Preparing Students for the Future

Introduction

In 2021, The Ewing Marion Kauffman Foundation conducted a survey to learn about the feelings of adults, employers, and high school students on the future of education and work (Mays, 2021). Results of this survey showed that adults, students, and employers all felt that school could have better prepared them for the workforce and the real world (Mays). Specifically, while 7 out of 10 (70%) students felt that school somewhat prepared them to succeed in college, only 2 out of 10 (20%) felt that school prepared them for real life or the workforce (Mays). These results, as well as societal changes, show a shift in attitudes surrounding which skills are most crucial for future generations to learn. As a result, educators must adapt to the ever-evolving society, and focus on teaching in-demand skills that will prepare students to succeed in higher education, work, and civic life in the 21st century.

Section 1: How Schools are Falling Short

To put it simply, many schools are operating on outdated principles. The "standardized" model of "direct learning" used in most modern mainstream schools was influenced by the first and second Industrial Revolutions, "when the mass production of uniform talent was used to fill repetitive, process-oriented early manufacturing jobs" (World Economic Forum, 2020). Innovation, technology and new models of productivity have vastly changed the skills that are required of individuals to succeed in today's workforce, yet educational models have remained largely unchanged. With "massive shifts in the skills required to contribute to the economy and the ways in which people work," this raises questions "about the adequacy of current education systems in keeping pace with these changes" (World Economic Forum). This section will examine the way that schools are failing to prepare students for today's world, and the future.

Survey Results Show a Lack of Preparation

The Kauffman Foundation's survey results questioned which skills should be taught in high school and college, as well as the value of a college degree (Mays, 2021). While many adults still believe that a college degree is the best path to success, employers "are increasingly looking at credentials other than degrees when making hiring decisions" (Mays). However, employers and adults agree that a "happy medium" would be

attainable if high schools offered more opportunities for students to gain real world skills and experiences (Mays). High schools continue to focus largely on preparing students for standardized tests, but all of the groups surveyed agreed that "students would benefit more from learning 'essential' skills like communication, problem-solving and financial literacy, as well as having internships and projects with employers" (Mays).

Students, adults, and employers also agreed that high schools could do a better job of preparing kids for the real world, by placing an emphasis on soft skills and technical skills that are necessary in the workforce (Mays, 2021). Soft skills, which will be discussed in more detail in section 2, refer to personal attributes that allow someone to effectively interact with others, as well as manage their own emotions and behavior. Some important soft skills include problem-solving, communication, perseverance and emotional intelligence. 78% of employers identified soft skills as "very important for success," while only 60% identified subject-matter knowledge (e.g. reading, writing, math, digital literacy, financial literacy) as very important (Mays). Similarly, 64% of students identified soft skills as very important, while only 50% identified subject-matter knowledge, and 74% of adults identified soft skills, while 67% identified subject-matter knowledge.

Parents report that high school could have better prepared students for life and work by teaching topics like personal finance, taxes, budgeting, and practical skills; 77% of employers believe that high school should focus on real world skills instead of traditional subject matters (Mays, 2021). Test-taking, while emphasized from elementary school through high school, was considered one of the least important skills needed as preparation for the real world by all the groups surveyed (Mays, 2021). These opinions speak to the fact that not every student is college bound and those who are not, are not adequately prepared for the real world.

The Kauffman Foundation's survey results highlight "that there needs to be this practical connection between what and how you are learning when you're in school and what happens when you're not in school . . . that there could be a balance between things that may be applicable to a very narrow number of fields and things that are highly applicable to your life no matter what field you go into or what path you choose" (Klein, 2019). It seems that high school aims to mainly prepare students for the college path, which is not the reality for all students. Individuals end up having to navigate a non-

college bound life "without much of a road map, the kind of road map we've provided around college" (Klein).

Declines in College Enrollment

There has been a significant dip nationwide of high school students enrolling in both two year and four year colleges in the fall following their graduation from high school. The percentage of students enrolling in college went from 70% in 2016 to 63% in 2020 (Marcus, 2022). Some observers theorize that the reasons for the drop include: "the Covid-19 pandemic, a dip in the number of Americans under 18 and a strong labor market sucking young people straight into the workforce" (Marcus). However, these theories don't have a ton of merit. The pandemic definitely exacerbated the drop, but the decrease was happening before then. By the time Covid-19 hit, there were already 2.5 million fewer students at colleges and universities since 2012, and another 1.5 million have dropped since then (Marcus). Further, statistics show that high school graduates are not getting jobs at higher numbers, as "workforce participation for 16-to-24-year-olds" is actually lower than it was before the pandemic hit (Marcus).

So what are the real causes for drops in college enrollment? Focus groups and public opinions suggest that there is "widespread and fast-growing skepticism about the value of a degree, impatience with the time it takes to get one and costs that have finally exceeded many people's ability or willingness to pay" (Marcus, 2022). Many Americans are doubting the need to go to college today. The Strada Education Network reports that less than one in three adults feel that a college degree is worth the cost (Marcus). In addition, recent college graduates are expressing more dissatisfaction with the value of the education that they received. More than 40% of Bachelor's degree holders under the age of 45 years old did not feel "the benefits of their educations exceeded the costs," and only 25% of recent graduates said they'd take the same educational path if they could do it over again (Marcus). The frequent discussions in the media about student loan forgiveness also play a part in the decline, as prospective college students constantly hear about how much adults are paying back for their degrees. Another reason for the decline in college enrollment is that with inflation, college costs have also increased, and people simply cannot afford it. Even with financial aid, "the inflation-adjusted average cost of a four-year college education has more than doubled since 1974," and the cost of a two-year degree is up by 66% (Marcus, 2022).

Post-Graduation Challenges

Completing a K-12 education is just the beginning. Following high school graduation, students will face the challenges of college and/or careers, and the real world in general.

College Prep

XQ Schools (2022) polled over 300 respondents and 60% of students said that they did not feel prepared for college, while 84% of non-students (educators, adults, and parents) did not feel that high school adequately prepares students for college. In 2022, scores of the ACT college admissions test were at their lowest in 30-years. The average ACT composite score for the class of 2022 was 19.8 out of 36, the first time since 1991 that the average score was below 20 (XQ Schools). Further, "an increasing number of high school students failed to meet any of the subject-area benchmarks set by the ACT, meaning they weren't ready for college" (XQ Schools). While these scores might be indicative of a lack of college preparation, they might have also been partially due to interrupted learning due to Covid-19.

Even prior to the pandemic, researchers found a lack of college preparation due to high schools failing to prioritize teaching critical thinking skills that students will need in college, such as "how to analyze texts" or "craft persuasive arguments" (XQ Schools, 2022). XQ Schools also discusses how high schools are falling short in traditional academic areas. Reports show that academic transcripts are an inaccurate measure of what students actually learned because while they "may pass their classes, but they lack the mastery they'll need to tackle complex, college-level work" (XQ Schools).

As discussed earlier, it seems that the goal of high school is mostly to prepare students for college, as real world prep is not the focus; therefore, if that is not happening then the system needs to change. Post secondary school is still important to many students and can aid in finding stable, well-paying jobs. After the recession in 2008, "over 95 percent of jobs created during the recovery went to workers with some college education," which proves the importance of at least some post-secondary education or training (XQ Schools). Considering the economy has suffered some since the Covid-19 pandemic, it is likely that a college education will play a larger role in job security again.

Choosing a Career

Over two-thirds of the students polled by XQ Schools (2022) feel that high school is not preparing them for careers. While that number is high, it was even higher for non-students (adults, parents, educators) at 93% (XQ). Today's students "will graduate into a workforce increasingly characterized by technology and automation," which was further accelerated by the Covid-19 pandemic (XQ). With career fields becoming increasingly automated, soft skills like critical thinking, adaptability, and creativity are more in-demand than ever, but are seldom taught in schools. In fact, a 2022 survey by Manpower Group revealed that 75% of companies "reported talent shortages and difficulty finding in-demand soft skills like creativity and problem-solving" (XQ).

High school students are not given enough opportunities to obtain career and technical skills, which translate into employable skills. A report released by RAND Corp., a nonprofit research organization, emphasized that while the "needs of the workforce have transformed dramatically thanks to technological changes, globalization, and demographic shifts," K-12 schools, colleges, and vocational schools are still mostly using the same strategies that they have for decades (Klein, 2019). Essentially, high schools are not adequately preparing students for the work of the future. High school students are unable to "gain exposure to different career paths and industries, especially in high-growth, high-wage sectors like healthcare and information technology" (XQ). It is important to note that there are some exceptions to this rule, such as career and technical education high schools; these schools specifically focus on preparing students for certain career paths.

Robert Balfanz, professor at John Hopkins School of Education, explains the shortcomings of high schools:

> *The challenge is schools are not designed, nor resourced, nor staffed, to provide things that would help build workplace skills and engineer transfer from other domains—like work-based learning, internships, community service— at a scale where they are normative for all. They are designed to provide this to a few. Success is often defined in improving access from 10 percent of students to 15 percent, which can be reported as a 50 percent increase. (As cited in XQ, 2022)*

Balfanz notes that the concerns about a lack of preparedness for the workforce go back decades. For example, a 1991 report by the U.S. Department of Labor stated that "high

schools need to focus more on thinking skills. It broke these skills down into creative thinking, decision making, problem-solving, seeing things in the mind's eye, and knowing how to learn" (XQ). This same report also discusses the need for personal qualities, or soft skills, like responsibility, self-management, and sociability. To obtain such skills, "high schools need to provide work-based learning, internships, and community service for all students" (XQ). The benefits of teaching students career focused skills expands far beyond the students themselves, also benefiting employers, local economies, and larger society as a whole.

Real World

In addition to taking on college and careers, "high school graduates also have to navigate what it means to be an adult and community member outside of school structures" (XQ, 2022). High school graduates are typically either already legal adults, or almost legal adults, which brings with it additional opportunities and responsibilities. XQ's survey revealed that when respondents were asked to rate on a scale of 1 to 5 how prepared they thought high school made them for the real world, only 30% rated preparedness at a 4 or 5; this was higher than the non-student ratings, in which only 7% rated preparedness at a 4 or 5. Similar to the findings surrounding career readiness, "across the board, there's a disconnect between what students learn in school and the skills and knowledge they'll need to solve challenges in real life" (XQ).

Respondents were also asked to identify which skills were needed for the future and the results, listed in order of greatest importance to least, include: problem-solving & critical thinking; real-life skills; creative, innovative, & independent thinking; collaborating & working with others; communication & working with others; leadership & responsibility; civic engagement & democracy; STEM & digital literacy; a strong academic core (XQ, 2022). XQ reports that problem-solving and critical thinking were selected as the most important by a large margin, and few respondents felt that these topics were taught well in school. Katie Martin, Chief Impact Officer at Learner-Center Collaborative, explained, "We see an increased demand for these skills in the workforce and to be effective citizens in our modern world. Educators often understand the importance and value of these skills, but traditional curricula and pacing in school rarely leave room for actually focusing on them" (as cited in XQ).

Section 1 Key Terms

College and career readiness - A student is prepared to go directly to work or enroll and succeed – without remediation – in a variety of postsecondary institutions so that they are ready to enter a career of their choice (Parent-Teacher Association [PTA], 2023)

College bound - Intending to go to college

Soft skills - Personal attributes that allow someone to effectively interact with others, as well as manage their own emotions and behavior

Section 1 Discussion Questions

1. Do you think your school is doing an adequate job of preparing students for the real world, whether that means college, career, or some other track? What is your school doing well in this preparation and what can they do to improve?

2. Do you think schools should focus mainly on preparing students for college, career, or civic life? Why do you feel this way? Do you think there is a way to achieve a balance of all three?

3. What skills or knowledge do you think are most important for students to obtain at school? Why do you feel this way?

Section 1 Activities

1. Create a survey to distribute to your own students to gauge their feelings on how well-prepared they feel for the real world, or for the "next steps" in their own lives. Share the results with your administrators.

2. Research postsecondary trends in your own district (i.e. the paths students are taking after graduation). Discuss with a colleague if these trends surprise you and what your school can do to improve outcomes.

Section 2: How Schools Can Effectively Prepare Students

Failing to ensure that all students are prepared for college, the workforce, and civic life, has enormous consequences that expand far beyond the struggles of individual

students. This failure has "led to inequitable educational, economic, and civic opportunities that are disproportionately borne by Black, Latinx, and Indigenous students and workers" (Jimenez, 2020). The dropout rates, remediation, and under or unemployment of these minority groups compared to their white peers is disproportionate, and further exacerbates the wealth gap between whites and people of color (Jimenez). The Covid-19 pandemic has only sped up these trends, and "comprehensive recovery will likely be slower for Black, Latinx, and Indigenous students and workers, whose jobs are less likely to offer remote work or employment benefits such as paid family or sick leave" (Jimenez). While there is no easy fix, the only real remediation lies in addressing these systemic shortcomings in the education system.

Schools are in the unique position to close systemic gaps within the education system, and ensure that all students are prepared for a successful future. Jimenez (2020) explains, "From early grades, students are not prepared across a wide range of skills; students are not exposed to a rich set of career preparation activities; and school accountability systems are not oriented around successful career and civic outcomes." However, this is not a lost cause. With some policy shifts and focus on the research, schools can prepare students for the ever changing needs of the future. This section focuses on ways that schools can effectively prepare students for college, career, and civic life.

Cross-Systems Approach

"When students are prepared across a broad range of knowledge, skills, and abilities, they not only get better jobs, but they also engage more actively as citizens—especially in activities such as voting and community participation—which leads to greater voice and influence in society" (Jimenez, 2020). While schools play an important role in instilling such complex skills, schools alone cannot adequately prepare students for all the facets of their adult life. To appropriately prepare students for career and civic life, "it will take resources and knowledge that come from broader parts of the community" (Jimenez). For example, schools can partner with companies in various fields so that "education can more adequately reflect the career preparation and training needed for current and emerging local industries" (Jimenez). Likewise, schools can partner with community organizations to work with students on civic engagement.

Jimenez (2020) explains, "Collaborations must center on preparing students for good jobs—the kind of jobs that afford economic security and participation in civic life as opposed to occupations that require few skills, pay low wages, or are vulnerable to outsourcing." Research shows that individuals with good jobs are also more engaged citizens and "are better able to influence the laws and policies that affect their lives" (Jimenez). The combination of job security and civic engagement builds a more functional and successful society as a whole. Reaching a consensus on the "defining characteristics of good preparation, good jobs, and good citizenship in the 21st century is a critical first step" (Jimenez). While most states have a definition of college and career readiness, most of these descriptions "focus on college readiness, lack sufficient detail to guide daily interactions with students, and are not connected to good future jobs" (Jimenez). Once there is a working definition of the skills necessary to secure good jobs and successfully engage as citizens, schools and local partners can create "structured pathways" for "for students to progress from education to training and, ultimately, careers" (Jimenez).

Early Career & College Pathway Preparation

Research shows that "most schools lack the strategies and resources to expose students to careers and industries, especially in early grades" (Jimenez, 2020). As a result, students enter high school unprepared to pursue their desired postsecondary goals. Likewise, additional factors, such as a student's socioeconomic status, play a bigger role in decision making when there is not sufficient guidance at school (Jimenez). The effort to build stronger postsecondary pathways at earlier grades, particularly in middle school, is not a new initiative. The development of the Common Core State Standards (CCSS) "sought the same goal and improvements to the rigor and quality of academic standards, helping to raise expectations for all students" (Jimenez). However, academics are only one element of college and career readiness. Beginning in late elementary school or at least by middle school, schools can help students to gain skills that are necessary for in-demand jobs, and postsecondary training that they will need to secure such jobs.

Advance CTE and The Association for Career and Technical Education (ACTE) identified specific components that middle schools can implement to create college and career readiness pathways for students. Advance CTE and ACTE suggest that "middle school

should include rigorous academic career readiness standards along with a focus on career and postsecondary education exploration" (Benner & Sargrad, 2020). CTE and ACTE recommend that all middle schools implement the following:

- "Rigorous instruction that ensures readiness and eligibility for high-quality high school coursework

- Counseling and exploration for career pathways and college preparation

- Opportunities for teachers to connect with and learn from industry and secondary postsecondary programs

- Family engagement and frequent information sharing regarding college and career pathways options

- Exposure to role models who deviate from cultural and occupational stereotypes

- Implement Individualized Academic and Career Planning Documents" (Benner & Sargrad)

Rigorous Instructional Coursework

Unfortunately, data shows significant inequities in access to rigorous coursework at the high school level (Benner & Sargrad, 2020). Data shared by the United States Department of Education (DOE) shows that "access to the full range of math and science courses is significantly better for white and Asian American students than for other student subgroups" (Benner & Sargrad). For example, 81% of Asian American students have access to the full range of math and science courses, while only 57% of Black students and 67% of Latino students have the same level of access (Benner & Sargrad). While students might have a lack of access due to restrictions in course offerings within their districts, "insufficient preparation in previous grades may also contribute" (Benner & Sargrad).

A recent analysis by Creating Academic Progress (CAP) showed that "students may struggle to achieve in postsecondary education in part due to inconsistencies between state requirements for a high school diploma and college and career readiness benchmarks" (Benner & Sargrad, 2020). In other words, in some states, high school graduation requirements were not consistent with the state's college coursework

requirements. The study found that "almost every U.S. state failed to meet general college admission coursework requirements in at least one subject area" (Benner & Sargrad). ACTE and Advance CTE both recommend that schools "have a standards-based curriculum that is sequenced to align with credentials of value or postsecondary programs, as well as teachers who have industry-specific knowledge and strong pedagogy" (Benner & Sargrad). As such, middle schools need to prepare students to engage with rigorous coursework and high quality programming in high school. Middle school students "should be performing at or above proficiency in courses that set them up for a high school curriculum and are aligned to postsecondary and career expectations." (Benner & Sargrad). However, data shows that middle schools face similar challenges with rigorous instruction and coursework in preparing students for high school, that high schools face in preparing students for postsecondary outcomes (Benner & Sargrad).

Exploration of Career & College Pathways

Many students enter high school without knowledge of the full range of postsecondary opportunities. Recent data shows that most teenagers in both the United States and worldwide have "relatively constrained expectations about their future careers," with about 46% of teenagers expecting to work in one of the 10 most cited jobs (Benner & Sargrad, 2020). Some of these commonly cited jobs include doctors, lawyers, teachers, police officers, and business managers. Students from disadvantaged backgrounds have "incongruent" career and college goals for themselves, and "a greater percentage of disadvantaged students than advantaged students expect to have a managerial or professional career without completing postsecondary education" (Benner & Sargrad).

Schools can provide "more deliberate" efforts to "broaden students' horizons in middle school" and "can help them set ambitious goals early and with sufficient time to secure their future" (Benner & Sargrad, 2020). On-the-job learning, survey courses, and other "experiential" opportunities are often effective in sparking student interest, but they are not always available to middle school students (Benner & Sargrad). Alternatively, "universal pathways counseling and structured resources to explore available pathways in middle school and beyond can level the playing field and ensure that all students are aware of career pathways, opportunities to access postsecondary credit in high school, and the prerequisites to access any of those programs" (Benner & Sargrad). When students are informed of their postsecondary options early on in their academic careers,

they have time to prepare, enroll in necessary courses, and seek resources that they may need to access these pathways. When a student thinks his only option is to attend a university or try to get a job right out of high school, it can create a grim outlook.

School counselors are an excellent resource to "help guide students to explore what opportunities best meet their interests and goals and develop living, individualized academic and career preparation plans to track their progress" (Benner & Sargrad, 2020). However, there is a nationwide shortage of counselors, leaving districts unable to employ enough counselors to provide individualized counseling to support college and career exploration. In addition, a recent report by the American School Counselor Association and Advance CTE showed that only about ¼ of middle school counselors reported connecting students to career-focused coursework or pathways, and "most counselors report that they need more professional development and resources to effectively support students to explore career possibilities" (Benner & Sargrad).

In addition to counselors being a resource, there are also tools that schools can implement for students to independently explore careers and pathways. Such options, referred to as a "custom-made career awareness and planning tool or platform," are also useful, with "58 percent of the respondents reporting it is effective or extremely effective" (Benner & Sargrad, 2020). Many states have online tools available to schools, so that students and families can go through the information together, and so that it is accessible in the case of remote learning. For example, South Dakota uses an online platform called SDMyLife, which helps students learn about career and college options. One of the tools offered in SDMyLife, as well as other platforms similar to it, "is an individualized career and academic plan that requires students to articulate goals and the steps to successfully reach those goals" (Benner & Sargrad). Although many states require high school students to complete these types of plans, it would be more successful if it were implemented earlier, as to allow students and families time to prepare.

Opportunities for Teachers to Connect with Industry and Postsecondary Programs

Content knowledge is important. "High-quality high school pathways programs have teachers that have a clear understanding of the skills and knowledge they are trying to foster . . . This knowledge helps teachers effectively develop lessons and curriculum that

are aligned to future opportunities and can increase the relevance of the coursework for students" (Benner & Sargrad, 2020). Teachers in middle school should have similar knowledge but since middle schoolers are usually just beginning their exploration, it is "more important for teachers to have a broad understanding of available pathways, future careers, and postsecondary opportunities," than it is to have specific industry knowledge (Benner & Sargrad). Teachers can then use this knowledge to plan lessons or projects with real-world connections, help students explore opportunities, or plan experiential learning.

In order for teachers to gain this type of knowledge, administrators at the building level and district level need to partner with businesses in various industries, as well as postsecondary institutions. Most teachers don't have the individual relationships to form these partnerships on their own. "District or school staff can close these gaps by working with intermediary organizations, workforce boards, or labor market partnerships to develop professional development resources or structured activities" (Benner & Sargrad, 2020). Middle schools can also work with the local high schools to gain some insight into the needs in this area. An independent school district in Texas offers "three-day industry externships" for middle and high school teachers to allow them to gain hands-on industry knowledge (Benner & Sargrad). "The goal is to ensure educators have the opportunity to interact with business partners in specific industries and build strategies to integrate what they learn into their instruction" (Benner & Sargrad).

Family Engagement & Frequent Information

Parents, guardians, and families in general play a big role in exploring careers and academic pathways, so it is pertinent that schools engage with them on this topic. For example, "some high-quality high school pathways are housed in public schools of choice—public schools that require students to apply and admit students by lottery or through admissions requirements," which means that students and families might need to research and apply to several schools to be admitted to one of these programs (Benner & Sargrad, 2020). Likewise, public school choice and lotteries are not always straightforward, and can often be complicated for students. Obviously, having informed guardians will increase the chances of students being able to take part in high quality choice programs. "As a result, strong middle school programs that prepare students for

high-quality pathways should also engage, share options, and provide information with parents and families" (Benner & Sargrad).

Exposure to Diverse Role Models

According to a 2019 report by the Connecticut Learning Alliance, "middle school students are at a critical age to build the foundation for youth occupational identity—goals and expectations for an individual in the workforce" (Benner & Sargrad, 2020). Exposing middle school students to individuals in different professions helps form "youth occupational identity," meaning that they will be more interested in a given field if they have personal experience with people in that career (Benner & Sargrad). Unfortunately, there is still a lack of diversity in prestigious, high-paying jobs, as white people and men are still overrepresented (Benner & Sargrad). For instance, in 2019, of individuals that have architectural and engineering jobs, 77.5% identify as white, and only 16% identify as women (Benner & Sargrad). As such, students of other demographics are less likely to gain exposure to such careers, "particularly if they do not see individuals who look like them in those careers" (Benner & Sargrad).

Schools can expose students to a variation of careers and pathways early on, while they are still forming their own occupational identities. This can happen through work-based learning opportunities, guest speakers, and project based learning (PBL) assignments. If traveling off-campus is not an option or students are learning remotely, there are an abundance of resources for career exploration virtually. Websites like Nearpod and Discovery Education offer virtual field trips for students to explore different careers. Virtual guest speakers are another great option if in-person meetings are not possible. "Whenever possible, schools should work with individuals from various career fields who may challenge common cultural and occupational stereotypes" (Benner & Sargrad, 2020).

Individualized Academic and Career Planning Documents

Benner and Sargrad (2020) recommend that each middle school student has a "living document" for academic and career planning, meaning that this document is continuously updated. Such documents help students, families, teachers, and counselors "clarify goals, identify deficiencies, and make necessary adjustments to academic plans" (Benner & Sargard). Some states require such documents by the end of

eighth grade, but others only require or recommend them during high school. Students and families, with the help from school staff, should revisit the document on a regular basis to reflect ongoing progress and changes in interests. "School districts can help encourage this planning behavior by ensuring that counselors and advisers have capacity to support students, providing professional development to middle school and high school teachers and counselors around these documents, and incorporating their development into the curriculum of core academic courses" (Benner & Sargrad).

Shifting School Models & Learning Experiences

"As globalization and rapid advancements in technology continue to transform civic space and the world of work, education systems have grown increasingly disconnected from the realities and needs of global economies and societies" (World Economic Forum [WEF], 2020). While the world is rapidly changing and societal needs are evolving, school models and learning experiences have remained largely the same. The WEF has identified eight characteristics in learning content and experiences to "define high-quality learning in the Fourth Industrial Revolution -- Education 4.0":

- Global citizenship skills

- Innovative and creativity skills

- Technology skills

- Interpersonal skills

- Personalized and self-paced learning

- Accessible and inclusive learning

- Problem-based and collaborative learning

- Lifelong and student-driven learning

These characteristics are divided into learning content: Global citizenship skills, innovative and creativity skills, technology skills, and interpersonal skills, and learning models: Personalized and self-paced learning, accessible and inclusive learning, problem-based and collaborative learning, and lifelong and student-driven learning. The characteristics identified by the WEF are progressive, creating learning models that are

meant to equip students "with the skills to create a more inclusive, cohesive and productive world."

Learning Content

"Children must be prepared to become both productive contributors of future economies, and responsible and active citizens in future societies" (WEF, 2020). To achieve this vision, WEF identifies four key skill sets that students must obtain: Global citizenship skills, innovative and creativity skills, technology skills, and interpersonal skills.

Global Citizenship Skills

Income inequality has only increased in the last few decades. WEF (2020) explains:

> *With the key drivers—including market concentration, inequality of opportunity, globalization and technological change—seemingly out of the control of individual citizens, these trends have the potential to create a general sense of unfairness and increase social polarization. At the same time, human activity continues to push planetary boundaries, posing further risk to growth and equality.*

As such, children will need to navigate these new challenges, and the changes that society will bring with it in the future. "Children must have the skills to navigate this new context, maintain social cohesion, promote sustainability and be agents of positive change" (WEF). Helping students become citizens that promote a "more cohesive world" will "require school systems to focus on helping children develop a general awareness about the wider world, an understanding of the interconnectedness of global issues, and their duty and agency in playing an active role in the global community" (WEF). Typically, these skills are integrated into already existing curricula, rather than adopting a specific global citizenship program. For example, sustainability can be integrated into a science or technology project, while global awareness can be "fostered by exploring moments in history through the perspectives of different people around the world" (WEF). Students can also learn global citizenship outside of the classroom, volunteering, participating in community service initiatives, or campaigning (WEF).

Technology can play a pivotal role in teaching global citizenship skills. "Virtual classrooms and video conferencing, for example, can connect children from classrooms

in various parts of the world, allowing them to exchange ideas and learn about global challenges through different lenses" (WEF, 2020). Virtual and augmented reality allow for students to visit different parts of the world, and explore new environments that they would otherwise not be able to see.

Innovation and Creativity Skills

On the list of skills and content that teachers need to cover, innovation and creativity do not usually make it to the top. However, both innovation and creativity are increasingly in-demand 21st century skills. First, it's important to define and understand both creativity and innovation skills.

Creativity. "Creativity is the ability to think about a task or a problem in a new or different way or use the imagination to generate new ideas" (Abraham, 2021). Creativity enables individuals to "think critically, solve complex problems or find exciting ways to approach tasks" (Abraham).

Innovation. The concept of innovation can be defined as "the development of the product or practice of new and useful ideas to benefit individuals, teams, organizations or a broader range of society" (Campinas, 2018). Skills that enable innovation include "curiosity, creativity, critical thinking, problem-solving and systems analysis," all of which are predicted to be in high-demand in the workforce in the coming years (WEF, 2020).

Relationship Between Creativity & Innovation. In recent times, researchers have begun to investigate the relationship between creativity and innovation. In the view that defines creativity and innovation as complementary constructs, "innovation involves two stages: the creativity phase (generation of new ideas) and the implementation phase (the succession of creative ideas)" (Campinas, 2018). In this model, creativity is the first step of the problem-solving process, and innovation is more concerned with the implementation of the idea (Campinas). As such, "to productively contribute to a future economy, children must develop the skills necessary to generate new ideas and turn those concepts into viable and adoptable solutions, products and systems" (WEF, 2020).

Fostering Creativity & Innovation Skills. Playful learning lends itself to building innovation skills. "Structured and unstructured play activities enable children to tap into their natural curiosity, learn through trial and error, and explore new solutions to challenges" (WEF, 2020). Because children gain so much valuable experience through

play, learning through play has been a widely adopted model in early childhood education in many parts of the world. Learning through play can also happen in informal settings, such as daycares and at home.

Collaborating with individuals from diverse backgrounds also builds innovation skills. "School enrollment and classroom grouping should consider diversity across a range of factors, including gender, race, ethnicity, ability, sexual orientation and language" (WEF, 2020). People are an invaluable resource, and diverse groupings provide the opportunity for students to learn from people that are different from themselves.

Digital tools can also foster creativity and innovation skills. "Online education and coding games can help facilitate experiences for children that allow them to contextualize learning while channeling their creativity into creating their own online worlds" (WEF, 2020). Applications, including Dassault Systèmes' SOLIDWORKS, "can help children express themselves creatively using design and engineering" (WEF).

The approaches discussed above are not often used in traditional educational environments where students are "passive recipients" (WEF, 2020). "Fostering innovation and creativity will require a shift toward more interactive methods of instruction where teachers serve as facilitators and coaches rather than lecturers" (WEF).

Technology Skills

Technology skills are becoming increasingly important in today's society, in both academia and the workforce. It is important to note that along with the technical skills of technology design and development, it is crucial that children also "understand principles of digital responsibility" (WEF, 2020). "Such a shift in learning content would help children develop healthy relationships with technology, understand principles for managing digital risk and security, and build awareness about their duty as responsible developers and consumers of technology" (WEF). Further, teaching technology skills will help students better adapt to an increasingly automated world.

Teaching Technology Skills. "Teaching methods that leverage computational thinking—combining math, science and digital literacy to help students understand how to approach problems in the way that a computer would—can support the integration of technology skills into school curricula" (WEF, 2020). In other words, school curriculum

does not need to be completely revamped, as it is possible to integrate such skills into existing content areas. For instance, "after learning about climate change, students might use tools such as the Raspberry Pi or Scratch to design a website that increases awareness about this challenge" (WEF, 2020). There is an abundance of school-friendly options that teachers can use for students to build their own websites, including Google Suites. There are also a number of tools, such as CodeAcademy and Code.org, which "offer resources for teaching programming, and help students develop fluency in the use of digital technology by creating unique interactive stories, animations, games, music and art" (WEF).

Business-school collaboration efforts are also a necessary part in implementing a shift toward technology skills, to "ensure that schools have both the infrastructure to enable digital learning and the job market insight into the technology skills that will be most relevant to employment in the future" (WEF, 2020). Many technology companies are already working with schools to bring this shift into fruition. For example, Verizon's Innovative Learning Programme "works with schools across the United States to provide free technology, internet access and a technology-focused curriculum to under-served communities to bridge digital divides" (WEF). Thinktank DQ Institute is also leveraging their resources for this initiative "through their Global Standards for Digital Literacy and the Coalition for Digital Intelligence, which aims to set a global standard for digital intelligence" (WEF).

Soft Skills, Interpersonal Skills & SEL

Although hard skills (writing, math, science) will always have a level of importance in academia and the career worlds, soft-skills have become increasingly desirable as well. Soft skills, transferable skills, 21st century skills, are "character traits, attitudes, and behaviors—rather than technical aptitudes or knowledge," that allow people to "adapt to new jobs, overcome obstacles, develop productive relationships . . . and thrive" in a workplace or educational setting (Appleby, 2018). These are both intrapersonal and interpersonal skills that enable individuals to function successfully. Savitri et al. (2020) iterates James Hekman's theory about the aspects of cognitive and non-cognitive skills, where "cognitive skills are related to thinking skills such as knowledge and understanding, and non-cognitive skills are consisting of personality and social emotional behavior." Current trends in the workforce show an increased desire for individuals to have those non-cognitive skills, such as critical thinking, creative problem

solving, emotional intelligence, and collaboration. As technology continues to automate routine tasks, human-centric skills will provide a distinct advantage over machines in the workplace" (WEF, 2020). The reason for this? To put it simply, at this point, machines cannot yet replicate soft skills. Studies also show that fostering soft skills in children at an early age has a positive impact on individual outcomes besides employment and college, including "higher wages, better health and lower chances of being involved in crime" (WEF). Fostering soft skills also helps children to develop healthy relationships, see different points of view, and respond to adversity in a healthy manner.

Teaching Soft Skills. Soft skills can be "formally taught in courses that focus on social and emotional development or be integrated into existing curricula" (WEF, 2020). For example, an English class can incorporate communication skills by "having students give a persuasive speech in a public setting," or by writing a professional letter to congress (WEF). Soft skills can also be taught informally in a variety of settings and interactions. The Collaborative for Academic, Social and Emotional Learning (CASEL), has the Guide to Schoolwide Social Emotional Learning, which "provides a tool for implementing school-wide social-emotional learning, through interactions with student support services, discipline policies, and community partnerships" (WEF).

Teaching methods that focus on cultural awareness and diversity help children foster interpersonal skills. "Diverse schools enable children to collaborate and interact with people with different perspectives, which can help them exercise more inclusive and empathetic leadership in the future" (WEF, 2020). When students work with other students and teachers that are different from them, it enables them to see that there is more than one way to approach an issue, and that peoples' feelings about topics can differ. Communication technology that can connect classrooms across the world can also aid in this type of learning. For instance, students can deliver persuasive speeches to children in classrooms from another part of the world. "Such an exercise would add an additional layer of complexity to a simple persuasive writing activity, as students will then need to consider the point of view of and influence people outside of their own contexts" (WEF). Similar technologies, such as Google Docs and Google Slides, can also be "powerful collaboration tools," and "can enable students to co-create presentations and projects in a truly global team made up of learners from around the world" (WEF).

"Governments and business can support interpersonal skills development by aligning on and clearly defining the key competencies required for the future of work and the future

of citizenship" (WEF, 2020). Initiatives like the Common Core State Standards (CCSS) propose minimum academic standards that children should meet by each grade; a similar initiative for soft skills would create a roadmap for schools and teachers to introduce and foster soft skills within instruction. Some organizations have attempted this on a smaller scale, including The Skills Builder Partnership, which "enables schools, families and private sector leaders to align on a common framework for building teamwork and leadership skills, with specific activities and milestones for skills mastery" (WEF).

Learning Experiences

Personalized and Self-Paced Learning

"Today's children are growing up in a world of abundant choice and personalized experiences enabled by technology . . . Yet even though children will enter workplaces and have experiences that are more customized and agile than ever, most education systems continue to take a standardized approach to learning" (WEF, 2020). Shifting learning experiences to a more personalized model more closely resembles "the realities of work and life outside of school," and it also has proven to show better student outcomes (WEF). One study showed that personalized learning methods - including "designing individual learning journeys, progression based on skills mastery, and flexible learning environments" - significantly improved student math and reading performance over the course of two years (WED).

Progression Based on Skills Mastery. One major discussion amongst stakeholders in the field of education is implementing competency-based learning models, or progression based on skills mastery, rather than the credit hour. "For more than a century, students' progress toward academic degrees has been broken into 120-hour chunks: the Carnegie unit" (Sparks, 2022). The Carnegie unit (CU) was developed in 1906 by the Carnegie Foundation for the Advancement of Teaching, and is a time-based system meant to keep track of student learning. The Carnegie system "measures how much time students spend directly with a teacher, with a standard unit requiring 7,200 minutes of instruction —an hour each weekday for 24 weeks—to earn one credit in a given subject" (Sparks). However, the Carnegie Foundation has admitted that the CU is outdated and has launched a "decade-long research, practice, and legislative initiative to replace time as

the essential measure of learning" (Sparks). The goal of the initiative is to build a "legitimately outcomes-based system where learning can happen anywhere" (Sparks).

Initially, the CU was created to have "some basic norms and expectations for what would be an adequate amount of schooling prior to applying to postsecondary school or college" (Sparks, 2022). Ultimately, time was an easy and accessible variable to measure. Now, well over 100-years later, the CU has taken over almost every part of schooling: "how schools are organized; how assessment works; what is assessed; what goes on a transcript; what accreditation is; who gets financial aid and who doesn't" (Sparks). However, the latest research in neuroeducation and learning has led experts to believe that the CU is outdated.

Neuroscientists, cognitive psychologists, and learning scientists have shown that "we learn through immersive experience, we learn from mentors, from experts in apprenticeships and internships, and from peers. As individuals, we learn at highly variable rates depending on the subject of study" (Sparks, 2022). In other words, using time to evaluate the appropriate level of learning no longer makes sense. The Carnegie Foundation's initiative is working with "10 of the leading large city [school] systems [to discuss models for mastery-based credits], and the appetite for this kind of work is really significant" (Sparks).

Competency-Based Education. Sudderth (2022) discusses Iowa BG, an XQ high school program where students learn by doing. For instance, "when Cedar Rapids was hit with a derecho—a severe windstorm—that left the community in disarray, students took the opportunity to get involved by creating documentary films about the impact of extreme weather" (Sudderth). This project was done in partnership with the Czech and Slovak Museum and Library. This type of project is common at Iowa BG because the high school is competency-based, rather than time-based. Competency-based education (CBE) is "an approach to education where students progress through learning content and skills based on mastering a defined and transparent set of core competencies, rather than the time they've spent in class" (Sudderth). Organizing classes by competencies allows educators to "integrate the teaching of academics and core life skills such as collaboration and problem-solving, putting the focus on a broader set of outcomes and measuring what students have actually learned" (Sudderth). This approach, which equips students with both academic knowledge and life skills, better prepares them for postsecondary success, whether that includes, college, vocational training, or a career.

CBE experts at the Aurora Institute offer seven components that define a CBE approach:

1. Students are empowered daily to make important decisions about their learning experiences, how they will create and apply knowledge, and how they will demonstrate their learning.

2. Assessment is a meaningful, positive, and empowering learning experience for students that yields timely, relevant, and actionable evidence.

3. Students receive timely, differentiated support based on their individual learning needs.

4. Students progress based on evidence of mastery, not seat time.

5. Students learn actively using different pathways and varied pacing.

6. Strategies to ensure equity for all students are embedded in the culture, structure, and pedagogy of schools and education systems.

7. Rigorous, common expectations for learning (knowledge, skills, and dispositions) are explicit, transparent, measurable, and transferable. (Sudderth, 2022)

All seven elements should be implemented in a competence based model, which also requires "policies, pedagogy, structures, and culture that support every student in developing essential knowledge, skills, and dispositions" (Levine & Patrick, 2019).

Diving deeper into some of these elements, educators often wonder exactly what *meaningful assessments* look like. "Meaningful assessment includes formative feedback that is useful, growth-oriented, and actionable. Educators use data from formative assessments and student feedback in real time to differentiate instruction and provide robust supports so that every student makes progress toward graduation" (Levine & Patrick). Further, both formative and summative assessments should include multiple opportunities and measures for students to show their competency. "Multiple measures include opportunities for authentic, performance-based assessment, allowing students to engage in project-based, community-based, and workplace-based learning that is aligned with required competencies and higher-order skills" (Levine & Patrick).

Different pathways and *varied pacing* refers to the personalized nature of each student's learning experience in a competency based program. "Student pathways are

personalized, reflecting each student's unique needs, strengths, interests, goals, and pace. The order in which students master learning targets both within and across academic disciplines may vary" (Levine & Patrick, 2019). Learning experiences are both formal and informal, and can occur both inside and outside of the classroom. "Rather than coupling the standards with specific ages or grade levels, they are based on learning progressions that provide guidance to students within their zone of proximal development" (Levine & Patrick). Pacing is not uniform like it is in a traditional school. "Varied pacing can mean that students who are proficient in certain standards are encouraged to engage in ways that lead to greater depth of knowledge and multiple ways of demonstrating competency," but it "does not imply that there is a single learning pathway that students simply navigate at different speeds" (Levine & Patrick). Likewise, progress is being continuously monitored so that additional instruction and support can be provided for students who aren't on the trajectory to graduate on time.

Transferable skills refers to those 21st century skills, or soft skills - problem solving, creativity, collaboration - that are so important in today's society, and will probably even more important in the future. "An essential purpose of schooling is to have students develop skills and deep understandings that they can apply or 'transfer' to other academic content areas and interdisciplinary work, as well as to new and unfamiliar contexts beyond the classroom" (Levine & Patrick, 2019). It is not enough to simply have academic skills, and competency based programs focus largely on the soft skills that traditional schools often miss.

So what might a competency based program look like in practice? "Part of what makes competency-based programs so effective is the flexibility they offer to personalize learning for students" (Sudderth, 2022). Because of the flexibility and personalization, no two schools that implement CBE look exactly the same. However, they typically do share some common features, including: Flexibility in student schedules, wide use of project-based learning (PBL), "Culture that prioritizes student voice and student agency as part of student-centered learning," and "Strong mission and culture that unite students and educators in common purpose" (Sudderth). Avalon Charter Schools in St. Paul, MN, is a high school that utilizes CBE. At Avalon High, students have access to a dashboard that shows their learning goals and how close they are to mastery. "Students then work alongside advisors to plan projects, pick classes, and build placed-based learning experiences. As they work, students record their progress towards mastery of competencies" (Sudderth). This aids in teaching them time management, organization,

intrinsic motivation, and self-assessment. CBE also allows students to learn beyond the four walls of a classroom, linking skills to the real world. At Purdue Polytechnic High School in Indianapolis, Indiana, students build competencies through real-world projects (Sudderth). For example, a group of students built and raced electric go-karts, and were involved in the entire process; this included "fundraising, marketing, and hands-on building to make their plan a reality" (Sudderth).

Although CBE does not measure mastery using standardized tests, there are specific procedures to do so. In a CBE setting, mastery means "the level of knowledge or expertise a student needs in order to apply a given skill. In contrast to traditional testing, in competency-based education, assessment not only determines whether students have achieved mastery but also helps them on their path towards doing so" (Sudderth, 2022). This means that assessment should be frequent, formative, standards-based, and collaborative (Sudderth). Assessments should be formative and done frequently, not just at the end of a cycle, so that students and teachers are consistently monitoring progress. This allows students to get feedback, improve their work, and make any changes to their program as they go. Standards-based does not mean that it is aligned to Common Core State Standards (CCSS), but rather that there are clear competencies and standards that the students are working toward. Finally, assessments are done in collaboration with students, where they have a say in how they are being assessed, rather than just handing them a test to take.

Accessible and Inclusive Learning

Even in today's modern and very technological landscape, learning is still inaccessible to many children around the world. More specifically, 258 million school-aged children do not have access to an education (WEF, 2020). Some students experience physical barriers, such as "conflict and lack of basic infrastructure," and in some parts of the world "private education has emerged as an alternative to underperforming public education systems, creating new financial barriers to quality learning" (WEF). Further, even for students who are able to physically attend school, the "standardized approach to learning" may not work for the "estimated 93–150 million children living with disabilities" (WEF). Because education continues to be a key factor in social mobility and well-being, "learning systems must shift toward more accessible, and therefore more inclusive, methods to ensure access to opportunity for everyone" (WEF). Without more accessible and inclusive schools, there will continue to be a rise in inequality. In addition

to creating opportunities for everyone, "increasing accessibility in learning today is a pathway for shaping diverse talent pools in the future. In increasingly innovation-driven economies, diverse talent will have positive implications for innovation and future growth" (WEF, 2020).

Multiple Modalities. Multiple modalities for learning is one of the cornerstones of Universal Design for Learning (UDL), which is "a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn" (CAST, 2018). Therefore, it is no surprise that this is key in creating accessible and inclusive learning experiences. "Multiple modalities for learning—including visual, audial, tactile and kinesthetic methods—can be integrated into existing curricula to help students engage with material in different ways" (WEF, 2020). For example, tools that are geared toward students with special needs, such as "weightest accessories and tactile stimulants," or manipulatives, can be used during lessons, creating optimal learning environments for everyone (WEF). Further, while students with special needs may need manipulatives to learn a mathematical concept, all students still benefit from such hands-on learning. Exposing students to diverse representation in their learning materials, "such as book characters and historical figures, can also make learning more accessible to children of various backgrounds" (WEF).

Technology. Technology, when used properly, can increase accessibility. Text-to-speech technology, for instance, can assist students who are visually impaired, as well as students who struggle with decoding. Digital courses and modules "can have a ground-breaking impact on those without physical access to education by connecting children with teachers and learning resources from other parts of the world" (WEF, 2020). Particularly following the Covid-19 pandemic, we learned that school simply cannot be confined to a school building; now, many schools are offering remote learning options for students who cannot physically attend school. Further, remote learning is no longer limited to discussion boards and reading, as several companies now offer virtual field trips, virtual labs, and other virtual experiences. "EdTech companies such as Labster and Praxilabs, for example, have designed online lab simulation experiences to help teach science subjects in places that may not have access to science facilities'' (WEF).

Partnerships. "Governments and non-profits can work together to shape more inclusive education systems . . . The private sector can also champion inclusive and accessible education systems by providing the necessary physical and digital infrastructure" (WEF,

2020). For example, the South African mobile communications company, Vodacom, provides their customers with an e-school, with self-paced lessons, homework help, and self-assessment tools (WEF). Likewise, IBM partnered with schools in the United States to create the "P-TECH model" for students aged 9-14 years old, which enables "students to earn a high school and two-year post-secondary degree in a STEM (science, technology, engineering and math) field at no cost" (WEF).

Problem-Based and Collaborative Learning

In traditional school models, teachers "impart direct knowledge to students by demonstrating processes and formulas to arrive at one answer. These formulas are memorized, and children imitate these processes to solve other similar problems" (WEF, 2020). This method might work for some subjects and certain students, but it is truly an outdated model. "Today's innovation-driven economy depends on the creation of wholly new ideas, services, products and solutions, and there is no process or formula for doing that . . . Creativity and innovation . . . require individuals to try solutions and iterate based on how well their design addresses the given challenge" (WEF). Oftentimes, this type of practice requires kids to collaborate, try various solutions and designs, and determine what works the best. To support this type of thinking, schools will need to shift from a "process-based" to a "problem-based" learning approach (WEF). Studies show that using a problem-based approach improves students' problem solving skills, and their perception of the learning (WEF). Such collaboration "enables children to feel ownership of their learning and creates a stronger sense of community in the classroom" (WEF).

Problem-based learning can be implemented in classrooms by assigning students "collaborative projects to create solutions to real-world challenges," which requires them "to research the topic and understand the various viewpoints, ideate and design a solution, and then finally develop a prototype" (WEF, 2020). PBL does not need to be based on abstract scenarios, as standard academic content can be taught via PBL as well. For example, when studying cubic volume, a problem-based approach might "ask students to design a container that can hold 25 toys of a certain size and will protect the toys from water damage as they are transported in the snowy season" (WEF). Students would have to research water resistant materials, determine the size of the container, and then decide on the best design for it. Students will solve the same problem but their solutions will look very different from one another, which is the whole idea. "By

presenting the challenge in an open-ended way, children can tap into their creativity and innovation without the pressure of arriving at one single answer" (WEF).

Lifelong and Student-Driven Learning

"While traditional education systems have been designed to decrease learning with age, a new system must emerge whereby people engage in lifelong learning to navigate future job disruptions" (WEF, 2020). This type of vision can only come to fruition if students are instilled with a love of learning at a young age. As such, student choice must be embedded into the school experience. "Notable experts have long-championed student-centered approaches, highlighting that children are naturally inclined to be curious, and student choice helps to activate that natural curiosity" (WEF). Teachers can integrate student choice into their classes by using PBL assignments, choice boards, or even hyperdocs, to allow students some agency in their learning activities. Likewise, teachers can embed opportunities for student choice in how their knowledge is assessed; for example, students can choose between writing an essay, giving a speech, creating a music video, or completing a one pager.

End the Stigma: Vocational Training & Non-Traditional Education

In the United States there is still a stigma surrounding vocational training. "The notion that someone may not attend a four-year university or college program is often looked down upon, with those individuals taking vocational courses being perceived as less "intelligent" than someone earning a bachelor's degree" (Monk, 2018). In America, almost two-thirds of all available jobs require a bachelor's or associate's degree at minimum, "which eliminates career paths for millions of Americans and, quite frankly, is not necessary to succeed in many of today's open jobs" (Hansen, 2021). Still, businesses continue to set the requirement of a four year degree for employment, regardless of whether or not it is actually necessary to perform the job duties. Ultimately, this way of thinking penalizes individuals who followed non-traditional education routes and causes businesses to miss out on "millions of qualified candidates for whom a four-year education in America wasn't attainable" (Hansen).

Despite the stigma, there is a "need for an educated and well-prepared workforce, especially in the rapidly changing tech economy" (Monk, 2018). Further, the demand for professionals, such as electricians, healthcare workers, construction managers, and

mechanics will only continue to increase (Monk). For these reasons, strengthening vocational programs continues to receive bipartisan support (Monk). The "devaluing" of a technical education is most prominent in North America, as countries in Europe, such as Germany and Switzerland, pride themselves on offering quality technical education opportunities (Monk). "In Germany, where a greater percentage of young people opt for non-university post-secondary education, which often includes classroom work alongside apprenticeships, there is much greater respect shown towards these career paths" (Monk).

Devaluing career and technical education has led to underfunding and low enrollment in such programs as well (Monk, 2018). Monk explains, "By characterizing one form of education as inferior and deeming it less useful, we ultimately undervalue the person as well. When white-collar jobs are valued more than blue-collar jobs, we ultimately create greater social divisions." While career and technical education take a brunt of the devaluing, there are college degrees that have stigma attached to them as well. For example, academic areas within the arts are often ridiculed due to a perceived lack of employment opportunities. "By working to end the stigma surrounding certain education paths, namely career education, and by not pushing children, whether overtly or clandestinely, to discount non-college degrees, we can build communities which respect all types of work" (Monk).

Section 2 Keywords

Carnegie Unit - Time based references for measuring educational attainment

Competency-Based Education - An approach to education where students progress through learning content and skills based on mastering a defined and transparent set of core competencies, rather than the time they've spent in class

Problem-Based Learning (PBL) - A student-centered pedagogy in which students learn about a subject through the experience of solving an open-ended problem

Universal Design for Learning (UDL) - A framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn

Section 2 Discussion Questions

1. Why do you think a stigma exists around vocational or technical education? Have you experienced this stigma in your life or in your practice? How can educators combat this stigma?

2. How do you feel about competency-based education versus the traditional credit hour requirements of traditional schools? Which system do you think is more beneficial for students and why?

3. How are soft skills or SEL skills taught at your school? Do you think this approach is effective or is it lacking? How can it be improved?

Section 2 Activities

1. Take an existing lesson plan for your content area (or design a future one if you prefer) and turn it into a problem-based project for your students. *(Remember: The project should solve a problem, require students to think outside the box, and be open-ended, rather than single-answer based)*

2. Research competency-based education and find some schools that utilize this philosophy. Learn about what their days look like and get some ideas for ways that you can implement some of these approaches in your own classroom.

3. Create a Google folder with resources for students surrounding both college and career opportunities in your community. Include options for internships or extracurricular activities as well.

4. Research ways to integrate soft skills and SEL skills into your subject matter. Use an approach that you find in your research in one of your lessons in the following week.

Section 3: Major Research and Outlooks on the Future of Education

The world saw major changes to schooling and education during the Covid-19 pandemic. While most schools have resumed the traditional, in-person, learning that society is used

to, some trends in education continue to shift with technology advancements and changes in societal priorities. This section will look at potential outlooks for the future based on current trends and research in education.

Outlooks for the Future

In 2001, The Organisation for Economic Cooperation and Development (OECD) published "What Schools for the Future?" which examined a set of scenarios for what the future of education might look like in 20-years, and they have recently updated it for 2040 (2020). The OECD emphasizes that the scenarios are not predictions, but rather possibilities "based on extending currently existing trends," which draw on "the original thinking as well as over a decade of CERI work on Trends Shaping Education." The OECD further describes the purpose of looking at scenarios:

> *Scenarios are designed to foster reflection on the possible ways in which the future may differ from our current expectations. These reflections can then be used to gauge our preparedness for the different possible futures, if they were to happen. Imagining multiple scenarios for the future thus recognises that there is not only one pathway into the future, but many.*

The updated scenarios that OECD presents "build on and reframe the ideas of re-schooling and de-schooling . . . the expansion of learning markets, the growing investment and role of digital technologies in connecting people as well as its impact on the personalisation of learning." OECD's four scenarios include: 1) schooling extended, 2) education outsourced, 3) schools as learning hubs, and 4) learn-as-you-go.

Schooling Extended

Goals and Functions

Scenario 1 emulates a continuance of what our current system entails, for the most part. In this scenario, "participation in formal education during the early years of life continues to expand for most individuals. There is widespread recognition of education as a foundation of economic competitiveness . . . Formal certificates continue to be the main passports to economic and social success" (OECD, 2020). In addition, international collaboration and technological advances support more individualised learning," but the structures and main processes of traditional schooling remain the same (OECD). While

diplomas and degrees continue to be lucrative, they are also "increasingly insufficient," which forces individuals to seek out alternative credentials, as well as various informal experiences, to stand out to potential employers (OECD).

Learning

Schools continue to be a bureaucracy in scenario 1. There continues to be a strong focus on curriculum, with many countries using "common curriculum and assessment tools" (OECD, 2020). While the pressure for achieving standards and uniformity is still present, it is also true that "greater choice is granted to students in choosing the content of their learning as long as defined core competencies are achieved" (OECD). Further, there is a continued focus on knowledge and skills, but soft skills and attitudes are emphasized more.

Technology will allow for more flexibility in assessment and reporting. "Continuous analysis of instructional dynamics and evaluating student effort and discipline are possible with learning analytics and facial recognition technology" (OECD). This technology provides instantaneous feedback reported to both students and parents in regard to progress and behavior. Likewise, assessments and instruction are done simultaneously.

Teachers

"In schools, the organisation of instruction and student-teacher relations remains generally impervious to change, although there is room for innovation" (OECD, 2020). While classrooms still operate under an individual adult, there is more flexibility with the use of blended instructional models and the use of technology (OECD). The vision of the OECD is that "a reduced but distinct, well-trained teaching corps remains in charge of designing learning content and activities, which may be then implemented and monitored by educational robots along with other staff employed under diverse working arrangements (voluntary/paid, part-time/full-time, face-to-face or online), or directly by educational software." Essentially, highly trained educators would be in charge of creating and designing the learning experiences, but they wouldn't necessarily be required to implement the lessons. New roles, such as learning data analysts, also play a large role in school districts and other educational jobs.

As digital technology allows students to work more independently on academics, school staff can focus more on students' social-emotional learning (SEL) and motivation. "An emphasis on digital tools impacts traditional teaching, and many tasks for educators in the classroom may become restricted to 'contingency management'" (OECD, 2020). Since the role of educators would look relatively different, professional development would also have to be altered accordingly.

Trends Leading this Way

There are many reasons to believe that there will be a continuation of "massive schooling systems," and "some are economic and practical . . . Some are cultural" (OECD, 2020). Some of the economic and practical implications include schools caring for young children - providing food, supervision, and enrichment - which allows parents to have "both work and family life" (OECD). Some of the cultural ramifications are that "in increasingly diverse societies, schools act as a social fabric, building relationships, bridging inequalities and reproducing social norms" (OECD). Overall, individuals and society as a whole are in no rush to make changes to a system that has been around for so long. Thus, the lack of change can also be "attributed to conservatism and inertia in the system" (OECD).

Another reason for the extension of massive schooling systems "is the continuing reliance on traditional forms of educational attainment by employers (e.g. degrees, reputation of tertiary education and training institutions)" (OECD, 2020). While more employers are beginning to seek soft skills and alternative qualifications, there is still a large emphasis placed on formal education and degrees. There are jobs available for individuals with no education past a high school diploma or equivalent, but the pay is significantly lower than it is for jobs that require additional education. For example, the Bureau of Labor Statistics identified 10 occupations for groups that require high school diplomas or equivalent, Associate's degrees, and Bachelor's degrees that they expect to have openings between 2019 and 2029: The median annual salaries range from $25,280 to $39,080 for jobs that require a high school diploma or equivalent; jobs that require an Associate's Degree, postsecondary nondegree, or some college but no degree have salaries that range from $26,090 to $52,270; jobs that require a Bachelor's degree have salaries that range from $59,670 to all the way to $110,630; jobs that require a Master's or higher have a similar range to the Bachelor's degree category (Torpey, 2020).

Therefore, for now, in order to earn a livable wage, there is still a requirement for higher education.

Education Outsourced

Goals and Functions

In scenario 2, "diverse forms of private and community-based initiatives emerge as an alternative to schooling" (OECD, 2020). Essentially, traditional schooling is no longer the norm, and society is "more directly involved in educating its citizens" (OECD). Schooling and learning become more flexible and there is a significant growth in privatization of education. "Great experimentation in organisational forms takes place, including a mix of home-schooling, tutoring, online learning and community-based teaching and learning" (OECD). In some countries, competition exists between public and private providers, and in others "public provision remains purely a 'remedial solution' that provides parents with free or low-cost child care service and offers children access to learning opportunities and activities to structure their day" (OECD).

As education outsourcing expands, the traditional bureaucratic functions of schools decrease. Different "credentials and indicators of quality" exist, but "private solutions are dependent on how well they meet perceived needs" (OECD, 2020). Further, with additional private options and individualized educational routes, "concerns about growing social fragmentation have become a recurrent issue in politics across countries and a revival of conscription – in this case with civic rather than military purposes – is becoming a common policy response" (OECD).

Learning

"The abandonment of rigid structures of traditional schooling (i.e. year groupings, educational stages) provides learners with greater flexibility to move at their own pace and potentially combine formal learning with other activities" (OECD, 2020). Learning in this scenario is more autonomous and personal choice plays a larger role, particularly as students get older. Students and their families will have more alternatives regarding length, scope, and cost of their education, and such programs will be more adaptive to individual needs (OECD). While this type of learning might become the norm, it is likely that some traditional schools will still exist. "Cultural aspects of traditional schooling

organisation may well survive in this scenario, such as teacher and student roles" (OECD).

Teachers

The teacher workforce looks different in scenario 2, as massive schooling systems are more scarce. "Learning networks bring different human resources together according to perceived needs and as a result traditional conventions, contractual arrangements, and career structures in teaching are rapidly eroded" (OECD, 2020). There will still be a need for educators but such roles will look different than they do in traditional school systems. For example, "there is greater variety of teaching profiles, working arrangements, and professional and reputational status," which results in educators "as independent carers, career advisors, skills market analysts, pedagogy specialists in private platforms or others" (OECD).

Trends Leading this Way

While this scenario might sound outlandish, there are multiple trends that suggest this direction. "New forms of work due to changes in individual preferences, innovations in business models and policy choices lead to increasing experimentation in working arrangements" (OECD, 2020). School and work arrangements made a major shift during the Covid-19 pandemic, allowing for flexible remote options. As many institutions have gone back to a face-to-face model, others have continued to evolve into more hybrid models to fit diverse needs. Further, technology allows for so much digitalization now that schools and workplaces "continue to devote greater attention to well-being," which may result in alternative schooling and work conditions, as well as reduced schedules (OECD).

Scenario 2 utilizes technology to its maximum potential. "Access to information at the touch of a screen allows for teaching and learning without the need of a traditionally qualified teacher," which means that education is no longer limited to a classroom setting (OECD, 2020). Some parents, perhaps informed in the area and with the means to do so, are already dipping into "diverse public and private solutions for the organisation of teaching and learning" (OECD). With increased flexibility and changes in the workforce, these same parents might want their children's education to be based on such private, more progressive, forms of education, rather than traditional structures.

Schools as Learning Hubs

Goals and Functions

In this scenario, the massive schooling system and most of its functions remain as they are. Schools continue to care for children and help them to develop cognitively, emotionally, and socially. However, "diversity and experimentation are the norm," and "opening the 'school walls' connects schools to their communities, favouring ever-changing forms of learning, civic engagement and social innovation" (OECD, 2020). While international and regulated systems are still important in this scenario, local institutions have more power, creating initiatives that they deem important for schools. Schools are considered strong "where intense connections with the community and other local services are developed" (OECD). While school systems no longer depend so much on uniformity, there are cases when "strong pressures for corrective action surface where there is evidence that a particular school is under-performing" (OECD). Although the local institutions play a larger role in these school systems, "regulatory and strategic frameworks (local, national, international) and targeted, pre-distributive investment and technical assistance support the action of local communities, and play a key role within communities with weaker social infrastructure" (OECD).

Learning

Learning is characterized by comprehensiveness, experimentation and diversity. Students can embark on personalized pathways, "strengthened within a general framework of collaborative work, self-evaluation and peer accountability" (OECD, 2020). Grading and tracking practices are no longer used, and the various methods of both teaching and learning are constantly evolving. "Learning is ongoing; it is an all-day activity guided by education professionals, but may not always take place within the confines of classrooms and schools" (OECD). Both formal and informal learning experiences are valued in this scenario.

School activities are designed to expand beyond a classroom, "resulting in flexible structures (physical infrastructure, schedules) to accommodate blended learning activities supported by digital information systems" (OECD, 2020). In this sense, schools are really a learning hub, or the center of an educational ecosystem that expands "across an interconnected network of educational spaces" (OECD). This allows for diverse individuals to play teaching roles, exposing students to a variety of skills, knowledge, and

expertise. The OECD explains, "Learning builds on 'teachable moments' as defined by collective and learner-specific needs and local developments instead of uniform and rigid curricula."

Teachers

In this scenario, teachers "act as engineers of ever-evolving learning activities, and trust in teacher professionalism is high" (OECD, 2020). Teachers must have strong pedagogical knowledge, as well as connections within the multiple networks that schools branch out to. "This scenario is thus driven by a strong emphasis on teacher initial education and professional development, although these may develop in more flexible and collegiate ways than they do today" (OECD).

Schools also utilize non-teaching professionals in teaching roles. "A prominent role for professionals other than teachers, community actors, parents, and others is expected, and indeed, welcomed" (OECD, 2020). Again, this allows for students to be exposed to diverse skill sets, points of view, knowledge, and expertise. Likewise, with a shift from rigid curriculum requirements to more personalized learning pathways, non-teaching professionals might have expertise in areas that can be beneficial to students. Schools will also seek strong partnerships, leveraging the resources of "the resources of external institutions, such as museums, libraries, residential centres, technological hubs and others" (OECD).

Trends Leading this Way

While many employers are still seeking advanced degrees as discussed above, there are many initiatives in place at this time to place more emphasis on other qualifications. There are several global corporations that are already hiring individuals based on specific skill sets that are separate from advanced degrees. Further, "increasing polarization and fragmentation in society has prompted calls for building bridges and strengthening belonging in communities. Reinforcing links between schools and local communities is thus aimed at both enhancing learning and reinforcing social capital" (OECD, 2020).

Many individuals and groups believe that traditional schooling is simply outdated. Today, we have more research on the way people learn, as well as the way the brain takes in and retains information, and the information-overload model of traditional skills is not the most efficient. "Multiple examples exist of more purpose-oriented, horizontal,

collaborative and iterative ways of teaching and learning (e.g. service-learning, citizen science, and more recently Agile methodologies emerging from the 'high tech' sector)" (OECD, 2020). Further, stakeholders are becoming more interested in situated learning, which is a teaching approach that places "students in authentic learning situations where they are actively immersed in an activity while using problem-solving (critical thinking) skills. These opportunities should involve a social community which replicates real world situations" (Northern Illinois University [NIU], 2022). Situated learning activities might include field trips with active participation in unfamiliar situations, cooperative education and internships, music and sports practice emulating the real settings of such events, and laboratories or child-care settings used as classrooms (NIU).

Families of all different backgrounds are growing increasingly dissatisfied with traditional schooling as well. In the past, conservative, white families were the "leaders of opting out of traditional school," in order to educate students in ways that aligned with their religious beliefs (Griffin, 2021). However, in recent times, other groups have also begun taking alternative paths at record numbers. Recent data shows that Black families went from being the least likely group to homeschool their children to the most likely group, increasing from 3.3% to 16.1% in 2020, which is an almost 500% increase (Griffin). There were dramatic growths for other groups as well, including Hispanic families, growing from 6.2% to 12.1%, Asian families growing from 4.9% to 8.8%, and White families growing from 5.7% to 9.7% (Griffin). Overall, prior to the pandemic, about 3.3% of families homeschooled their children, and that number grew to 11% by the fall of 2020 (Griffin). Griffin notes, "These families are not simply doing the Covid-virtual option offered by their public, private, or charter schools — they are withdrawing and disenrolling from those systems altogether." The traditional schooling system is failing to meet the needs of families and children, so guardians are looking for alternative options. It seems that these numbers are only increasing each year.

Learn-As-You-Go

Goals and Functions

The Learn-as-you-go scenario builds on advancements in artificial intelligence (AI), virtual and augmented reality, and the "Internet of Things" (IoT) (OECD, 2020). IoT is "the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices," and is essentially a giant network of things and people

that share data (Clark, 2016). In this scenario, connectivity has changed the way that schooling is accessed. "Education takes place everywhere, anytime. Distinctions between formal and informal learning are no longer valid as society turns itself entirely to the power of the machine" (OECD). Essentially, the traditional schooling system is dismantled in this scenario. Without the distinction between formal and informal schooling, "massive public resources previously devoted to large-scale schooling infrastructure become liberated to serve other purposes or education through other means" (OECD).

Digitalization has "made it possible to assess and certify knowledge, skills and attitudes in a deep and practically instantaneous manner," eliminating the need for educational institutions to certify learning (OECD, 2020). AI is used to connect to the environment "to feed their information systems and propose personalised learning solutions, building on individuals' curiosity and needs, helping to identify knowledge and skills gaps, encouraging creativity and self-expression and connecting learners one another in communities of common purpose" (OECD).

Learning

In this scenario, there may be some remnants of the traditional schooling infrastructure, but there are no requirements when it comes to scheduling or in-person meetings. "Places for learning welcome children on a drop in basis, as do open and private, digital or face-to-face learning communities," but alternative childcare arrangements may be necessary as well (OECD). Here, digitalization and a smart infrastructure replace the security and supervision of a traditional school by creating "safe and learning-rich public and private spaces," and by expanding surveillance systems, using "digitally connected, interactive infrastructure, such as intelligent playgrounds, [which] can now look after children while proposing them with learning activities and fostering behaviours towards the satisfaction of certain goals (e.g. healthy lifestyles)" (OECD).

Teachers

In this scenario, the teaching profession is nonexistent because "rich learning opportunities are available anytime and everywhere and individuals have become prosumers (professional consumers) of their own learning" (OECD, 2020). Still, there might be some classes, lectures, and tutoring options available online and offline, but they will not be the norm.

Trends Leading this Way

While this scenario is futuristic to say the least, there has been "enormous interest and investment in digitalisation and artificial intelligence" (OECD, 2020). Additionally, an increase in machine learning, as well as curiosity to learn from the high tech sector in general has occured. Between investments of time and money into technology and machine learning, as well as the urge to increase efficiency in every facet of life, it does not seem so far-fetched for schooling to take on these characteristics. There are already examples of "learning and skilling" outside of the traditional school happening today, including coding boot camps, unschooling, and various applications offering on-demand courses (OECD). OECD says that "this is a step beyond home education in the sense that children decide what they'd like to learn and when."

This scenario is becoming even more realistic as we are "increasingly embedding technologies in our lives (and our bodies)" (OECD, 2020). An abundance of technology is already used that changes the way people learn, interact, and go about their daily lives. This type of technology includes wearable devices like watches and ear pods, digital personal assistants, and smart toys that interact with other devices that are also connected.

Section 3 Key Terms

<u>Digitalization (in education)</u> - Refers to the use of technology (computers, internet, applications, et cetera) in teaching students of all ages

<u>Internet of Things (IoT)</u> - "The concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The IoT is a giant network of connected things and people – all of which collect and share data about the way they are used and about the environment around them" (Clark, 2016)

<u>Machine Learning</u> - A subfield of AI that describes the capability of a machine to imitate intelligent human behavior.

<u>Unschooling</u> - A form of homeschooling that is less structured and is dictated by the child's interests, rather than guided by state and national standards

<u>Situated Learning</u> - A teaching approach that places "students in authentic learning situations where they are actively immersed in an activity while using problem-solving (critical thinking) skills (NIU, 2022)

Section 3 Discussion Questions

1. Do you think instant access to information and educational content can eventually remove the need for qualified teachers? What aspects of teaching do you think are unable to be replaced by such technology?

2. What forms of collaboration do you think would be beneficial for students in an educational ecosystem? Who would be included in these collaborations and who would lead it?

3. To what extent do you see personalized learning technologies used in the classroom today? Are such technologies truly effective and adaptive to individuals? Do you think technology can be more efficient in personalizing learning plans and content for students than humans? Why or why not?

Section 3 Activities

1. Design a lesson for one of your classes that implements the situated learning approach. If possible, this lesson should cover content and standards that you actually need to cover, but in an immersive way.

2. Research some of the current trends in education in your state. After performing this research, consider which scenario the trends seem to be reflecting.

3. Using an old lesson plan or one that you will use in the future, add a technology element that adds personalization to the learning. Try to complement the tech element with teacher-led personalization as well.

Conclusion

Preparing students for the future does not look the same now than it did in the past, but schooling remains largely unchanged in today's society. With the needs of society and students evolving, the role of schools in preparing students for the future must also

change to meet the demands of today and the future. In examining current trends and potential outlooks in education, schools and teachers alike must adapt their practices to best prepare students to succeed in the 21st century.

Case Study

Mrs. Stone is an 8th grade teacher at Boulder Junior High. Recently, her district released a survey to gauge student and family perception about preparedness for high school and postsecondary options, as well as quality of learning at the middle school level. The results showed unsatisfactory results, with students and parents reporting a lack of knowledge about applications and processes for selective enrollment schools, as well as postsecondary pathways. In addition, students revealed that they have very little information about different career paths and have had little opportunity to explore varied opportunities. Mrs. Stone wants to implement some exploration enhancement activities in her homeroom class, but does not know where to begin. She will network with other professionals who have experience or interest in this area.
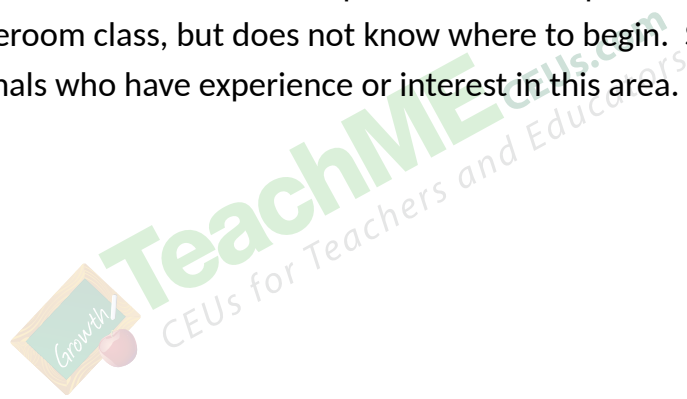
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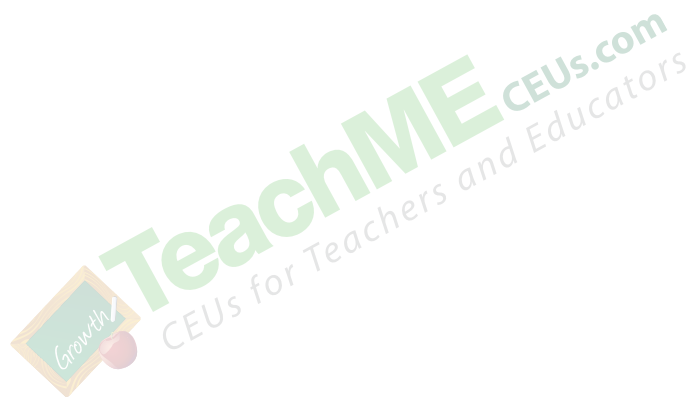Nakano, T. C., & Wechsler, S. M. (2018). Creativity and innovation: Skills for the 21st century. *Estudos de Psicologia* (Campinas), 35(3), 237-246. http://dx.doi.org/10.1590/1982-02752018000300002

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