the change."

Perhaps one of the most radical approaches to the architecture of schools has been in the form of school size. Nineteenth and twentieth century school buildings were designed to mimic the factory environments in which the students would one day be working (Rose, 2012). The "cells and bells" model of school design has been repeatedly critiqued for creating alienating learning environments that fails to promote sense of ownership, collaboration, or community (Holden, 1994). More recent research points to a more troubling concern surrounding large schools: that they are not safe. A 2010 report by the National Center of Education Statistics maintained that most serious violence in schools happened at schools with 1,000 students or more. In fact, schools with over 1,000 students have almost three times as many serious violent incidents" as do schools with between 300-500 students (NCES). While some school leaders combat school violence with metal detectors and increased security, others have chosen to build small schools. According to Deborah Meier, American Educator and considered by many to be the founder of the small schools movement, "small schools offer what metal detectors and guards cannot: the safety and security of

being where you are known well by people who care for you" (1995, p.112). John Goodlad, 1984, wrote "Indeed, I would not want to face the challenge of justifying a senior high of more than 500 to 600 students (unless I were willing to place arguments for a strong football team ahead of arguments for a good school, which I am not" (Goodlad, 1984, p. 310). And finally, Lee and Smith (1997) found in their study of high school size that moderate sized schools of between 600-900 have the most pronounced effects on reading and math gains, regardless of the types of students that attend the school (Lee & Smith, 1997).

While the issue of school safety did not emerge as an overwhelming concern among our interviewees, many parent interviewees did express a preference for their children to be known well and that there be a sense of connectedness between and among students, teachers, and families. Small schools not only address parent concerns about safety, but they also facilitate the development of meaningful community among students and teachers. Unlike their large school counterparts, small schools inherently facilitate relationship building and create a "sense of belonging" that has been found to reduce disciplinary issues and dropout rates (Klonsky, 1995). As we discuss in our recommendation section, the choice to open small schools by Sterling Ranch will address prospective parent concerns around safety and facilitate the kind of learning that promotes greater collaboration and community-building.

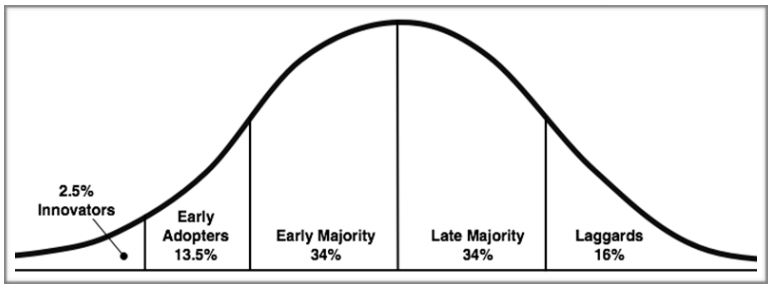
THE DNA OF SCHOOL IMPROVEMENT

Murphy's work (2012) on school improvement is salient in the considerations of successful innovative education practices As evidenced in the distinction between the unsuccessful implementation of the "Fab Lab" at the Gregory School and the successful permeation of innovation throughout other schools and systems, the architecture of education initiatives determines their effectiveness. Murphy outlines that structure does not predict performance, thus a school cannot simply implement a new education approach and hope that it fits and impacts their larger goals. Instead, the schools must first determine their DNA - their core identifying values, principles, and goals - and then build forward from that internal sense of knowing. He goes on to enunciate that context always matters and that cohesion and alignment are essential. These centering structures are evident throughout the models of innovation that consider first their own surroundings, partners, communities, and opportunities and then create thorough, aligned, and impactful forms of innovation.

DIFFUSION OF INNOVATION AND COMMUNITY READINESS

Understanding what is essential for education systems of the future is an important starting point, but in a high choice, market-based education system such as Douglas County, it is crucial that the community chooses to adopt and integrate these innovative concepts.

Figure 6



Rogers Model for the Diffusion of Innovation

Innovative schools in open enrollment systems depend on families deciding to attend them, so it is crucial that Sterling Ranch consider the readiness of their community to adopt these innovative practices.

Rogers's model (2003) for the diffusion of innovation posits that the most important attributes for the adoption of innovation are relative advantage, compatibility, complexity, observability, and trialability. All five of these characteristics are present in Douglas County with regard to innovative practices in education. Many parents already perceive the relative advantage of the existing innovative education practices in the community as evidenced by the large numbers of students attending district schools characterized by their innovative practices. Given this context, there is also an established degree of compatibility: the community has established a value for innovative education practices and they are a core practice of DCSD, so moving toward the next level of innovation is a small step for the region. The existence of these practices also creates a degree of observability, as many of the concepts that are considered innovative are already happening in DCSD, which also lessens their complexity. For example, parents are not likely to resist a thematic school focusing on sustainability if they have already understood, witnessed, and supported a thematic school based on STEM. Many of the shifts and trajectories into education practices aimed at preparing students for a changing world and workplace are already taking place in Douglas County. Their use of personalization, emphasis on 21st century skills and problem solving, and the focus on learning in a globalized world is evidence that DCSD has already taken the lead on many of these forward-thinking education practices. Finally, there is a degree of trialability that is afforded in the high-choice enrollment policies of the district. Parents have the opportunity to send their child to a very innovative school and can easily transfer to another school if that "trial" does not suit their needs and preferences. For these reasons, Sterling Ranch is fertile ground for the further development of innovative, progressive schooling options. The majority of the community expresses affinity for innovation in education and it is likely that the Sterling Ranch community, by extension, would also perceive these practices to be beneficial and desirable for their own children.

Rogers (2003) also notes that interpersonal channels play a critical role in the communication about various innovations, and those interpersonal networks are most effective when they

exist in homophilous communities. People tend to believe and accept the subjective evaluations of people who are most similar to themselves, what Rogers calls "near peers," rather than the perspectives of experts or individuals outside their communities. Parents in the Douglas County community, existing in a largely homogenous and like-minded region, have an abundance of near peers and are already exercising robust interpersonal communication channels to guide and inform their behavior and decisions with regard to school choice. Rogers categorizes "laggards" of innovation adoption as those who are late to an expected response within any social group (2003, p. 281). It might be reasonable to consider that the presence of the core knowledge charter schools, a direct resistance to innovative practices in education, is a representation of technology adoption laggards. Under that framework, it might also be reasonable to predict that families choosing to live in Sterling Ranch, a technologically and environmentally innovative and progressive community, might be more likely classified as innovators or early adopters and more inclined to also participate in innovative education practices.

RECOMMENDATIONS

Education at Sterling Ranch will build upon the outstanding excellent educational practices that Douglas County is already known for: world-class school, highly effective and talented teachers and administrators, and some of the most innovative ideas in education. Schools at Sterling Ranch should address Perkins' "limiting agendas" discussed previously by closing the "relevance gap"; emphasizing important 21st century habits and dispositions through a unique P3BL approach; and engaging students in deeper learning that prioritizes understanding over breadth of content knowledge. None of this need occur at the expense of achievement or college readiness.

One central theme that emerged from our various findings should steer the Sterling Ranch school development process: the culture of choice that pervades the entire county with regards to schooling is a positive empowering phenomenon that Sterling Ranch school developers would be well-advised to build upon. In other words, just as parents throughout the county are disinterested in a one-size-fits-all approach to education, neither will the eventual residents of Sterling Ranch be compelled by a narrow definition of what good education looks like. That said, there are four essential guidelines that we advise the Sterling Ranch school developers to pay close attention to:

RECOMMENDATION #1

We recommend that the first school(s) in the Sterling Ranch Community be public charter schools.

Given the high quality and wide variety of public schools that exist within the school district, very few parents choose to send their children to private

school. As of the writing of this report, around 7% of all school-age children in Douglas County attend private schools. Roughly half of those students are in religious private schools. Consequently, it would not be in Sterling Ranch's best interests to open private schools, at least not in the early phases of the school system. SR has a significant opportunity to offer a different kind of choice, one that capitalizes on both an already-strong interest in innovation, as well the unique features and values of environmental stewardship and smart technology that will characterize the Sterling Ranch community. In the early phases of Sterling Ranch school development, it is highly unlikely that DCSD will open neighborhood schools within the Sterling Ranch community. Given the potential school finance constraints of opening new schools.

RECOMMENDATION #2

We recommend that Sterling Ranch plan small schools that maximize efficient land use, allow for long-term flexible usage, and allow for shared community usage.

A large majority of parents interviewed for this study, along with a high number of survey respondents, expressed a strong preference for schools in which their children would be known well and have a sense of connectedness to their school community. School safety also emerged as a recurring theme throughout the interviews and survey as well as a desire for students to be known well by their teachers. Small schools that include elementary, middle, and high schools, of between 350-500 students each, will address these concerns as well as position Sterling Ranch to respond to a rapidly shifting and unknown future for the educational landscape. Elementary schools should be on the smaller end of this spectrum at no more than 350 students; middle and high schools should serve no more that 500-600. Small schools will have much greater adaptability in terms of future use as opposed to traditional large-school models that are built for upwards of two-three thousand students. If demographics at Sterling Ranch shift in such a way that a small elementary school is no longer relevant, the building can be repurposed as a community center, a home for the elderly, or mixed-use space that is responsive to community needs.

RECOMMENDATION #3

We recommend that Sterling Ranch schools embrace innovative education values and practices that build upon and expand the boundaries of the practices that already exist within the district.

Douglas County School District is engaged in innovation at a high level throughout the district and has created a context that positions the community as ready for the next level of innovation. We recommend that Sterling Ranch capitalize on the context that surrounds them to encourage the next step of adoption for education innovation. We suggest that Sterling Ranch not align with a traditional, core knowledge philosophy that is

prominent in the existing charter school system and to instead embrace progressive and innovative education practices that will mirror the larger values that have guided the development in areas such as technology development, community planning, and sustainability. As evidenced by the successful school models in this study, it is crucial that these values permeate the DNA of the education system and serve as a compass throughout decision making, not just exist as additional or secondary considerations. To that end, we have identified five guiding principles that can guide and inform the planning and development of their work in the education ecosystem.

Guiding Principles for Sterling Ranch Schools

This set of principles will guide the essential qualities of Sterling Ranch school planning and development, but will not serve as a recipe. It will be critical for school founders to maintain deep levels of conviction around programming, authentic relationships with community stakeholders, and high levels of commitment and endurance. Instead, these principles will serve as a framework that allows cohesiveness while also empowering school developers' autonomy within these values. Research indicates that autonomy and creative freedom within a structured framework are two key variables that lead to teacher satisfaction, commitment, and longevity in the field (Pearson & Moomaw, 2005). Taking this research into account will ensure a strong launch for the schools during start-up and optimize chances of success. Informed by the wide range of preferences that exist among parents in Douglas County, as well as among those that completed the survey, we recommend that the following principles, each described in terms of essential qualities, serve as key drivers of Sterling Ranch school development, at least in the initial phases. The educational ecosystem at Sterling Ranch should provide experiences for learners at all age levels that is:

RELEVANT: Learning at Sterling Ranch will not be limited to the various schools and campuses throughout the community. Students will master core academic content that is both relevant to their community and region as well as critical to their success as global citizens. Like the greater Sterling Ranch community, the educational ecosystem will have a strong emphasis on environmental sustainability, allowing students to engage with and learn about the local environment, as well as develop as environmental stewards. School practices that create relevance for students include: community-based learning, fieldwork, and place-based learning

FLEXIBLE: Education is not a one size fits all endeavor. Sterling Ranch schools will provide a wide range of educational opportunities for all types of learners, including internships, blended-learning, job-shadowing, and project-based learning. Elementary school facilities at Sterling Ranch will include flexible

learning spaces that allow for large group and small group breakout spaces as well as technology that facilitates individualized and self-directed learning. Secondary school facilities at Sterling Ranch will accommodate traditional, college preparatory learning as well as hands-on technical training so that students can gain access to a multitude of education pathways geared toward college and career. School practices that create flexibility for students include blended learning, flipped classrooms, results only work environments (ROWE), and 20% time.

INCLUSIVE: All styles of learning will be honored at Sterling Ranch as students develop their "academic mindsets", learn to effectively communicate, and become self-directed learners. Additionally, schools will promote deeper learning outcomes-like critical thinking, communication, problem-solving, communication, collaboration, and persistence. School practices that create inclusivity for students include: a focus on social-emotional learning, student-led conferences, and public presentations of learning.

COLLABORATIVE: Students will gain real-world experience and practical knowledge through various integrative partnerships with the health care, technology, and energy industries. The community will become the textbook, as students study the natural surroundings in nearby state parks, bird sanctuaries, and energy laboratories, as students collaborate various community stakeholders to understand relevant and current issues. School practices that create collaborative opportunities for students include: problem-based learning, place-based learning, and expeditionary learning.

PURPOSEFUL: Sterling Ranch schools will have, at their center, a focus on problem and project-based education that will develop students at all grade levels into thoughtful critical thinkers; innovative problem-solvers; and skilled and responsible users of technology who are well-prepared for college and career. School practices that create a greater sense of purpose for students include: project-based learning, STEAM learning, makerspaces, and internships.

RECOMMENDATION #4

We recommend the Sterling Ranch community emphasize and embrace the unique context of this development through a P3BL signature pedagogical approach.

The P3BL pedagogical approach, envisioned by this research team, brings together project based learning, problem based learning, and place based learning to synergize the instructional excellence of each of these separate models and is responsive to the context of Sterling Ranch. Because of the unique place that is Sterling Ranch, the initial anchor school will, through P3BL, embrace the values of stewardship, social ecology, environmental sustainability, technology

development, and community engagement in its own context.

RECOMMENDATION #5

We recommend that Sterling Ranch conduct a widespread, national search for a school developer through a formal Request for Expression of Interest (RFEI).

This school developer must be responsive to the values of the community; possess a deep grasp of the ideals of the Sterling Ranch development; and have a deep and flexible understanding of the innovative opportunities that currently exist in Douglas County and beyond. This search should occur promptly, so that the eventual school developer(s) have adequate time to get approval for a school charter, assemble a high-quality planning team, and develop meaningful relationships with community stakeholders.

RECOMMENDATION #6

We recommend that Sterling Ranch engage in a series of structured and facilitated community dialogues intended to collaborate with the Highlands Ranch community around principles of school design and community partnerships.

Community support will be essential to the solid foundation of the first school. Given the authentic nature of the proposed curricular foci (project, problem, place), it will be crucial for the founders, educators, and leaders of the school to establish strong and functional relations within Douglas County with community members, business owners, civic leaders, and Douglas County School District educators and administrators. A collaboration between Sterling Ranch and a wide array of community stakeholders will serve a twofold purpose: it will allow Sterling Ranch to show the greater community that it wants to maintain its status as a "good neighbor" in terms of education; and it will provide a venue through which Sterling Ranch can build upon existing and establish new relationships with potential community partners.

The Peabody College Expression of Interest: The Lookout School

In response to these recommendations, we offer a model for Sterling Ranch's initial, anchoring school. This vision is inclusive of the findings, discussion, and recommendations given above and models a possible response to the RFEI process.

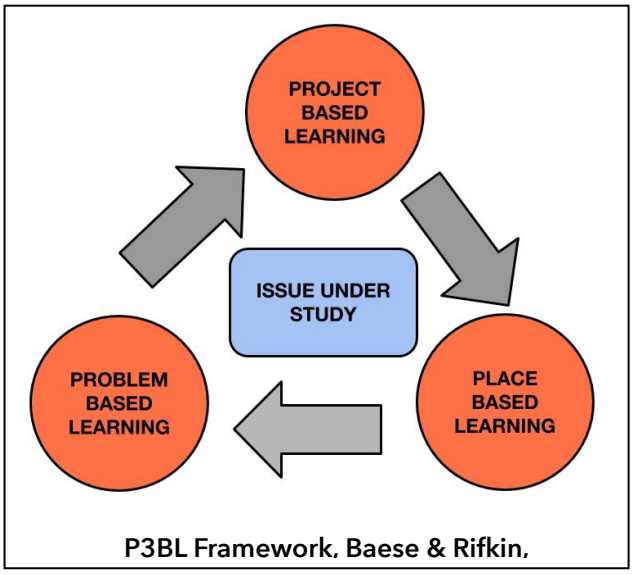
We propose that the first school of the educational ecosystem be a prek-6 school starting with grades preK-3 and growing from there. The ecosystem will ultimately be home to a number of small schools, serving grades K-12, each with its own distinct focus. For example, these broad content areas might include: environment, health and wellness, and smart technology. Eventually, this model would facilitate an approach in which students would be learning core content at their respective "base camp" school, but would be able to learn from teachers and/or take courses at any of the neighboring base camp schools. Additionally, there will be a robust approach to shared facilities that will encourage creative and flexible learning within each school as well as strong community support and engagement.

The flagship school of Sterling Ranch will be called "The Lookout School". This prek-6 school will use the immediate environment as the "textbook" as students learn about the unique ecology, environmental concerns, and innovative problem-solving and ingenuity that is prevalent not only within the Sterling Ranch community, but in the surrounding areas as well. The Lookout School will reflect the unique values and qualities of the surrounding community of Sterling Ranch both architecturally as well as pedagogically. Lookout will serve as a prototype for additional schools including middle and high schools and should, as such, be firmly rooted in the one foundational quality that families in Douglas County have already come to expect: "world class education". The flagship school will serve as a model of the educational design principles that we have outlined above, with a specific emphasis on bringing together place-based, project-based,

EDUCATION AT LOOKOUT

The P3BL framework synthesizes three unique approaches that are commonly found in highly innovative schools: project-based learning, problem-based learning, and place-based learning. Project-based learning, as discussed previously, requires that students produce an authentic response to an issue they are studying. These responses typically go beyond the traditional essay or written analysis and may include physical structures, panel discussions, research symposia, or performances. problem-based learning expects students to solve an actual problem that exists in either their immediate school or local community, or grapple with an issue of national or global concern. And finally, place-based learning positions the local community of the school as the "textbook" and asks students to consider local issues, learn from local experts in various fields, study phenomena that are unique to the region, and collaborate with community partners. In a P3BL approach to learning, students engage in problem solving that has context-specific implications. For example, beginning with place, students at Lookout will be situated within a community that is dedicated to environmental stewardship, that exists within a western context with a long history of concern around water usage. This place-based reality then drives teachers and students to address the problem of water use as they engage in any number of projects designed to address the problem of sustainable water use. Final projects might include a water catchment system that the school uses for its garden; a series of public service announcements (radio or television) designed to inform community members about smart water use; or a digital story project that engages elderly community members as they recall their own memories of the importance of water in their own lives.

Figure 7



P3BL Framework, Baese & Rifkin,

It will be particularly important for students in the early grade-levels at Lookout to have ample learning opportunities and experiences beyond the bounds of environmental studies. While students even as young as 3-4 will gain exposure to age-appropriate environmental science content at their base-camp, they will not be pigeonholed. All students will also have the opportunity to learn at the numerous shared facilities that will be the centerpiece of the educational ecosystem. While students at Lookout will be immersed in

environmental studies, this will not happen at the expense of other critical disciplinary areas, such as the humanities and the arts. Instead, Lookout will provide a solid grounding in environmental studies for students at all grade levels, but will intentionally integrate the arts and humanities throughout all units of study. As discussed in the research findings, many parents interviewed for this project expressed criticism of the narrow approach that is typically found in STEM learning environments. These parents desire more arts integration, an emphasis on social-emotional learning, and greater access to internships and job-based technical skills. Students at Lookout will develop age-appropriate knowledge of specific environmental phenomena and simultaneously gain a multi-disciplinary understanding (through literature, history, and the arts) of how humans have lived in and grappled with the environment. Ricardo Dal Farra, composer and scholar of in the merging fields of arts, sciences and new technologies, sees great potential in arts and science integration and suggests that "The arts could play a major part in promoting awareness around environmental matters" (Dal Farra, 2013).

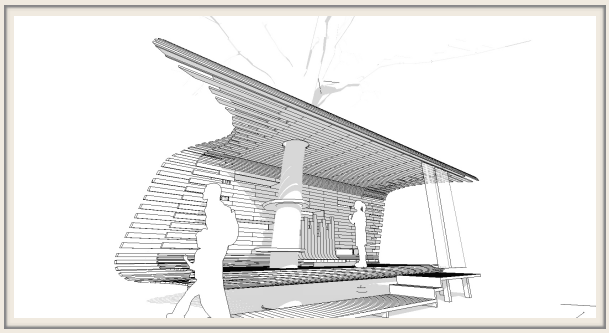
STEAM LEARNING AT LOOKOUT

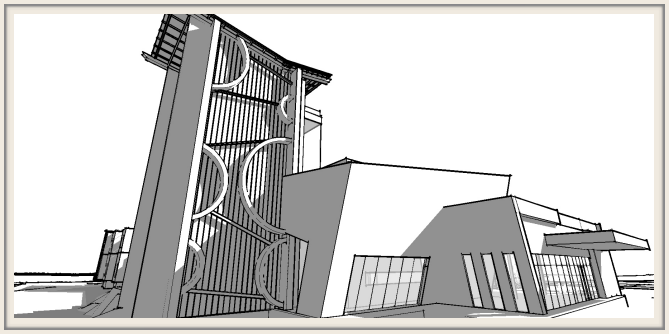
As a means of addressing parent concerns over the narrow effects that STEM learning may have in schools, we suggest that The Lookout School embrace STEAM. Educators and researchers have come to realize that the composite elements of STEAM (science, technology, engineering, arts, mathematics) are powerful tools with which students are able to make sense of their world and experience more relevant, hands-on learning. These tools, of course, mean different things to different people and are often context-specific; STEM in coastal areas will not mean the same as STEM in the desert. In order to avoid using the ambiguous lingo that many STEM schools around the country have adopted, it will be critical for The Lookout School to have a clear and specific approach to STEAM education that is meaningful and relevant to the unique nature of the immediate community. STEAM learning at Lookout will be inspired by the ecological values inherent to the school's mission and curricular framework, as well as be rooted in the underlying principles of problem, project, and place based learning.

SCIENCE

Science at Lookout will be rooted in the Next Generation Science Standards (NGSS). These standards were finalized in 2013 and represent a multi-state effort at codifying essential science standards that prepare students for college and career. NGSS are intended to help students deeply understand core scientific concepts, to understand the scientific process of developing and testing ideas, and to have a greater ability to evaluate scientific evidence. In addition to core disciplinary content strands that will be relevant to Lookout's curriculum (e.g. botany, ecology, astronomy, etc.),

Figures 8





The Lookout School will have architectural features that reflect the place-based nature of the school's curriculum as well as the unique qualities of its immediate surroundings. The treehouse study area, left, provides a quiet space for students seeking a space for focused work. The lookout tower/cistern (right) will serve dual purposes: as a lookout deck for students studying weather patterns, foliage changes, or other natural phenomena; and a rain catchment system that all irrigate the gardens on the school grounds. (Sketches by John Pretwich, PCS Architects, Denver, CO.)

TECHNOLOGY

Most students at Lookout will be residents of Providence Village and, as such, will already be immersed in a home atmosphere that integrates smart technology into everyday life. Students will develop deeper understandings at school about the technology at home that tracks energy and water use. Lookout students will from local experts as they use technology to understand wind and sun energy, storm water quality, and variables that impact snowmelt.

ENGINEERING

NGSS includes a rigorous approach to "cross-cutting" which integrates core discipline areas into science and engineering practices that describe what scientists do to investigate the natural world and what engineers do to design and build systems. Students at Lookout will not only understand the science behind storms and stormwater management; they will have opportunities to design and build stormwater diversion structures. Similarly, students will design and build irrigation systems as well as hiking trails and tree houses.

ARTS

The arts humanities will play a central role in the culture and curriculum of The Lookout School. As students deepen their understanding of the natural world that surrounds them, they will read literature with themes of nature and ecology; learn about historical events of the West; study famous American landscape painters such as Remington and Russell; learn and practice the photographic techniques of Ansel Adams; and design and construct features of their very own campus, such as kinetic wind sculptures, garden plots, and interactive hiking trail signs.

MATHEMATICS

Mathematics at The Lookout School will need to prepare students for college readiness by ensuring a solid foundation of skills and understandings, but it will not stop there. Just as in the other core content areas, mathematics will be approached with rigor and relevance as students develop deep awareness and understanding about the environment that surrounds them. Students will become skilled at data collection, analysis, and presentation; they will learn to calculate square footage and material costs as they design school gardens; they will understand slope and erosion as they collaborate on trail maintenance and stormwater drainage systems.

All of the STEAM elements proposed here will provide students with a deep, relevant, and flexible understanding of core content areas. Furthermore, in order to be as authentic as possible, this approach will necessitate community partnerships. Students will learn from area experts in design, construction, smart technologies, and conservation. These community experts will serve as mentors as students design and execute real solutions to local problems. Consider the following project example of how STEAM learning at Lookout will work.

THE 6TH GRADE TREEHOUSE PROJECT

To illuminate these concepts of project, place, and problem based learning through a STEAM curricular approach, we have outlined the 6th grade culminating treehouse project. As students progress through various other projects during their experiences, they are working toward competencies and skills that will allow them to build a treehouse they can physically construct and leave behind as a legacy of their learning at Lookout. The 6th grade culminating project will serve as an important milestone for students as they enter their secondary school years and will guide students to examine relevant themes of resourcefulness, independence, and relationship to the natural world.

At the heart of the Treehouse Project will be a literary unit on Italo Calvino's The Baron in the Trees (1957). This novel, set in Italy, tells the story of a 12-year old boy who, after refusing to eat his dinner, climbs up a tree and spends the rest of his life in the canopy above his small village. The Baron's choice to leave his home is a means of rejecting the rigid roles and expectations that constrained his life in a royal family. Once the students have had the chance to read and develop a deep understanding of the central themes of the novel, they will turn their attention to the annual 6th Grade Treehouse Project. In teams of 3-4, students will engage in a design process that resembles the one developed by the Stanford d-school and includes five key phases of empathizing with the user, defining a design problem, ideating, and prototyping. Students will apply principles of problem and project-based learning as they collaboratively craft and present their final designs to an advisory group of teachers and community members. This

SHARED FACILITIES at LOOKOUT

DIGITAL ARTS STUDIO complete with state of the art equipment and software that supports graphic design, CAD drawing, animation, web design, etc.

PERFORMING ARTS SPACE with dance studios, musical rehearsal spaces with high-quality acoustics, and a theater large enough for community-wide events.

INTEGRATED TECHNOLOGY SEMINAR ROOM that supports networked learning for teachers as they continuously improve their practices in P3BL as well as students who will be collaborating with peers and experts locally, nationally, and globally as they solve problems and design solutions.

THE HEALTH AND WELLNESS BARN that supports agricultural studies, garden design, planting and harvesting, food science and culinary arts. The Barn also has a kitchen to support farm to table practices for all schools in the ecosystem as well as for the Sterling Ranch community.

ATHLETIC FACILITIES that include sports fields, swimming pools, a boathouse, and a recreational supply space that houses camping and hiking equipment.

FINE ARTS STUDIO that supports non-digital art such as darkroom photography, painting, sculpting, and pottery.

group will ultimately select the winning treehouse which students will, with the help of local architects and construction experts, build on a local trail in Chatfield State Park or on the school grounds.

THE ARCHITECTURE OF LOOKOUT

The physical structure of the Lookout School will serve the key function of being the place where innovative learning is happening. As such, the school will need to be designed in such a way that facilitates learning that is project-based and connected to the environment that makes Douglas County so unique. The following images are the result of a three-day workshop at Harvard's Graduate School of Education titled "LEFT: Learning Environments for Tomorrow" that the research team, along with a Denver-based architect, attended in March, 2017. Each image below is accompanied by annotation that explains how the various architectural features support the educational vision of The Lookout School.

Additionally, given the intense focus on environmental stewardship, energy efficient building materials, and smart technology, the physical structure of The Lookout School offers an excellent opportunity to engage students in thinking about how things work. Christine DeBrot, educational space and furniture designer, says that "making school

infrastructure literally transparent, to display the flows of water, teaches kids the workings of the real world" (Syvertsen & Pigozzi, p.143). In numerous conversations with homebuilders and engineering scholars, the notion of having a Sterling Ranch home serve as a "classroom", with sections of wall removed to reveal insulation and technological features, has been discussed. This idea would be powerfully expanded upon if The Lookout School were to be built in the same manner as the Sterling Ranch homes.

SHARED FACILITIES

The Lookout School will be the flagship school of an eventual "ecosystem" of small schools that share common facilities but maintain unique identities that provide parents and students with clear and distinct choices on one hand, and are tied together with common curricular and pedagogical principles on the other. In 1929, Clarence Perry, mid-20th century American planner, advocated that the best neighborhood plan was one in which schools were located in the center of communities. His reasoning for such placement was to promote schools as the location for community activity, providing opportunities for residents to engage in social, political, and physical activity (Lawhon 2009). As a means of becoming a true community resource that Perry encourages, we recommend that Sterling Ranch school developers, with the help of Sterling Ranch, seek to establish "joint use partnerships" (discussed previously) to develop formal relationships, policies, and procedures to support a functional approach to sharing facilities with the greater community. Schools traditionally struggle with the tension between wanting to provide state-of-the art equipment and technology to students on one hand, and justifying the high-cost and relative low use on the other. Establishing joint use partnerships will alleviate this tension. Moreover, joint partnerships allow schools to offer amenities to community members, thus creating broad-based support for the school. As Rick Dewar, school architect, says "once you past the challenge of realizing that you're going to allow adults to share space with kids, there are endless opportunities." (Syvertsen & Pigozzi, p.117). Not only will the Sterling Ranch schools share certain facilities, but these facilities will also be open to the community to allow for intergenerational and adult learning, and community engagement in the evenings and on weekends.

COMMUNITY ENGAGEMENT

Just as The Lookout School will serve as a model of key educational design principles, the process used to develop such a school will serve as the model for how Sterling Ranch school development will engage the greater community in terms of school design. The joint partnership model discussed above will create shared spaces that benefit the school and community. Additionally, however, Sterling Ranch school developers would be well-advised to engage community members during the planning and design process. Given that

the curricular design principles so heavily rely on relationships with the community, this will be essential. In "The Third Teacher", educational architect John Syvertsen suggests that "those heading up the planning process for a new school will get off on the right foot by inviting every potential user and stakeholder into the process-right from the start"(2010, p. 121).

CONCLUSION

Since the mid 1800s, the west has been identified as a frontier, both literally and figuratively. Colorado, more specifically, is place of invention and innovation. With extreme weather patterns, an arid landscape, and complex water policy issues, Colorado is no stranger to innovating in name of sustainability. And if necessity truly is the mother of invention, here we have a new kind of pressing necessity, which will require us to rethink our educational landscape. A truly sustainable public education system will require visionary school designs and new ways of teaching and learning in order to respond to the rapidly changing global landscape. Sterling Ranch is well-positioned to enter uncharted territory as it engages its surrounding community in a collective conversation around what it means to go to school.

Figure 9. The Lookout Observation Deck

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APPENDIX A: INTERVIEW PROTOCOL

Focus Group Interview Protocol: TIPs Sterling Ranch Project

Introduction:
Thank you for participating in this voluntary focus group discussion regarding your preferences and priorities for student and adult learning at the new Sterling Ranch development in Douglas County. We are conducting research to learn more about your vision of innovative approaches to schooling.

No names will be used when we summarize this discussion; your comments and ideas will not be attributed to you or any individual. We plan to use these discussions to inform the facilities design, curriculum, partnerships and adult learning that will become part of the Sterling Ranch development in the years to come.

We are recording our focus group discussion today so that we can capture the richness and detail of your responses for later transcription and summary analysis in a paper that will be submitted to our project director, Dr. Claire Smrekar of Vanderbilt University. Dr. Smrekar will share the results of these 40 focus group interviews with the Northwest Douglas County Economic Development Corporation officials, who are assisting the Sterling Ranch developers in thinking about community interests and community partnerships. If you have any questions, comments, or concerns at any point, feel free to contact Dr. Smrekar or the Institutional Review Board at Vanderbilt University.

Again, thank you for being here (in a quiet, private meeting room at the employee's workplace). Please know that we can turn off the recorder at any time, if you desire.
We plan to conclude our discussion in about 45 minutes. So, let's begin.

Innovation in Education:
Is there a new approach to education -- perhaps different than what you experienced -- that you have read about or perhaps observed first hand? (e.g., Kahn Academy; micro schools; flipped curriculum; non-traditional classroom without walls; learning labs and project-based; STEM; workplace schools)?
What did you like about this new approach? What did you question about this approach to education? What were your concerns?
What are you concerns about the current, traditional approach to public education? Private schools? Home schooling?
When you think about new schools at Sterling Ranch, and if you were able to design these new schools, what should these schools look like in terms of:
Grade configuration (k-8; k-12; traditional elem; middle; high)
Buildings and classroom space (traditional/non-; labs; shared spaces)
Partnerships with local tech businesses, universities, libraries, museums?

Partnership/internships/apprenticeships?
Theme of energy sustainability?
Adult learning opportunities?
Curriculum? Any particular focus?
Public schools? Preferences?
Private schools? Preferences?
Career-prep? – what does that mean to you?
College readiness? –what does that mean to you?
How should technology be used in schools?
Hours of open space (7-7-7 hours of operation)
Choice in Education: Policies
What are your views on school choice as a policy in Douglas County Schools?
What types of school choices would you support?
Do you prefer charter schools? Traditional public schools? Mix?
How do you view the idea of school vouchers in Colorado?
Choosing Schools: Parents
Did you choose a school for your child(ren) this past year? Will you in the future or will you opt for the assigned school in your area?
What is most important to you when you think about choosing a school? (e.g., curriculum/ quality? teachers? academic reputation? location/proximity to home or work or child care? safety?)
What types of information do you rely upon in selecting a school? What is the most important source of information?

Work, Life & School: Balance
What are your typical hours (day) at work? Flex time?
Do you ever work at home?
How should school hours "fit" with parents' work schedules? What could schools do better?
Do you have any good examples of schools getting it right for parents who work full-time?
How far would you be willing to travel/drive to your child's school?
How far do you travel for work now?
How far do you travel for your children's schooling now?
How do you and your family like to spend your free time/recreation time (outdoor activities; travel; museum/libraries)?

Background Information
How long have you lived in Colorado? In Douglas County?
What is your position at this business? How would you describe what you do?
What educational backgrounds are required for this position?
What work experiences stand out for you as most enjoyable or rewarding?
Would you be interested in a teaching "fellow" role at the new schools at Sterling Ranch?
Would you like to add anything else that we may have missed/of importance to you?

THANK YOU!

APPENDIX B: SURVEY INSTRUMENT & RESULTS

Sterling Ranch Survey & Results

•Q1 - How important are the following practices to encourage student learning in the classroom?

#	Question	Very important	Important	Somewhat important	Not at all important	Total
1	Integrating technology into the classroom	62.64%	27.55%	7.17%	2.64%	265
2	Grouping students within their class by ability (as opposed to grouping all students of all abilities together)	30.94%	30.94%	24.91%	13.21%	265
3	Using real-world problems as the basis for learning in the classroom	52.27%	36.36%	10.61%	0.76%	264
4	Having students complete projects on a regular basis	26.24%	39.16%	28.14%	6.46%	263
5	Emphasizing science, technology, engineering, and math (STEM) education	47.92%	33.96%	14.72%	3.40%	265

•Q2 - Respond to the following statements with the choice that best describes your opinion.

#	Question	Strongly agree	Agree	Disagree	Strongly disagree	Total
1	Schools should teach students "soft skills" such as collaboration, follow-through, and communication.	53.79%	42.05%	3.41%	0.76%	264
2	Students should be prepared for a variety of post-secondary options that are not limited to college.	54.17%	40.91%	4.92%	0.00%	264
3	Students should integrate the use of technology whenever possible.	40.53%	46.97%	10.23%	2.27%	264

4	Schools should emphasize art and music instruction.	48.67%	39.16%	10.27%	1.90%	263
6	Schools should have strong athletic programs and offer a variety of sports with successful teams.	35.11%	50.76%	13.36%	0.76%	262
7	Schools have a responsibility to prepare students for the workplace as well as for college.	67.56%	30.15%	2.29%	0.00%	262
8	I expect my child to go to college.	61.07%	31.68%	6.49%	0.76%	262
5	Schools should offer a variety of extracurricular activities other than sports (drama, debate, band, yearbook, etc.).	69.73%	27.59%	2.68%	0.00%	261
9	Students should learn to work with people from diverse backgrounds.	73.18%	24.14%	1.92%	0.77%	261

•Q3 - What is important to you when choosing a school for your children? OPEN ENDED

•Q4 - When choosing a school, I would like to have:

#	Answer	%	Count
1	2 options	26.98%	68
2	3-5 options	56.75%	143
3	more than 5 options	3.97%	10
4	I have no plans for choosing a school	12.30%	31
	Total	100%	252

•Q5 - Respond to the following statements with the choice that best describes your opinion.

#	Question	Strongly agree	Agree	Disagree	Strongly disagree	Total
1	It does not matter to me whether a school is a district school, charter school, or private school.	19.07%	36.19%	29.57%	15.18%	257
2	It is important to me that my child/children attend a school that is socio-economically diverse.	21.88%	53.13%	21.09%	3.91%	256
3	It is important to me that my children attend a school that is racially or ethnically diverse.	24.61%	49.61%	21.88%	3.91%	256

•Q6 - Respond to the following statements with the choice that best describes your opinion.

#	Question	Strongly agree	Agree	Disagree	Strongly disagree	Total
1	Students should have the opportunity to engage with local community resources, such as parks, industries, businesses, and universities.	55.29%	43.14%	1.57%	0.00%	255
2	I would like my child to complete an internship during high school.	30.20%	47.06%	21.18%	1.57%	255
3	It is important for students to have educational experiences outside of the classroom.	53.73%	43.92%	2.35%	0.00%	255
4	It is important for students to develop a deep understanding of the community in which they live.	35.04%	54.72%	9.45%	0.79%	254

•Q7 - What educational opportunities have you heard about that do not currently exist in your area that you would like to see introduced? OPEN ENDED

•Q8 - Respond to the following statements with the choice that best describes your opinion.

#	Question	Strongly agree	Agree	Disagree	Strongly disagree	Total
1	If it were convenient and safe, I would prefer my child walk to school.	50.60%	44.58 %	4.82%	0.00%	249
2	It is important for schools to be built for environmental sustainability.	42.97%	48.19 %	7.63%	1.20%	249
3	State-of-the-art building facilities are critical to student learning.	18.07%	40.56 %	36.14%	5.22%	249
4	Schools should prioritize hiring high quality teachers above all other considerations.	59.44%	36.55 %	3.61%	0.40%	249
5	Schools should find ways to pay their teachers competitive salaries.	68.95%	29.03 %	2.02%	0.00%	248

•Q10 - What do you value most in a teacher? Choose only two.

#	Answer	%	Count
1	Content knowledge	57.20%	143
2	Caring personality	46.80%	117
3	Communication skills	42.40%	106
4	Creativity and innovation	53.60%	134
	Total	100%	250

•Q11 - Do you live in Douglas County?

#	Answer	%	Count
1	Yes	74.19%	184
2	No	25.81%	64
	Total	100%	248

•Q12 - What is your age?

#	Answer	%	Count
1	Under 18	2.01%	5
2	18 - 24	0.40%	1
3	25 - 34	22.49%	56
4	35 - 44	38.55%	96
5	45 - 54	19.68%	49
6	55 or older	16.87%	42
	Total	100%	249

•Q13 - How many children do you have?

#	Answer	%	Count
1	0	10.04%	25
2	1	18.47%	46
3	2	41.37%	103
4	3	20.88%	52
5	4 or more	9.24%	23
	Total	100%	249

•Q14 - What is the average age of your children?

#	Answer	%	Count
1	0-3 years	16.14%	36
2	4-10 years	41.26%	92
3	11-17 years	23.77%	53
4	18 years or older	18.83%	42
	Total	100%	223

•Q15 - Does your child/children currently attend school?

#	Answer	%	Count
1	Yes	77.03%	171
2	No	22.97%	51
	Total	100%	222

•Q16 - What type of school does your child/children currently attend?

#	Answer	%	Count
1	District	57.07%	109
2	Charter	18.85%	36
3	Private	7.85%	15
4	Other	16.23%	31
	Total	100%	191

APPENDIX D: Request For Expression of Interest (RFEI)

STERLING RANCH EDUCATIONAL ECOSYSTEM REQUEST FOR EXPRESSION OF INTEREST

EXECUTIVE SUMMARY

A state-of-the-art community will require state-of-the-art schools.
Sterling Ranch Development is pleased to invite forward-thinking school developers to participate in the one-of-a-kind, visionary, master-planned community project. Sterling Ranch, a mixed-use, master-planned community, is intentionally designed to cultivate mindful and sustainable uses of natural resources. This new community will offer a highly innovative approach to education that integrates cutting-edge technologies, dynamic community partnerships, and relevant project-based learning. Schools at Sterling Ranch will be more than just buildings; they'll become an integral part of the fabric of the community. Learning facilities will feature advanced instructional amenities and the very best educators, mirroring the thoughtfulness of those who will call this place home. Prospective school developers should have a proven track record in educational settings and a strong interest in exploring new and innovative ways to educate students at all grade levels.

STERLING RANCH

Sterling Ranch is the model for community development of the future. At its completion, nearly 40,000 residents will make their home in this amenity-rich town that has valued and integrated education from its very inception. Shared experiences, intergenerational living, and lifelong learning are signatures of the Sterling Ranch community plan. Pedestrian-friendly planning and design focused on connectivity will offer 30 miles of trails, prolific open space, and access to two state parks and three regional parks.
Nestled at the gateway to the Front Range, this remarkable rolling terrain boasts spectacular views of the mountains and southern foothills and provides a one-of-a-kind backdrop for education that is rooted in the unique qualities of the Sterling Ranch Community. Students will not only be learning about essential elements of environmental stewardship, such as water usage, and clean energy; they'll be living as environmental stewards in homes that are designed to elevate awareness and inform conscientious behavior.

DOUGLAS COUNTY, COLORADO

Douglas County is a unique setting situated just south of the Denver, Colorado area. Nestled below the front range of the Colorado Rocky Mountains, this region is known for its bustling economic and employment growth, an embrace of the active Colorado lifestyle, and a historical commitment to educational excellence.

ECONOMIC GROWTH: One of the fastest growing counties in America, Douglas County is surpassing the national growth rates for population, income, and job creation. However, the number of jobs available in the area currently exceeds the number of residents qualified to fill those jobs. Colorado is in the top five states that have a projected education attainment rate that is lower than what the projected workforce will demand. Local residents and industry leaders are eager to solve this 'Colorado paradox' to ensure the economic viability of the region. Education at Sterling Ranch will play a key role in ensuring that students are prepared for rapidly developing workforce landscape. Students who graduate from the Sterling Ranch educational system will face an employment landscape that requires 21st century skills such as collaboration, critical thinking, and habits of inquiry and analysis, as well as postsecondary education preparedness.

OCCUPATION	2010 jobs	2020 jobs	Growth rate (%)
Managerial and Professional Office	412,150	501,640	22
STEM	152,490	172,560	13
Social Sciences	14,900	18,550	24
Community Services and Arts	131,520	160,860	22
Education	130,010	158,150	22
Healthcare Professional and Technical	106,190	133,130	25
Healthcare Support	48,410	64,790	34
Food and Personal Services	396,600	491,550	24
Sales and Office Support	692,460	780,970	13
Blue Collar	451,590	477,430	6
TOTAL	**2,536,320**	**2,959,620**	**17**

"Job Growth and Education Requirements through 2020" Georgetown Public Policy Institute; Center on Education and the Workforce

EDUCATION LANDSCAPE: Education at Sterling Ranch will take the best of what is already happening in Douglas County and move beyond it to create schools that innovate at unprecedented levels. Douglas County School District serves over 67,000 students and has one of the highest graduation rates in the Denver metro area, with four-year graduation rates having risen steadily from 81.9% in 2009 to 90.0% in 2015. A district-wide open enrollment choice system allows students to choose from a wide array of education options throughout the state, placing "voice and choice" as values that are central to the parents of Douglas County. There are currently sixteen active charter schools in Douglas County, serving approximately 8500 students. The majority of DCSD charter schools emphasize a "core knowledge" approach to education.

	JOB OPENINGS BY OCCUPATION AND EDUCATION LEVEL (IN THOUSANDS)					
OCCUPATION	Less than high school	High school diploma	Some college/ no degree	Associate's degree	Bachelor's degree	Master's degree or better
Managerial and Professional Office	2	14	31	11	73	35
STEM	0	3	9	4	27	14
Social Sciences	0	0	0	0	2	4
Community Services and Arts	0	3	8	3	28	11
Education	0	1	4	2	20	25
Healthcare Professional and Technical	0	1	5	9	15	14
Healthcare Support	1	5	7	5	2	1
Food and Personal Services	25	50	43	13	29	4
Sales and Office Support	10	64	77	23	71	14
Blue Collar	28	60	42	14	14	2
TOTAL	**67**	**201**	**226**	**84**	**282**	**124**

THE COMMUNITY: Local economic growth has led to an enthusiastic and engaged grouping of education partners. Collaboration and cross-industry partnership are a vital part of the area's growth and progress. From industry leaders like Lockheed Martin, Siemens, (bank), and UCHealth Hospitals to leading environmental stewards like National Renewable Energy Lab (NREL) and (water conservation), Sterling Ranch will carry on and deepen the entrepreneurial and community-oriented spirit of the region.

THE RESIDENTS: Home to over 320,000 people, Douglas County is the fastest growing county in Colorado and the 16th fastest growing county in the nation. It ranks 9th in the nation for highest median household income among communities of 65,000 or more. Only 22% of Douglas County residents have lived in their homes for the past 5 years and the median age is 36.9 years. A highly educated community, 97.7% completed high school compared to the 88% national average, and over 56% of residents hold a bachelor's degree or higher compared to 33% nationwide.

THE NATURAL SETTING: Situated at the foot of the Colorado Rocky Mountains, the open plains of Sterling Ranch capture the essence of natural western beauty. This region abuts Colorado's most visited state park, Chatfield, with popular hiking trails, lakes, and open spaces. The area is part of a migration path for herds of elk, home to the (special owl) and rests upon the ancient grounds of the wooly mammoth. These unique, active environments provide a one-of-a-kind living and learning environment for children and families alike.

LOCAL RESOURCES

Like the greater Sterling Ranch community, schools at Sterling Ranch schools will have a strong emphasis on community engagement with, allowing students to learn about the local environment, as well as develop as environmental stewards. With over 30 miles of trails, prolific open space, and access to two state parks and three regional parks, students of all ages at Sterling Ranch will have opportunities to engage with local resources in meaningful ways that are fully integrated into their learning experiences. Sterling Ranch educators and their students will have access to a wide range of natural resources and industry. The Sterling Ranch community's well-established local partnerships will facilitate powerful and innovative teaching and learning Sterling Ranch's proximity to a multitude of recreational and cultural resources will inspire learning that is relevant, engaging, and purposeful for all students,Listed here are just a few:

National Energy Renewable Lab: NREL has a well-established energy education program and works closely with local schools to promote science, technology, engineering, and mathematics (STEM) using renewable energy as the vehicle to capture student interest.

Roxborough State Park: A 3,339-acre Colorado State Park, is known for dramatic red sandstone formations. The park is located in Douglas County 25 miles south of Denver, Colorado. In 1980 it was recognized as a National Natural Landmark because of the number of ecological systems and geological formations. It is also a State Historic Site and National Cultural District because of the number of archaeological sites.

Chatfield State Park: The Audubon Society of Greater Denver operates the Audubon Center at Chatfield State Park, a nature education center that offers classes, workshops and lectures for all ages, with an emphasis on children and families. Over three hundred bird species both migrant and resident frequent Chatfield.

Siemens: Siemens Industry Inc. Building Services, a division of the German industrial technology leader, has a lab nearby dedicated to Sterling Ranch where it researches and develops internet-connected infrastructure products and home automation technologies for Sterling Ranch homes.

Denver Museum of Nature and Science: Located just 25 miles to the north of Sterling Ranch, Denver Museum of Nature and Science offers educational programing and professional development for schools and teachers in the greater Denver area.

EVIDENCE-BASED SCHOOL DESIGN

The core priorities of the Sterling Ranch educational system have been informed by extensive research through a dynamic partnership with Vanderbilt University's Peabody College of Education and Human Development and School of Engineering. This research project has involved acclaimed educational and engineering scholars; students at the doctoral, master's, and undergraduate levels; and a range of industry partners including Siemens, IBM, and Mortenson Construction Co. Extensive community interviews included residents, prospective homebuyers, local educators, industry leaders, and healthcare employees. Community stakeholders expressed that they want educational system at Sterling Ranch to build on and expand beyond the outstanding educational practices that already shape the Douglas County community: world-class schools, highly effective and talented teachers and administrators, and evidence-based effective and innovative educational practices. Through survey data and focus group interviews of Sterling Ranch's target home-buying market,

parents and future parents identified these as some of the top priorities for their children's educational and schooling experiences:

- **Engaging in real-world problems as basis for learning**
- **Opportunities to engage with local community resources (parks, businesses, universities)**
- **Integration of technology in the classroom**
- **Learning to work with people from diverse backgrounds**

Based on community stakeholders educational preferences and priorities, Prospective school developers are strongly encouraged to design schools that support:

PLACE-BASED LEARNING

Students educated at Sterling Ranch will develop a deep understanding of the local context of Douglas County and its unique history, environment, culture, issues, economy, etc. Their experiences as residents of a unique master-planned community will be informed by real, day-to-day experiences.

PROBLEM-BASED LEARNING

Learning at Sterling Ranch will be centered around the unique issues of environmental sustainability that inform the entire master-planned community. Students will have opportunities to study their homes and community in deep and unique ways. As residents of a master-planned community that is informed by sustainable energy use, students will have the opportunity to consider local and global issues around stewardship as they research, design, and develop solutions.

PROJECT-BASED LEARNING

Sterling Ranch students will not simply learn about issues in the theoretical sense, but will gain knowledge and skills by investigating and respond to an authentic, engaging and complex question, problem, or challenge. Students will design and produce projects that are intended to address a multitude of social and environmental issues.

SUBMISSION REQUEST

Expressions of interest should include the following:

- A cover letter expressing interest
- A brief summary (5-page limit) that describes your vision for the school at Sterling Ranch that demonstrates a clear understanding of the values and principles outlined in this RFEI
- Resumes and bios of key school development team member(s)
- Letter(s) of support from community members and educational partners from previous projects