2021 REPORT

Report on California Community Colleges CTE Programs: Return to In-Person Instruction

June 2021

California Community Colleges Chancellor's Office | Daisy Gonzales, PhD, Acting Chancellor

California
Community
Colleges

October 10, 2021

Dear Colleagues:

As the COVID-19 pandemic continued into fall 2020, we began to capture the new processes and assets that many colleges developed and put in place to ensure continuity of in-person instruction in an effective and safe manner. This report is intended to document best practices to augment emergency preparedness manuals; better prepare for future pandemic recovery and resilience; and capture innovations that could be utilized beyond the pandemic.

For career and technical education program instruction, there is much agreement that many career education courses and program components are appropriately hands-on in nature, and therefore challenging to deliver and support within the online and virtual learning environment entirely. Our colleges should be commended for demonstrating an array of timely and creative strategies and in making the necessary adjustments during the pandemic for safe delivery of in-person instruction.

There are many lessons and practices captured in this report for on-campus in-person instruction under pandemic conditions. This report also includes innovative and notable practices that are worthy of continuing as many restrictions are lifted with California reopening. An extensive appendix is available that includes reference materials submitted by colleges in the spirit of learning and sharing (see editor's note on page 38)

It is important to note California's lifting of some COVID-19 mandates does not mean we have won the fight against the COVID pandemic. With continual high infection rates, spread of the Delta variant and the slowing vaccination demand in the U.S., truly vanquishing the pandemic globally will largely depend on personal responsibility and actions taken to prevent the spread. The new fight against COVID is on the vaccination front, as college leaders wrestle with whether to institute vaccination mandates and policies for their campuses.

While no one knows for sure when the pandemic will end, California community colleges are moving towards fully reopening campuses to the public. It is important to underscore the need to continually adapt in designing flexible program formats, schedules and supports using relevant learning modalities that provide students and

the wider campus community safe learning environments; whether in-person, online or in some other format. Some students thrive with in-person instruction to help bring structure to their lives, particularly incoming high school students. Adult learners, who often juggle work schedules and other life commitments, have different pressures and online learning may be the preferred or only viable option.

At the end of the day, California depends on community colleges to provide the education that helps people gain knowledge, skills and competencies to advance their educational goals and careers, improving their financial health. Everyone stepping foot on campus deserves an environment that is safe and secure, knowing that necessary steps are being taken to prevent the spread and transmission of COVID. Whether fully vaccinated or not, it is expected that some individuals will continue to be anxious and even fearful of environments where they are exposed to large groups of people.

Even as California has returned to more traditional operations, this report may also be useful as a reference in the planning process as colleges consider how best to return to on-site operations, whether fully, phased in or with a hybrid approach.

As you continue to grapple with these issues, please know that the Chancellor's Office will continue to share information and provide guidance as appropriate and applicable. We are all in this together.

Sincerely,

Daisy Gonzales, PhD, Acting Chancellor

REPORT ON CALIFORNIA COMMUNITY COLLEGES CTE PROGRAMS: RETURN TO IN-PERSON INSTRUCTION

June 2021

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I.   EXECUTIVE SUMMARY

This report has been prepared by the American Association of Community Colleges (AACC), in collaboration with the Workforce and Economic Development Division of the California Community Colleges Chancellor's Office (Chancellor's Office), to document the in-person instruction practices developed and implemented by colleges during the pandemic.
The report is intended to provide to assist California community colleges in planning for continuity of instruction when fully returning to in-person instruction for career and technical education (CTE) programs. This report incorporated work AACC created at the outset of the pandemic, which addressed the economics of a mindful return for community college CTE programs, and the limitations of online education for CTE. Additionally, AACC surveyed Chief Instructional Officers across the system, and conducted multiple individual interviews with college leaders, including campus executives, facilities and emergency response staff, and career and technical education deans, from October 2020 to February 2021. Some common struggles and successes as identified across the country by community college CTE programs were also incorporated.

This final report is a synthesis of lessons learned for a mindful return to CTE in-person instruction in an efficient and effective manner, with a focus on safety in the vastly varied, and ever-evolving situation at the time of the writing of the report. It is unquestionable that the future of higher education has changed, and while this report covers the functional realities of community colleges and delivery of instructions under pandemic conditions, considerations for new expectations from students and industry partners should also be top of mind as California, the nation and the world navigate towards what that "new normal" looks like.

The following key points and considerations were taken into account as part of the report:

1. CTE programs are essential to developing and sustaining industry relevant talent pipelines and improving the overall economic resilience of the state. Furthermore, CTE is heavily reliant on in-person instruction, and therefore in-person CTE instruction should be prioritized at community colleges.

2. There is not a one-size-fits-all solution for community colleges to navigate their continuity of operations during the pandemic, and colleges have moved at varying paces during their planning and implementation as the situation has evolved. Now, as the state is re-opening, effective models need to be disseminated and discussed across the state for the colleges to benefit and adjusted where applicable.

3. Diversity, Equity, and Inclusion (DEI) should be at the center of the work that colleges conduct to reopen campuses to the public and CTE programs. The pandemic has exacerbated existing inequalities of opportunity, and underserved communities have been disproportionately affected. Thus, Intentionality on the part of colleges in serving these communities is critical as colleges plan partial or full re-opening, depending on circumstances.

4. Community college students, faculty, staff and administrations have made extraordinary adaptations to continue instruction and learning during a pandemic, and many - if not all - of those adaptations will likely remain in place for some time.

5. The use of technology has increased during the pandemic with the move to online instruction. Some CTE programs have experimented with virtual and augmented reality systems to supplement traditional instructional modalities. These technologies hold great promise for the near future, however current costs, limitations in course materials, technological and connectivity barriers, and the continued need for face-to-face and hands-on instruction in some CTE programs is not likely to enable scaling in the short term.

II. ACKNOWLEDGEMENT AND RECOGNITIONS

The Chancellor's Office would like to acknowledge and thank the following individuals and organizations who took the time to provide thoughtful comments and insights in the creation of this report. The report also incorporates perspectives from individuals at community colleges outside of California, to provide a broader and more comprehensive review of the subject.

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American Association for Community Colleges

The Chancellor's Office would like to thank the team at the American Association for Community Colleges for their work in researching and compiling this report, and for their insights and national perspective on the challenges experienced by community colleges nationally in providing in-person instruction for career and technical education programs under the pandemic conditions.

- Jennifer Worth, Senior Vice President, Workforce and Economic Development

- John Dyer, Director, Workforce and Economic Development

- Katy Nelson, Project Manager, Workforce and Economic Development

The AACC team approached the opportunity to support the California Community Colleges' mindful return to CTE programming by building on AACC's white papers written at the early days of the pandemic, on *Addressing Online Education for CTE/RTI Programs*[i] and *The Economics of a Mindful Return for Community College CTE Programming*. After scanning practices at the system and governance-level as well as course-specific-CTE-level

considerations, several practices emerged as promising, and they have been noted in this document. AACC's perspective about a mindful CTE program delivery reset has also been embedded within each section, for colleges to consider and benefit from the innovations that are worthy of scaling and bring back in-person teaching as quickly and appropriately, as possible. This report is not intended to be comprehensive of all CTE program delivery experiences, rather, it is a synthesis of sampled practices to date.

None of these recommendations are meant to supplant any state, county, local (or otherwise) legal recommendations at your institutions.

III. MINDFUL PRACTICES FOR IN-PERSON CTE INSTRUCTION DURING THE PANDEMIC: LESSONS LEARNED

COVID-19 has taught higher education that the best planning can be upended in an instant, and the ability of institutions to quickly adapt and pivot will need to become a permanent feature. With vaccinations rolling out across the country to millions, and the increasing hope of "returning to normal", higher education is recognizing that it should not look or operate the same as it did prior to the pandemic.

The many lessons that learned about the needs of the most vulnerable students, the sobering digital divide, inequality, and injustice cannot be ignored and must inform our work going forward. In fact, the term "normal" has become relative, and higher education leaders agree that community colleges may return to some "familiar" practices post-pandemic, and a mindful reset of many practices will be required. The urgency to advance our efficiencies in delivering knowledge, skills and competencies, while supporting students in new and more comprehensive approaches is critical to ensuring that no one is left behind for opportunities and economic mobility.

As campuses plan for returning to on-site operations fully or partially, the needs of students, and how best to accommodate their differences in learning styles, individual safety preferences and circumstances is top of mind. For example:

- Some students will prefer full face-to-face instruction, to interact with fellow students and their instructors to maximize their learning. Campuses have been during the pandemic and will need to continue to be accommodating to students, faculty, and staff with responsible safety protocols and practices for face-to-face-instruction in open campus environments.

- Some students will struggle with returning to in-person instruction, for fear of COVID-19 or any other number of issues. This means a course that requires some in-person teaching will need to be scheduled in a manner that accommodates students, faculty, and staff with responsible safety protocols and practices for face-to-face-instruction for essential elements, while the remainder of the instruction stays online.

- Some students will choose not to return to campus in at least the short term, preferring fully online instruction, or perhaps because they are vulnerable medically and/or they care for medically, or otherwise vulnerable, family members, or for other reasons. Online courses, whether synchronous or asynchronous, will continue to be an important option offered to these students.

Students, faculty and staff are likely to experience some level of reentry anxiety. Therefore, it is likely to be most effective for the greatest number of students, community colleges will need to consider planning campus re-opening based on a phased approach that will likely include all of the scenarios outlined above depending on the program in discussion, which means CTE program planning should include:

- permanent all-online CTE courses

- permanent hybrid CTE courses

- in-transition CTE courses with the goal of returning fully in person as soon as possible

Colleges will need to identify solutions that are student-centric, and flexible to accommodate changing norms. As the world and jobs becomes more digital, it is important to consider changing delivery norms as well.

It is expected that students may not need to select a singular modality at the outset of a semester, rather, they may be in-person today, and remote tomorrow, as established by their personal choice and supported by the essential wrap-around services necessary for student success, similar in many ways to the changes with which colleges have been wrestling with in implementing Guided Pathways.

In additional to the necessary student supports and wrap-around services, the intentionality on designing the best journey for each student will continue to be a key focus in returning to full or partial campus operations to the public.

As the colleges moved through the pandemic, these practices became increasingly common and are noted here for consideration.

A. STRATEGIC THINKING FOR LEADERSHIP RESPONSIBLE FOR RETURNING TO ON-SITE OPERATIONS AND RE-OPENING CAMPUSES TO THE PUBLIC

Covid-19, and the precautions required to mitigate its spread, have placed community colleges in the position of having to make difficult choices about moving CTE programs online where possible, and developing alternative strategies for limited face-to-face CTE program delivery where a face-to-face component of instruction is expected, preferred, or mandated. These include a wide range of industry sectors such as health care, manufacturing, construction and the skilled trades, biotechnology, automotive, heavy equipment service and repair, first responders, culinary, cosmetology, and many others.

The adaptations that colleges have had to make in some cases resulted, and continue to result, in significant and sometimes detrimental impacts on the college community, as well as the community at large. Some students have faced delays, interruptions, or a complete halt in their educations and/or their licensure in professional occupations, employers have faced interruptions in their workforce pipelines.

Colleges have made remarkable and unprecedented adjustments to these circumstances, and continue to adapt. In many cases, an entire semester's curriculum was moved online in a matter of days. Remote instruction, once a niche modality, became the norm. Community college faculty worked tirelessly with curriculum developers, IT staff and administration to ensure minimal interruption to students. Faculty modified or created all new course materials, lesson plans, and assessment tools. They did so, in many cases, having never before delivered instruction online and with little to no time to learn how to do so effectively. That the entire system did not collapse is a testament to their commitment to their students, and to the work they did and continue to do.

While some colleges may be able to fully reopen all CTE programs while maintaining compliance with public health directives, many colleges will need to prioritize programs for returning to on-site operational challenges posed by limited resources, physical space limitations, staffing limitations, and most likely, some combination of these factors. In short, a full return to campus is unlikely happen overnight. However, having maintained continuity of in-person instruction for many CTE programs during the pandemic, those experiences can help inform the planning of full campus opening to the public.

By way of example, if the staffing and supplies needed to ensure that all surfaces on a campus touched by people are cleaned at a level consistent with CDC guidelines are finite, colleges may prioritize sanitizing a manufacturing laboratory over a general use lecture classroom, as the latter can be more easily replicated via distance learning than the former. Colleges may also find that there are programs that are assessed to be of lower priority in terms of workforce pipeline demand in the returning to on-site operations continuum and may choose to act accordingly.

No two colleges are exactly alike, nor are the communities they serve. Thus, the internal and external circumstances with which each college is using to inform decisions on which programs to prioritize are equally unique. Colleges should continue to make decisions that prioritize the health and safety of students, faculty, and staff, the needs of the community and region, diversity, equity, and inclusion considerations, and the overall economic wellness of the state. The decision-making process itself is likely to be well served by ensuring that the process is as open and transparent to all affected constituencies as is possible, is data-informed, and takes into consideration relevant regional industries, particularly the growth occupational sectors and economies that will help propel the state in its jobs recovery.

What is clear is that for California's talent pool to be appropriately diverse and robust, CTE courses, particularly those that require face-to-face instruction, must be prioritized, and in this critical moment in which higher education is undoubtedly recognizing an unlikely return to a traditional pre-pandemic model, how CTE is positioned on campuses will chart the course of local economic recovery.

a.   Consulting Public Health Guidance

A list of essential resources which are regularly updated by national and/or global healthcare experts and statewide entities exists and these public health guidelines can be found in Appendix I. This list is by no means exhaustive but offers leaders responsible for returning to on-site operations efforts a fast grounding in the topic of providing safe on campus in-person CTE instruction.

In April 2021, the Chancellor's Office issued a statement urging all California community college students, faculty and staff to get vaccinated against COVID-19. Additionally, as of May 2021, the California Community Colleges General Counsel provided guidance on mandating vaccinations in May 2021 as vaccination authority rests with community college districts. This guidance can be found in Appendix I.a California Community Colleges 2021-01 Advisory - Mandated COVID-19 Vaccinations in California community colleges.

b.   Strategizing with the Emergency Response Team

Every campus has an emergency management team and plans in place to handle scenarios ranging from active shooters to earthquakes. These teams serve as an essential resource that prepared the college to mobilize in an organized fashion to respond to disasters, and more recently, to a global pandemic. In many cases, several of these teams were tested in recent years due to environmental disasters (wildfires, earthquakes) or social risks (political unrest). As an example, Napa Valley College's Emergency Operations Planning team (EOP) pivoted quickly after mobilizing for wildfires to managing the pandemic. The EOP team at Napa Valley College is made up of the college's cabinet, the police chief, head of student health, and representatives from facilities, the campus communications team, technology and financial aid.[ii]

Each emergency response team is generally structured with key individuals (administrator, staff, faculty) tapped to fill specific roles at a community college:

- Incident commander – typically the college president, or someone who reports directly to the president

- Administrative leaders – typically these are individuals who oversee people and pay, so often the human resources executive, and the financial executive

- Logistics leaders – typically these are people who would oversee the physical evacuation of a campus, closing of dorms, etc. They are often vice presidents of student affairs, deans of students, etc.

- Operations leaders – typically these are campus security, healthcare leadership, etc.

- Planning and Communications – typically this is thePublic Information Officer (PIO) who will be tasked with crafting the proper messages in support to the emergency response team and disseminating those messages to the right people at precisely the right times.

New college leaders responsible for returning to on-site operations and opening campuses to the public are encouraged to watch the presentation provided by the Emergency Response Team at Evergreen Valley College.

Of the colleges that participated in interviews, most seemed to be functioning in a hub-and-spoke model with their Emergency Response Teams, meaning that instead of the full Emergency Response Team meeting with all mobilized specialists e.g., public health officials, each unit head brought back and coordinated information for the wider college team. Often, the colleges used their own key staff such as the head of Allied Health or public safety administrator to serve as a liaison to the appropriate external partners. This offered clear and specialized communication with the external partners within the context of practical possibilities of what was both legal and safe. In one case, the local health department official communicated multiple times per week with the college's incident commander, or in some cases, with the head of the health division at the college to help contextualize what the impact might be for returning stakeholders (students, faculty and staff) to the physical campus.

Given the varying infection rates for each California county, the relationship and communications line between the county health executive and the college's key Emergency Response Team were considered essential in the discussions regarding returning to campus.

c.   Communications in a Collectively Bargained Environment

During the pandemic, some California community colleges noted the importance of clear and proactive communication with collective bargaining units. For example, where safety and/or reopening protocols were approved by the emergency response or operations team, communications with union leaders who oversaw the facilities were also included in the process and consulted on issues related to returning CTE programs to face to face instruction on campuses. These relationships and communication chains were also important in ensuring reopening the physical spaces of the campus (e.g. study hall areas). Clear and proactive communications with collective bargaining units can help to ensure that a campus can make, and implement, strategic decisions in a timely fashion, while building trust and cooperation between all constituencies.

For an example of a community college agreement with a faculty association please see:

- Appendix II.f. iv. Memorandum of Understanding between Napa Valley Community College District and Napa Valley College Faculty Association

d.   Strategies to Effectively and Judiciously Communicate with Stakeholders

Initially, colleges struggled with the volume with which to provide information to stakeholders. Too much information could overwhelm some, while too little did not instill a sense of trust when people were assessing the risks of returning to campus. The following two complementary strategies:

i.   Return-to-Campus Plan Transparency

Community colleges documented and made widely available their detailed return-to-campus plans for all programs for stakeholders who sought detailed information. These plans varied in form and outline but created clear expectations which built trust by the stakeholders. At a minimum, these plans addressed when and how on-campus instruction and activities would occur. As they can be narrowly tailored to an internal audience e.g., students, faculty and staff, or can be more broadly addressed to the entire on and off-campus ecosystem, including partner organizations. Colleges considered the appropriate level of detail to share with the campus and stakeholders to build similar trust. While highly detailed justifications and specific adaptations of program delivery vary across institutions, what seems to be a common practice is to document essential details such as daily schedule specifics, class logistics (location, date/times, maximum size of students), campus entry/exit protocols for arrival inclusive of parking or bus transport, movement on campus during the course, assessment expectations, behavioral or physical space modifications for consideration by faculty and students, personnel details, workspace assessments/confines, interaction elements (waiting areas, other student interaction moments), traffic patterns, clear signage around the facilities, break protocols (restrooms), air flow and ventilation, and sanitation protocols before, during, and post-class.

Several colleges generated a "Safe Return to Campus Plan" which called out general risk mitigations, employee training, health screening procedures, cleaning and disinfecting guidelines, as well as physical distancing and face covering requirements. Many of these plans embedded lab and on-the-ground social distancing guidelines and/or protocols.

For examples of California community college return to campus plans please see:

- Appendix II.c.i Siskiyous COVID-19 Mitigation, Implementation and Response Plan

- Appendix II.d.i Hartnell College's Pandemic Response Plan

- Appendix II.e.i Moreno Valley College's Fall 2021 Safe Reopening Report

- Appendix II.h.i Santa Rosa Junior College's Reopening Plan

- Appendix II.i.i Sierra College's Safe return to Campus Plan

- Appendix II.k.i Solano Community College's COVID-19 Prevention and Response Plan

- Appendix II.k.i Ventura College's Reopening Plan

- Appendix II.l.i Yuba Community College's Draft Reopening Plan

Multiple colleges noted that they were strained by the protocols of reporting positive cases and the constantly changing environments of their local rates of infection during their attempts to reopen the campus. Many colleges noted that having exceptionally strong definitions of "close contact" (all must wear a mask, when closer than 6 feet apart and not for more than 15 minutes at a time) and clearly articulated policy around reporting positive case experiences, drastically reduced that pressure on faculty and administrators.

ii.   Managed Volume and Pace of Physical and Electronic Communication

Colleges noted that the volume and pace of physical signage and electronic communication became overwhelming to many stakeholders, so the most efficient strategies was to provide all relevant information on a centralized site for those who sought it.

Targeted information and just-in-time communications to student regarding individual classes was more effective than mass communication. For example, if communications are going out to a returning cohort of students related to HVAC, construction, and culinary, the messaging should be customized to each cohort (three separate messages) with logistical protocols, dates and timing, material needs, and instructor messages about what to expect, specific to each course versus one generic message to all CTE students. The approach of keeping communications at the classroom level and customizing the message with key relevant information conveyed that the institution cared, and build students' confidence in the institution.

At the broader messaging level, colleges protocols were communicated and accessible via a centralized site which allowed stakeholders seeking the most reliable and current information to access the information on demand. Colleges also advised that critical communications be coordinated with the college's legal team to consider waivers of institutional liability and/or acknowledgements of risk.

In every communication, consistent content included the campus expectations on the following:

- Policies around mask usage in all formats, ideally with samples on what the visual signage, verbal phrasing and written instructions will be so that all stakeholders will have standardized expectations.

- Policies around vaccination requirements, which have been determined to be the responsibility of each college district.

- The use of regular temperature checks and/or QR code "check-ins" for each entry on campus as well as the establishment of potential no-reentry policies without going through all safety protocols.

- Stakeholder responsibility for their own health, and consideration for the health of their fellow campus-attending colleagues, to encourage a shared responsibility for the well-being of the campus community.

For examples of college health screening questionnaires, campus signage and email please see:

- Appendix II.d.ii & iii Hartnell College's Health Screening Questionnaire and Instructions for Use of Facilities

- Appendix II.f.iii Napa Valley College's Sample community awareness emails

- Appendix II.l.iii & iv Yuba Community College District's Face Coverings and Screening Questions Posters

e.   Revisions to Critical Campus Functions and Common Safe Practices

During the pandemic, colleges offered more flexibility for allowing students to access services and complete tasks on campus where appropriate.

i.   Class Registration

Drive-through registrations became a common strategy in which, after passing a healthcare screening entry point, students entered the campus parking lots which were set up with stations. Students went from station to station in their cars to complete all the tasks previously completed in a building. In other cases, colleges established online registration but instead of allowing a narrow window of a few days an specific hours during those few days, both the number of days and the range of hours were increased to allow more opportunities for students to register. In the case of online registration, many colleges also expanded the technical support hours provided to students to include late night. These practices were designed to accommodate those who were juggling multiple responsibilities the greatest opportunity to re-engage with the college, and return to their CTE studies.

ii.　Textbook and Course Material Distribution

Colleges campus bookstores offered low-touch or contactless options where students placed orders for books electronically and were given appointment windows for pick-up in order to ensure adherence to space and campus capacity limitations for social distancing and safety. Some colleges developed completely contactless systems for textbook, class tool and material, and even food pantry delivery by using a locker system, where students electronically placed orders, and then faculty or staff prepared packages that were placed into code-locked boxes or lockers for pickup. Between students, any high-touch surfaces were sanitized in preparation for the next pick-up. Whenever possible, colleges utilized open educational resources to limit the number of physical items students needed to touch. This approach has the added benefit of reducing expenses for students as well.

iii.　Tracking Student Movement and Low-Contact Supports

The purpose for tracking students was to 1) support contact tracing activities, as well as 2) to protect the health of on-site staff by limiting face-to-face contact when such contact was not essential. In one example, a college utilized a "Robot Greeter" that campus visitors encountered when entering campus at restricted entry points. In this case, the college set up a mobile video monitor manned by a campus representative as the first point of contact with the visitor (similar to a video chat) in real-time as a safe way to serve students on-site. During the pandemic, many colleges used phone-based applications to track the movement of anyone on campus. This was accomplished by requiring individuals to scan QR Codes on each entry door through which they passed while on campus. It should be noted that any policy that requires downloaded mobile applications assumes a certain level of technology access, and therefore considerations should be made for alternative options for students or community members without access to technology in moving about campus, which may include personnel being available for such situation.

iv.　Common Area Usage and Traffic Flow

During the pandemic, several colleges noted that unstructured and free-flowing entry for common spaces might be unpractical or improbable in the long term once more students return to campus. Strategies considered for usage included staggering facility usage that is course-specific or timed-entry scheduling of course. Some colleges are fortunate to be in climates where outdoor space can be utilized for much of the year. While colleges are encouraged to utilize these outdoor and non-traditional spaces in as many disciplines as possible, it is important to remember that these flexibilities and freedoms do not come without the same amount of planning needed for traffic flow, ensuring social distancing, headcount, staggered scheduling, and use of communal spaces such as the restrooms, vending machines, and/or water fountains/refilling stations.

Cafeteria

Most colleges initially closed their cafeterias, which limited the physical gathering of groups of students during non-course-specific time. However, for many community college students, discretionary income or transportation limitations to allow them to go off campus and buy a lunch may not be a possibility, and many students packed their own bagged meal to consume

during moments of free time. To accommodate this, tables were positioned in ventilated areas with tables positioned and facing in the same direction to allow social distancing while also retaining a sense of community while also allowing for some privacy. Having the ability to speak to one another in a social moment during these necessary breaks is helpful for the camaraderie of the students.

Library

Much like the bookstores, the library practices were edited initially, but resumed through staff support where material selection and positioning at an appropriate pickup location was made possible. In some instances, the physical space of the library was used as an overflow area for technical courses which had been limited by social distancing requirements.

Parking Lots with Hot-Spots

During the pandemic, parking lots were frequently used to provide Wi-Fi to students who needed it. While this was most often made available in rural communities, this practices was also necessary to support students in urban and suburban areas. These parking lot spaces (within the span of the college's internet signal) were invaluable to support teaching and learning and afforded the student the choice to do their studying at the college albeit it may be so while sitting in their parked vehicles. Some colleges also created structures over these uncovered parking lots like pergolas for a rather limited cost to the college, which gave the student a covered space under which they could work with more comfort. Some students traveled to the campus with their children who might be in the car playing on their own handheld devices, or doing their own online schooling, while the student did their own course work.

f.   Incorporating Diversity, Equity, and Inclusion

As colleges are planning full reopening to the public, the campus return plans includes consideration of practices through the lens of Diversity, Equity, and Inclusion (DEI). Among the many examples, how reduced traffic flow would affect students with mobility issues, mask requirements for students who read lips, and cultural considerations for students who would traditionally not have a person of the opposite gender come in close physical proximity to take their temperature, are a few to note. Colleges must remain attuned to how policies affect the historically underserved communities, and integration of support available to students facing food and housing insecurity, as well as mental health needs. Many college leaders have been holding courageous and honest discussions with each other and students during the year of remote learning to be much more mindful about increasing awareness, instituting practices, and taking action to ensure the goal of "success for all" truly means "all" students.

i.   California Community Colleges Accessibility Standard

Information about the California Community Colleges Accessibility Standard can be found on the Accessiblity Center website. From board policies to web accessibility guidelines, all leaders seeking to create an inclusive environment are strongly encouraged to review this guidance on inclusion expectations.

ii.   DEI and Health Screening

During the pandemic, many colleges utilized downloaded mobile apps that subject individuals coming onto campuses with short questionnaires, primarily to confirm their lack of symptoms, and known virus exposures. As with use of mobile apps for tracking campus movements, considerations must be made for students and other individuals without access to technology, and workarounds should be designed to avoid situations where students feel singled out.

Many colleges instituted physical health screening upon campus entry, including temperature checks at entry points. Policies around physical temperature checks must have accommodations for students, faculty, staff, and visitors whose personal or religious beliefs require them not to have physical contact with, or be seen by, an individual of the opposite gender. Inclusive accommodation strategies may include privacy screens for individuals who wear veils that cover their faces or who must keep their heads covered with hats that prevent the use of even contactless thermometers. Additionally, these individuals could be given the option to take their own temperature at the screening point, or health screeners of multiple genders could be made available at each check point if self-checks are not possible.

iii.   DEI and Masking

During times when masks are required on campus, colleges must consider accommodations for individuals who are deaf or hard of hearing who rely on facial expression when using sign language and/or lip reading when employing verbal communication. Face shields, and other see-through apparatus may be utilized and made available in these cases to ensure that deaf students, faculty, staff or community members are accommodated. Likewise, campus community members who require interpreters, note takers, or other disability accommodations performed by individuals, should be taken into the planning process when designing classroom flow and maintaining capacity guidelines and social distancing protocols.

g.   Student Supports

i.   Device and Broadband Access

During the pandemic, many colleges made targeted efforts to increase direct support to high-need or multiple barrier student groups. Santa Rose Junior College (SRJC) saw increased enrollment in their Adult Education and English as a Second Language (ESL) programs because of this increase in direct supports for students in those programs. SRJC, like many colleges, made an early effort to expand technology access for students, by assigning mobile hot spots and loaning laptop to students. The college gave high-touch and detailed training in how to use the technology needed for students to continue their studies. These actions helped build resilience in a community that traditionally did not have access to technology, a situation affecting many students across the state and country during the pandemic.

Efforts to bridge the digital and broadband divide for students during the shift to online classes was critical during the pandemic, especially as the population of students with less access to technology and broadband often correlates with underrepresented students (rural, inner-city, and economically disadvantaged students all struggle with broadband access, and

many rural, inner-city, and economically disadvantaged populations are also members of the BIPOC community). Colleges used pandemic recovery or emergency funding to purchase and distribute laptops and hotspots to students enabling them to continue their studies and remain on track. Early in the pandemic, in order to maximize the purchasing power, some institutions offered low-powered products such as Chromebooks, which do not always provide the functions and processing power needed for completing CTE coursework online. It is worthwhile noting that broadband internet access remains limited or non-existent in certain parts of the state, as well as to large swaths of the US population (a 2019 study conducted by Microsoft estimated that 162 million Americans do have not broadband internet access).[iii]

ii.   Mental Health

Mental health needs increased during the pandemic with increased financial, emotional and social stresses impacting students and families. Offsetting, reducing, and even covering entire fees and materials did not drive students back into classes as expected. The struggle to make ends meet with the financial realities during the pandemic were often cited by students as so overwhelming that schools was not a priority. A number of colleges expanded remote mental health services, including practices that aimed to "humanize remote instruction" to keep students engaged and connected to instructors and each other during online learning until they returned to campus. Four principles of humanized online teaching are laid out by Michelle Pacansky-Brock, Faculty Mentor, Online Teaching and Learning at Foothill-DeAnza Community College District. In order to insure that students in remote, online, or hybridized programs get the most out of their courses, instructors must cultivate student trust, communicate to students that they are present and available, develop awareness of who students are in the class and what supports they need, and finally cultivate empathy toward students. Students who have strong relationships with their instructors perform better and by intentionally humanizing remote instruction and fostering an environment that encourages cultivation of those relationships, instructors can ensure that online, remote, and hybrid students have a greater chance at success.

iii.   Flexible Attendance Policies

One critical lesson of 2020 was the importance of patience and understanding. Faculty and instructors with in-person programs have had to develop absence policies that take into account when students end up having to self-isolate or quarantine having been exposed to COVID-19. However, many colleges noted that with all the safety protocols instituted for CTE programs returning to campus during the pandemic, it was often not the campus that was the point of transmission, rather it was people bringing their illness to campus while being unaware they were carriers.

Strict attendance policies that threaten students' ability to advance or remain in their fields of study were quickly found to be a disincentive to honesty and transparency. Clearly communicated and flexible policies on attendance are critical for the health and safety of everyone who comes onto campus. A student who is in fear of losing their slot in a training cohort may be less likely to report potential exposure, as happened in a tragic case, where a student who was experiencing symptoms of COVID-19 attended in-person class and exposed their classmates and instructor to the virus. This unfortunate incident resulted in the tragic

death of the nursing instructor in the class.[iv] Focusing on competency and skills development rather than logging hours in the classroom, is a consideration for colleges moving forward to support students to feel confident that they can put the health and safety of themselves, their classmates, and instructors first without risking their ability to hold their places in a course.

B.   SPECIFIC CTE CLASSROOM AND PROGRAM INNOVATIONS DURING THE PANDEMIC

From the hand tools used by construction, automotive maintenance, and carpentry students to the whisks and blenders used by culinary students, CTE is dominated - across almost industry sectors - by occupations that require tools. Traditionally, in laboratories, workshops, and kitchens, students and instructors work in close quarters, sharing tools and other hands-on experiences. During the pandemic, colleges employed various strategies to reduce and/or remove risk while still providing students with the high-quality experiences needed to develop their skills and competencies in their chosen professions.

Most colleges immediately eliminated tool-sharing by either providing students with individual tool kits or sets for which students were responsible for, or by relying on class-size reduction to ensure that only one student at a time used a set of tools with robust sanitation protocols employed between classes. This detailed management of cleaning, disinfecting, and spacing was equally true for student desks, welding booths, dental chairs, culinary preparation stations, hair salon chairs, and any number of essential teaching and learning spaces. Many credentials and licenses intentionally require students to log laboratory or on-the-job hours for certification which posed challenges when social distancing was required, but the hands-on aspects of the job often require that students have physical contact with other people.

In many instances, students were encouraged to generate work off-site and bring back the final product for assessment. While this was often the case for culinary students who were provided kits to take home and complete, this opportunity did not translate to CTE programs that required equipment that are not portable, such as automotive and manufacturing. Some manufacturing/machining programs created temporary workarounds by asking students to prepare instructions for the use of large-scale machines while they were within the confines of their own homes, and subsequently when they returned to their classrooms, only the instructor would enter those instructions into the machine for both teacher and student to observe the result of the final product.

Without question, most CTE programs require some form of human contact for teaching, learning, and assessment. During the pandemic, specific to CTE, colleges had to determine what could be, and what was appropriate to be, offered online. Some courses were granted immediate waivers to continue by accrediting entities (e.g. first responder trainings), while others made what reasonable accommodations were possible.

The following are innovations by colleges that stood out as noteworthy and potential replication, as well as provided for future planning and preparation consideration.

a.   Nursing and Allied Health Programs

Because workers in the health and public safety sectors are considered essential, some colleges were able to maintain some or all levels of operation of these training programs even under pandemic restrictions depending on their county health authority guidelines. Where possible, colleges quickly adapted programs to reduce risks by employing distance learning for as much curriculum as was practical, and then by following strict social distancing protocols for in-person instruction. In some cases, transitioning the practicum elements from the classroom to health care facility settings allowed students to continue their practice in controlled settings under the management of instructors. However, in many cases, clinical sites were unavailable during the pandemic, thus limiting or completely interrupting students' ability to complete their educational and licensure requirements.

The highly dynamic and personal relationship based practice of nursing in interacting with patients requires physical proximity as well as intimate trust. College that historically would have had students in class practice administering shots on each other made the decision to have students bring someone from their personal "pod" such as a family member to campus to demonstrate their skill using the arm of that family/friend/pod-member. To keep the students and guest participants safely away from each other, these shots were administered in varying places on the campus (classroom 1, classroom 2, the student hall, etc.) While this was a useful strategy to support the students, this practice had the potential to put additional burden on the facilities team who then had to sanitize multiple spaces versus one classroom. In the spirt of pulling together for continuity of instruction, the various departments came to mutual agreement and the students progressed efficiently and safely.

Hartnell College's nursing programs during the pandemic moved to very small cohorts of 10 students, with two instructors meeting in-person two days per week. With the understanding that these students nearly program completion were urgently needed in the community to provide care, faculty and staff intentionally prioritized these students using safe practices, paired with closely monitoring their clinical hours on their respective jobsites.

Napa Valley College faced challenges in their emergency medical technician (EMT) and nursing programs as practicum placements for health occupations classes were near impossible to secure during the pandemic. The college addressed this challenge by placing EMT students at a Napa County COVID testing site, and nursing students assisted at COVID vaccine sites to assist them in logging their required clinical hours.

As colleges reopen fully, considerations for the students, faculty, and facilities as an integrated system is not only necessary, being transparent about the impact and potential strain on each department will also be a key in developing and support a coordinated response.

b.   First Responder Programs

Many police and fire programs were able to obtain waivers to continue instruction as they were deemed essential to support the community and the pandemic. Like many institutions, Cabrillo College relied on the expertise of their departmental chairs to structure appropriate adaptations as to what was essential, possible, and allowable to maintain effective teaching and learning. For EMT labs, classes went online, ride-along activities were put on hold, and students were given provisional certifications. In the case of most colleges, these courses

were prioritized to return first to campus if they were halted at all. In police cars, much as with CDL teaching, the instructors and students often moved to one-on-one time in the cars as social distancing of 6-feet was simply not possible for multiple students given the size of a common police car. Windows were left open, and driving time was limited whenever possible in following safety protocols and guidelines.

For examples of other thoughtful California community college First Responder Program Protocols please see:

- Appendix II.b.i.1 & 2, College of San Mateo CSM Pre-Fire Academy Fire 680MD Spring 2021 Plan, and CSM EMT Program Spring 2021 Schedule Fire 797

- Appendix II.e.i Protocols for Public Safety Specific to Administration of Justice Academies, Advanced Officer Training, Emergency Medical Services, and Fire Technology within the Moreno Valley College's Fall 2021 Safe Reopening Report

- Appendix II.l.i Yuba College Public Safety Academy Plan within the Yuba Community College's Draft Reopening Plan

c. Programs with Large Scale Equipment

Following the first responder programs, the programs which frequently returned fastest were the welding, construction and building industries, automotive maintenance, diesel mechanics programs, agricultural technologies and maintenance. In the case of construction, welding, and many other heavy-equipment courses, adapting these programs during the pandemic was easier as they traditionally had built in health and safety protocols that students had to master as part of the program. These students were used to wearing personal protective equipment, checking in with administrators as they would do so at a job site, and being mindful of how to work in a manner that kept their own personal physical safety, as well as those that are around them. As a result, many colleges reported great success in returning these programs safely to campus during the pandemic.

The physical space used for these programs must be thought about not only in terms of the dimensions of the laboratory, but also how it is used, by whom it is used, and how often. Each program took into consideration the absolute least amount of time students might be on campus, but often, these programs required significant time on campus. At a minimum, each college took into account their physical assets (rooms, hallways, alternative teaching spaces), as well as their programs to determine how the interplay of different programs, different student cohorts, and varying scheduling should occur.

Woodland Community College's Lake County campus reorganized their welding shop from 28 to 18 stations with only 15 of those booths used at any given time. By leaving the three additional spots available, any last-minute accommodations for space, or potential contamination, or other last minute needs gave the class a buffer to continue operating safely.

Whenever possible, bay doors were left open. The heating ventilation and air conditioning (HVAC) systems in classrooms that were previously only activated during periods of active instruction were instead always running to clean the air at a higher volume and rate (e.g. culinary cooking hoods).

Sierra College's instructional assistants were trained to check in students, perform mask and temperature checks. Hartnell College College's COVID-19 policies included instructions for students, faculty and staff to avoid sharing tools and equipment whenever possible and when sharing could not be avoided, employees and students were instructed clean and disinfect after each use. Hartnell College's Maintenance department provided disposable wipes when available or cleaning supplies such as spray bottles with disinfectant, as well as a Safety Data Sheet (SDS) of the product in the spray bottle so commonly used surfaces could be wiped down.

Please also see Appendix II.f.ii for Napa Valley College's Welding COVID-19 Safety Plan.

d.   Early Childhood Education Programs

Early Childhood Education Programs often use on-site daycare facilities as labs for student to gain practical work experience. Campus leaders were extremely mindful on how best to protect the most vulnerable populations, a pressing issue at the forefront of their minds.

Yuba College's early childhood education program moved all classroom curriculum online that could be delivered online, while continuing in-person teaching and practice at child development centers located on campus where necessary. All adults were masked at all times, sanitation practices were increased, children were placed into cohorts/pods, and outdoor time was increased for the children whenever possible. Of all of these adaptations to support safety and social distancing practices, and increasing communications with participating children's families demonstrated the connectedness and compassion for all the stakeholders who came in contact with the child development centers. Class sizes in the childcare center were reduced, and initially only essential workers were encouraged to place their children within these facilities. These practices allowed the early childhood course students to continue to gain real-time practical teaching and learning opportunities for continuing their education.

IV. NOTEWORTHY LESSONS LEARNED DURING THE PANDEMIC TO BE STRATEGICALLY EMBEDDED IN FUTURE CTE EFFORTS

Community colleges are the most affordable, flexible, and diverse segment of higher education, serving women, African Americans, Asian/Pacific Islanders, Hispanic/Latino, Native Americans, LGBTQ students and students with disabilities. The student diversity at community college uniquely positions the system to change the trajectory of the talent base of the state post-pandemic via its CTE programs. California community colleges are also leading the nation in setting the standard for closing the equity gaps by creating an education and training environment that honors, respects, and embraces all students. CTE programs empowers students to gain career and wage progression that leads to brighter futures with economic and social mobility afforded.

A. DON'T GO BACKWARD, GO FORWARD

As the colleges move through the pandemic, courageous discussions are required to examine which jobs and career pathways will set Californians on an economically resilient professional pathway. Simply returning to the practices, behaviors and offerings of pre-pandemic campus will not strategically position the state's talent pipelines.

The biggest job losses occurred in the leisure and hospitality sector, further putting strains on already struggling low-wage workers, particularly in the Black and Latinx communities. As the State focuses on creating better jobs and high wages for workers, looking at labor market data to close employment gaps is no longer sufficient. With the digitization of jobs accelerated by the pandemic, college must look to key digital skills that are increasingly required by all jobs, not just those in the technology sectors. A combination of technical, human and soft skills such as analyzing and managing data, project management coupled with critical thinking and communications are important skills and competencies combined with industry knowledge that will increase a worker's career mobility options.

Colleges must focus on expanding their approaches to short-term workforce training and reskilling programs to serve adult learners and part-time students, clarifying pathways for low and middle skilled workers impacted by the pandemic and automation prior to the pandemic, to move to middle and high skilled and high wage jobs. Additionally, high levels of collaboration with stakeholders are required to help workers identify pathways to a new career, locate appropriate training opportunities, and connect with the resources and supports that will help them complete training and translate that training into a job.

Public and private partnerships that include higher education, social justice and racial equity groups, employment social enterprises, community-based organizations, local and regional economic development entities and others. Regardless of the pandemic, in-person experiential learning is key to a high-caliber career regardless of disciplines or program of study. For CTE in particular, the opportunity is in developing learn and earn models with employer participation, supports for part-time students and adult learners, credit for prior learning strategy to connect short-term workforce training to certificate and degree pathways, and reskilling of incumbent workers for job retention.

Jobs are changing fast as they become digitized, collaboration opportunities evolve, and production quickens. Sectors that used to be vertical are now turned horizontal (e.g. logistics is embedded in all sectors just as information technology had become so). The entrepreneurial skills of courageously innovating and failing-forward, resilience, and constant design-thinking is not only bound to those who want to start businesses, those skills are needed in every worker now. In the report, [After the Storm: The Jobs and Skills that will Drive the Post-Pandemic Recovery](#), Burning Glass assesses what post-pandemic careers will be most viable across the country. California leaders seeking to meet employer demands will have to not only track the data, but position themselves as the forward-thinking innovators that these employers now come to expect from the students they would hire.

College should prioritize offering and developing programs that support the occupational sectors with projected high job growth and demand sectors that will lead the way for California's economic recovery. Particularly, colleges must focus on jobs impacted by automation and the digital economy, and prioritize programs that reskills and upskills those in the underrepresented and disadvantaged population to provide the opportunity to participate in the new digital economy.

B.   UNPACK AND EMBED POST-COVID-19 EMPLOYER EXPECTATIONS

By spring 2021, many global employers had reassessed their business models and practices and adjusted their practices and strategies that impacted jobs, skills and workers. Microsoft, Ford, Google, Citigroup, Siemens, have all publicly stated that they will be instituting hybrid work models, and not return to an in-person-five-day-a-week model. Many have developed training and support models to ensure existing employees had the functional skills, interpersonal capacities, adaptive/troubleshooting skills, and cultural competencies to be effective in this new and permanent hybridized environment.

College CTE leaders should consider the move to hybrid work models by industry and expand course content focused on teaching teambuilding to significantly more robust learning and collaboration models that integrates the digital aspects of teambuilding skills and competencies that will set students up for success in the new work environment.

Equally as important for the way in which companies will now function, college CTE leaders should consider shifting hiring practices of many companies as many community college job fairs were cancelled and moved online. Employers realized the efficiency of having candidates in the virtual waiting rooms at the ready for their interaction time. When a candidate was not present, or late, the employer simply moved to the next candidate who was present. This maximized the employer's time reducing travel, extraneous discussions, and waiting for candidates to connect. Many colleges noted that local employers requested that the online practices remain in place even after safety guidance allow for increased face-to-face interaction.

C.   DOCUMENT THE DETAILS

In every case of returning to in-person CTE instruction, the emergency response team at the college held meetings to plan the design of a return-to-campus program and justify the need for the course to be in-person. Typically, plans were submitted and vetted, and selected CTE

programs then received a verbal walk-through which included the emergency response or operations team (facilities leader, safety leader, course leader, etc.) sitting around a table and talking through every element of a student coming onto campus, and then moving into the classroom for a specific course, the activities that would happen during the specific class, and then the exiting of the class, and eventually the campus. If approved at the verbal walk-through, and the course was determined to be a priority, the team typically then conducted a physical walk-through of the experience from the perspective of the student. This required the consideration of all routes would students enter, what elevators and elevator buttons they might likely push, and which classroom surfaces and items they would most often touch. After the physical walk-through, the team would do a final review to assess the viability and practical need for the program once more.

In many colleges, the process during the pandemic took one (1) to two (2) months before final approval was granted provided all paperwork was complete and the process found no major issues. While highly detailed justifications and specific adaptations of program delivery vary across institutions, the common practice that became most effective was to document essential details. In exceptional detailed manuals, multiple elements as outlined were also paired with physical images/pictures of the elements for extreme clarity on expectations.

For examples of course specific planning materials please see:

- Appendix II.a.ii, iii, & iv for Cabrillo College's Guidelines for Safety of CAHM Lab Classes, Culinary Arts Course Specific Plan, and an Example of Course Plan Including Faculty Safety Scoring and Review

- Appendix II.b.i for College of San Mateo's Sample Submission Plans for Spring Courses

- Appendix II.f.i & ii for Napa Valley College's COVID-19 Safety Protocols and Plans for Chemistry and Welding courses

D.   ELEVATE INCLUSION SUCCESSES

California's community colleges are at a crossroads as California moves towards fully re-opening its economy. As the largest and most diverse system of higher education in the country, the system has a tremendous opportunity to lead the recovery for the communities colleges serve to improve lives of millions by breaking down exiting barrier to equity. DEI I is a foundational principle underpinning of the *Vision for Success* and informs all our efforts. As colleges consider returning fully to on-site operations, and opening up more in-person instruction, the Chancellor's Office website provides additional information and resources on ways to prioritize DEI to ensure that marginalized and disproportionally impacted populations do not become even more so.

During COVID-19, a number of colleges highlighted the fact that many of the English as a second language students required special learning accommodations, including having to balance childcare or work while learning. These students thrived when the competency based approach was provided, which allowed the students the flexibility of learning lessons in their own time. There were some note of material comprehension, retention and understanding improved when students were able to play, and more importantly replay, their recorded course lectures.

Anecdotally, Santa Rosa Junior College noted that when this learning happens in the home, other household members also develop a level of curiosity and the college saw an uptick in interest in enrollment in English as a second language courses. The lesson learned from this particular experience noted that household members saw the learning process and "if you can do this, so can I" led to additional engagement of students.

As an additional point of reference, colleges may wish to look at the document developed by the Minnesota State Colleges and Universities, Applying an Equity Lens to Policy Review, which provides a step-by-step process to create targeted high-touch DEI responsiveness for students through deliberate policy-making.[v]

E.   CONTINUE STUDENT-CENTERED SUPPORTS

In responding to the pandemic, colleges created astoundingly rapid edits to a number of student services. Staff offered increased hours to support students registering for and/or paying for courses. Faculty became more flexible in allowing students to reach out for office hours or writing labs. Career exploration and counseling websites were reimagined along with the outreach strategies to engage students to those resources. Additionally, colleges recognized that the function of enrolling students remotely was equally as important as providing remote services for mental health supports, and with each service, "personalizing" the service was important while making each experience "personal" when dealing with sensitive topics remotely.

The changes in service delivery models created learning curves and necessitated different skillsets of faculty, staff, and administrators. Colleges quickly learned that departments that already had some experience offering their services in both online and in-person adapted and iterated more quickly in adjusting services due to a reduced learning curve with the technology, and were also able to support more innovative practices.

College in implementing Guided Pathways have begun to understand the importance of building in flexibility and more comprehensive supports that meet students where they are, and creating channels where students could have their needs met in multiple methods and options. Many of the practices colleges developed during the pandemic are practices that should be examined and continued as colleges reopened to the public and return to on-site operations. Colleges are encouraged to continue the higher touch practices and student-centric solutions (such as flexible and expanded service hours, assistance offered virtually, open education resources in place of textbooks, etc.) borne out of the pandemic that showed promising increased student engagement, persistence, and success.

F.   INVESTIGATE VIRTUAL REALITY AND AUGMENTED REALITY AS SIGNIFICANT NEAR FUTURE RESOURCES FOR CTE INSTRUCTION, SKILL ACQUISITION, AND ASSESSMENT

Learning to learn during the pandemic required colleges to investigate what and where online learning supports could be relevant. A number of colleges considered or investigated the utility of newer technologies such as virtual and augmented for CTE instruction when courses were moved online in April 2020.

The Los Angeles/Orange County Regional Consortium (LAOCRC) conducted a survey of its 28 community colleges on effective practices, distance learning strategies and virtual reality and/or simulated software platforms for hard-to-convert career education (CE) programs. In line with AACC's early research, twelve career education program areas were highlighted that posed challenges to distance learning and explores opportunities for online conversion. The report, [Hard-to-Convert Career Education Programs](#), is available online. For programs that had more flexibility to transition online, the report summarized preliminary strategies for the consortium to consider during the transition of traditionally hands-on CE programs into distance learning programs. Multiple vendors were assessed, and some proved to have the capacity to augment CTE instruction.

For colleges who might be considering these strategies going forward, please note the differences and definitions of Virtual Reality vs. Augmented Reality:

- **Virtual reality (VR)** provides an immersive experience, creating a complete environment in which the user operates, often using VR headsets. A VR example might be a student learning about essential personal protective equipment (PPE) and while in a virtual welding lab, "putting on" protective gear ranging from gloves and apron to welding helmet in proper sequence, "picking up" critical tools and pieces of metal, and then starting to weld.

- **Augmented reality (AR)** is the overlay of computer-generated content into an actual physical environment. An AR example might be an allied health student who has the ability to scan the arm of a patient and identify exactly where a vein might lay for a perfectly positioned needle insertion.

Some CTE programs experimented with such technologies pre-pandemic in their teaching and learning for first responder and police training programs. AR and VR allowed for multiple experiences in a safe environment allowing for practicing high-risk scenarios such as holding a laser-pointed firearm in a green screen room. In this case, the cadet might have had both real-time coaching from their instructor in the room, documentation and specific data about their decisions, timing, and outcomes, to specific scenarios. In training scenarios, a cadet is faced with possible choices such as: shoot, deescalate, etc. Each choice is recorded, analyzed, and discussed by instructors. In terms of pedagogy, this is no different than nursing faculty using simulated patients to demonstrate and practice appropriate interventions for medical issues such as choking, strokes, birthing traumas, and diabetic comas.

Real life situations encountered by first responders and police officers can be unnerving to the student the first time with prior exposure. Virtual simulations undoubtedly provide an ideal and more realistic scenario, as well as a safe learning environment for students to master the appropriate knowledge and skills needed to manage such encounters on the job.

Another common application of virtual reality technology is for automotive programs, where a student and instructor would be able to examine a 3D view of various engine models and parts, zooming in and out, and rotating to see how the component is fitted within the engine, without the colleges having to purchase a variety of cars for the purpose of the program. Use of VR as an instructional tool could provide students practice in dismantling and rebuilding an engine virtually, before they practice on an actual engine as well.

AR and/or VR offer solutions may also offer long-term cost-savings for other programs, such as anatomy classes that utilizes real cadavers in teaching labs. AR or VR technology would be an additional tool integrated into the lab and classroom learning to further enrich the learning process.

While there are dozens of providers who specialize in online AR and VR course technology, course gamification, and course-specific applied skill practice, two were identified in the LAOCRC report as having high-quality and a highly regarded vetted history with community colleges: TRANSFR and zSpace.

In the case of TRANSFR, experiences in the states of Alabama and California (College of Marin) indicated that it can be a useful tool for early career exploration for middle school students as well as having direct application for adults aiming to skill up (Lockheed Martin). The typical kit includes fully enclosed headsets with handheld remotes. The product has also been used by certain occupational clusters (manufacturing and automotive) for longer periods of time and is an area where more courses are available, and models of application exists for adoption. One challenge to note for any application of technology is user limitations particularly for those who reside in certain parts of the country with limited or no broadband or Wi-Fi access. This product was successful deployed even under those circumstances.

In the case of zSpace, it has been deployed at a number of colleges including College of the Sequoias (CA), Bishop State College (AL), Macomb Community College (MI), Renton Technical College (WA), and Gateway Technical College (WI). The most application to date has been in the health and automotive sectors. The typical zSpace kit includes a laptop, eyeglasses you can see through with sensory dots at crucial points to know where the student's head is moving to reflect the viewing context, a stylus, and when relevant, a welding wand.

Financial considerations for the implementation of VR/AR technology include the startup costs of faculty training (typically less than 24 hours), technical assistance during implementation (digital coaches), updates to content (typically 90 day refreshes per course), the costs of devices per station (or student if implemented in a format without the on-site-lab model), and the licensing for courses, from single courses such as culinary to "all access" for all courses.

Most colleges for cost reasons has implemented AR and/or VR has labs on-site labs with approximately 15-20 stations. Each station allows for multiple occupational licensing (culinary, welding, allied health) shared among different disciplines, which maximized the technology and lab use and to justify the investment of space, faculty, and dollars.

The set up mentioned above does not necessarily address the instruction models and supports necessary under pandemic conditions. This information is provided to assist colleges who are considering AR/VR technology as additional options for remote learning where feasible and appropriate. In considering any technology for instruction, the following factors should be investigated as important criteria:

- High-quality experiential moments for skill practice and acquisition;

- Lowered cost of course equipment for instructors;

- Lowered cost of course equipment for students;

- Increased variation of scenarios for teaching, discussion, and improvement;

- Tools that enhance content delivery and increase the teaching and learning experience for both students and faculty.

Although AR and VR technology may be an innovative technology for supporting applied learning and skills development for teaching and learning, the technology is still in its relative infancy in terms of education application. Course materials are still limited in general, and the content for many programs do not yet exists. Furthermore, certain professions like first responder and nursing still requires actual and real-time interactions in gaining experience and practicing of the craft, such as feeling the real weight of a tool, climbing a ladder, and working at actual height versus virtual height, etc. While useful for career exploration and specific practice scenarios, there is not compelling evidence that VR or AR can be a sufficient replacement for hands-on instruction across all CTE programs at this time.

V. CLOSING REFLECTIONS

As campuses develop plans to fully resume on-site operations, colleges have much to be proud of their creativity and inventiveness in adapting and getting through a very challenging and difficult year unlike any the system has experienced. It is important to take time to celebrate as well as reflect as we move forward, hold on to and continue the promising practices, lessons learned, and the progress made in serving students while continuing to innovative. The following are key points as recap:

- Elevate effective wraparound supports that increases student engagement, learning and equity, and continue to expand these practices into ongoing college practices and operations.

- Iterating on tested virtual services utilized during the pandemic to improve convenience and access for student to services, to further improve the student experience.

- Consider online learning as an opportunity to experiment with competency based education models which allows students the freedom to choose the pace, time and place for learning.

- Seek to learn and understand the needs of new population of students who enrolled when courses became more readily online, capturing their experience and leveraging learnings into strategies for increasing enrollment.

- Identify work-based learning strategies and models that worked well virtually and ways to expand these models to benefit greater number of students.

- Capture cost savings from virtual activities and streamlined functions, redirecting funds as appropriate to support other growing area of student needs.

- Leverage learnings from converting college processes to digital streamlining to teaching and learning for students in preparing them for increasingly digital nature of jobs and skills needed.

- Consider not-for-credit and short-term workforce training career pathways into noncredit and credit program that supports a lifelong learning model that not only addresses immediate earning needs of students for self-sufficiency, but continued acquisition of skills that would allow for wage and career progression and acceleration.

- Continue to innovate and adapt as that is the only constant not only for colleges but what our students are being prepared for the future of work which is happening now.

Endnotes

[i] https://www.aacc.nche.edu/wp-content/uploads/2020/05/CTE_Online_Recommendation_final2_DOL_Disclaimer.pdf

[ii] Unlike a single point in time (hours and days), however, these teams have been called upon on behalf of community colleges to respond over months as COVID-19 evolved. Typically, the individuals who had the detailed information about incident command systems (ICS), were those who went through the U.S. Department of Homeland Security's Federal Emergency Management Agency's (FEMA), Emergency Management Institute (EMI) courses, among many professional development classes. AACC encourages college stakeholder who wishes to be informed about the level of care and thoughtfulness put into an emergency management team to consider this free resource as a potential grounding resource as it was designed by FEMA's EMI: https://training.fema.gov/is/courseoverview.aspx?code=IS-100.c

This two-hour course covers topics such as basic incident command structure – span of control, delineation of duties, etc. While the target audience for this course is typically those who were involved in planning, response and/or recovery, an understanding of the basics may give great confidence to the faculty and administrators who are considering returning to campus but want to know the details about their campus's coordination and preparedness.

[iii] https://news.microsoft.com/2019/09/18/nextlink-internet-and-microsoft-closing-broadband-gap-in-central-us/

[iv] https://www.cnn.com/2020/11/25/us/teacher-nursing-student-Covid-19-death-trnd/index.html

[v] *Equitable access begins as students feel invited into the campus. Colleges seeking to create equitable access to all CTE programs must investigate ways they are truly offering program on-ramps for all students to all courses and the use of disaggregated student and course data can be very useful to inform in the planning and developing strategies.*

From a data perspective, colleges are encouraged to review Urban Institute's report, Racial and Ethnic Equity Gaps in Postsecondary Career and Technical Education, Considerations for Online Learning, which outlines CTE programs that can improve upward mobility for historically underserved communities at: https://www.urban.org/sites/default/files/publication/103777/racial-and-ethnic-equity-gaps-in-postsecondary-career-and-technical-education_considerations-for-online-learning_0.pdf

Editor's Note: a PDF copy of the report appendices can be obtained by sending an email request to Chancellor's Office Workforce & Economic Development Division (wedd@cccco.edu).

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