K12 to Community College Pathway Mapping Tool Recommendations

August 28, 2019

Background

This document describes how an interactive K12/CC Pathway mapping tool can be used by different stakeholders (e.g., career counselors, educators, parents, students) and provides recommendations on how to develop and sustain the tool (e.g., where it will live or be hosted, how often it will be updated). This work is part of a larger set of tasks focused on developing and implementing a regional career pathway development strategy linked to key industry sectors and Guided Pathways themes in the region. This includes mapping and assessing current activities at each college and its feeder schools; developing guidelines for pathway development; and supporting K-12 districts and colleges in pathway development. Work to date includes development of:

1. *K-12 to Community Colleges CE Map*: The initial map consolidates all the K-12 and community college CE programs and indicates their relationship or pathways to one another. Two pivot tables (developed in Excel) were developed and provide users the ability to filter information in a number of ways. These are available at: https://wested.box.com/v/K12Mapping
2. *CP Map Tool*: The K-12 to Community Colleges CP Map is a proof of concept using Tableau. This interactive tool maps Career Education programs from K-12 to the community colleges and is an example of how a mapping tool might work. It is available at: https://tabsoft.co/2YxLWnR

Discovery Activities

In order to inform recommendations for a final solution, it was important to identify potential users and document their specific needs related to a CP Mapping tool. Therefore, a series of stakeholder engagement meetings were conducted in person and by video conference. Stakeholders included both K12 and college representatives. Activities included:

1. March 7, 2019: K14 Blue Wall activity
2. May 31, 2019: Advisory Group meeting
3. June 19, 2019: Career Pathways Workgroup session
4. July 30, 2019: K14 Focus Group
5. August 20, 2019: K14 Focus Group
6. Ad hoc consultations with regional leadership

Stakeholders were asked to organize feedback based on user personas and the needs of different audiences, including:

1. Students
2. Parents
3. Counselors
4. Educators
5. District Leaders/Administrators
6. Program Directors

Similar existing tools were recommended for review by stakeholders and were explored during discovery meetings. Stakeholders were asked to react to the tools to note what they liked or disliked about them. Tools included:

- City Colleges of Chicago Program Finder:
  http://www.ccc.edu/Pages/studentgps/index.html
- UC Transfer Pathways Guide:
  http://pathwaysguide.universityofcalifornia.edu
- California Colleges:
  https://www.californiacolleges.edu/#/search
- A Degree with a Guarantee:
  https://adegreewithaguarantee.com/en-us/abouttheprogram/findyourpath.aspx
- Regional site:
  https://careered.org/#careers

Two tools being developed in partnership with the CCCCO were researched as well, via demos and interviews with project leads.

- Orange County Program Finder:
  https://staging.programfinder.dev/
- Bakersfield College Program Pathways Mapper:
  https://programmap.bakersfieldcollege.edu/academics

Summary of Requirements by User Role

These discovery activities informed development of a tool's requirements. Specific feature requirements identified by stakeholders are documented in the Tool Evaluation Rubric in Appendix A. The high-level needs of each user role are summarized below.

Students (and parents) need tools to:
- A. Explore CE programs available at their high school (or neighboring high schools)
- B. Explore CE programs available at local community colleges
- C. Explore opportunities for articulation/dual enrollment
- D. Research careers (especially those aligned to high-demand jobs in the region)
- E. Explore the education requirements for careers of interest
- F. View pathways that lead to education goals, including specific coursework requirements and where those courses are offered
- G. Make connections to community colleges (e.g., career center or admissions office)

Counselors and educators additionally need tools to:
- A. See what students are interested in (e.g., high school pathways, careers, colleges, types of programs)
- B. Track where students are taking college courses

K12 District Leaders/Administrators additionally need tools to:
- A. Identify opportunities for aligning with labor market trends
- B. Identify opportunities for aligning with college programs
- C. Track outcomes of students who continued a pathway in college

College Program Directors need tools to:
- A. Identify opportunities for aligning with labor market trends
- B. Identify opportunities for aligning with high schools
- C. Identify students in HS pathways for outreach activities
- D. Track outcomes of students

Recommendations Summary

The initial project requirement was to develop an interactive tool that maps Career Education programs from K-12 to the community colleges. In discussing this type of tool, several other requested features were introduced by stakeholders, such as connecting to labor market data, career exploration, and managing student-level activities. Because of the expanded scope of the requested mapping tool and the fact that no single tool currently addresses all the requirements, the overall recommendation is to engage in an iterative process to meet the full complement of requirements while addressing priority needs by implementing an existing tool. Specifically, start by engaging with Orange County and Concentric Sky to implement the Program Finder tool to showcase San Diego/Imperial County K12 and CC pathways data. Then,

determine next stage(s) of the project based on priorities and develop a project plan that may include:

- Enhancements to the Program Finder (e.g., displaying dual enrollment information)
- Adopting the Bakersfield College Program Pathways Mapper tool to showcase the 10 colleges' pathway maps and career information
- Enhancing the Pathways Mapper (e.g., to include K12 coursework)
- Connecting to more robust career exploration tools

Recommendations Detail

Below are detailed recommendations for implementing a technology-based CP mapping solution.

Recommendation 1: Prioritize Requirements of Comprehensive K12/CC Pathway Mapping Tool

A key next step is to prioritize the various requested features to inform final design and requirements of a K12/CC pathway mapping tool. This work will also inform development of a detailed implementation plan. Table 1 below lists the user requirements organized by type of user and identifies which of those requirements are addressed by tools described in this report.

Table 1: User Requirements Addressed by Various Tool Options

	Orange	Bakersfield	Career Exploration	Excel Pivot Tables*
Students (and parents) need tools to:				
A. Explore CE programs available at their high school (or neighboring high schools)	X			
B. Explore CE programs available at local community colleges	X	X	X	
C. Explore opportunities for articulation/dual enrollment				
D. Research careers (especially those aligned to high-demand jobs in the region)		X	X	
E. Explore the education requirements for careers of interest		X	X	
F. View pathways that lead to education goals, including specific coursework requirements and where those courses are offered		X		
G. Make connections to community colleges (e.g., career center or admissions office)	X		X	
Counselors and educators additionally need tools to:				
A. See what students are interested in (e.g., high school pathways, careers, colleges, types of programs)			X	
B. Track where students are taking college courses	X			

	Orange	Bakersfield	Career Exploration	Excel Pivot Tables*
K12 District Leaders/Administrators additionally need tools to:				
A. Identify opportunities for aligning with labor market trends				
B. Identify opportunities for aligning with college programs	X			X
C. Track outcomes of students who continued a pathway in college				
College Program Directors need tools to:				
A. Identify opportunities for aligning with labor market trends				
B. Identify opportunities for aligning with high schools	X			X
C. Identify students in HS pathways for outreach activities				
D. Track outcomes of students				

Recommendation 2: Establish Data Collection and Management Processes

Initial Data Collection Process. Developing the K-12 to Community Colleges CE Map data in the first phase of the project required the following process:

1. College data was accessed via the CCCCO's DataMart website: https://datamart.cccco.edu/DataMart.aspx

2. Interviews were conducted to understand how K12 districts and schools use CE pathways and what they offered. For any future data collection efforts, it will be helpful to have interviews or focus groups with practitioners to understand the nuance of capturing CE data and to better understand some of the gaps that might exist, regardless of how well the tool is constructed.

3. The second step required reaching out district-by-district to collect the CE data. Schools returned a variety of formats (Word, PDF, PowerPoint, and Excel) for the documentation of their CE courses. Most of these formats were not CALPADS exports and it is unclear how well aligned internal documentation of CE courses and pathways are compared to CALPADS. A template was developed for the data elements we were looking for and the data was manually added to the template for each district.

4. The final stage involved a process of cleaning up the data and verifying it district-by-district. In the data cleanup, spelling corrections and editing tasks were completed, while trying to maintain the integrity of the data provided. A detailed data report was sent to the data staff or designated administrator at each district to review. The data set was then updated as needed based on report feedback.

Recommendations for Data Management Moving Forward. Leveraging the work completed in phase one, the data for the tool should be updated at least once a year. The California Department of Education publishes de-identified data sets of student enrollment, including administrative and demographic information. It is possible to pull in more detailed school information (e.g., address) and course titles, pathways, and sectors for CE courses by joining the data sets provided on the CDE website. This would likely be the primary method to get regularly updated course and enrollment information (and this is how Orange County populates their tool), although it's unclear how often data is updated on the CDE website. If the Region was able to get an MOU and data agreement with CALPADS to have access to more current data vs. an annual downloading of files off the website, that would be preferable (although perhaps not a realistic option).

There would also need to be a high level of confidence that the data are accurate and it is recommended that a verification process occur each year with the districts. The district reports from CALPADS could be shared with each district as a prompt to verify what is planned to populate the tool.

Another consideration (and an identified requirement in Appendix A) would be how to manage requests by the districts regarding data accuracy. Often, practitioners find their data is incorrect for a variety of reasons. Sometimes it is an issue of outdated information, a data entry error, or a miscoding of course codes. However, sometimes there is a dissonance between what practitioners think they offer and what their data ends up looking like in online tools. There will likely need to be someone who can answer questions through a helpdesk email, online form, or other communication method.

Recommendation 3: Leverage Existing Tools

In conducting the review of existing products/tools, two met a number of the specified user requirements. To address priority needs, the recommendation is to work with Concentric Sky to adopt the Orange County Program Finder and consider linking it with the Bakersfield College Program Pathways Mapper.

With the support of the CCCCO, *the Orange County Program Finder* is a tool being developed by an outside technology vendor called Concentric Sky. After a lengthy period (2 years) of requirements development and an investment of about $600-700k, a soft launch of one sector (Hospitality) has been tested with students with positive feedback.
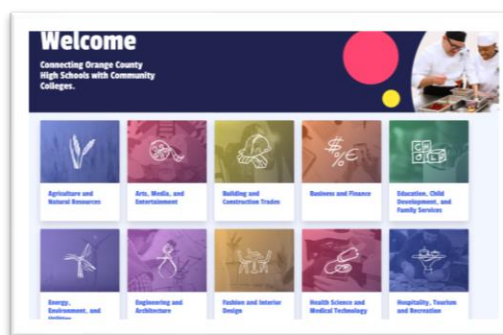
The project started with more robust goals but the challenge of maintaining and giving access to student-level data proved difficult and so the tool has been scaled back for the "1.0" version. The primary audiences for the tool are K12 educators and counselors working with students and those at the colleges tasked with K12 engagement and program development. The first iteration of the tool includes:

- A landing page with the 15 sectors/industries available for selection
- The sector page allows the user to toggle between a view of Colleges or High Schools
- Pathways appear on the left and a map appears on the right
- The Colleges view shows the pathways available on the left, aligned to the TOP codes of CE courses offered by one or more of Orange County's 9 community colleges
  - A map on the right side of the screen shows where the colleges are that offer pathways in that sector
  - A user may also select a specific pathway and the map will update to show where the colleges are that offer the selected pathway
  - A user may click on a college name on the map to go to a link determined by the college as the best destination for the user (e.g., the Culinary Arts program page on the college's website)
- The High Schools view shows the pathways available on the left, aligned to the TOP codes of CE courses offered by one or more of Orange County high schools
  - A map on the right side of the screen shows where the K12 districts are that offer CE courses in that sector (plus number of high schools)
  - A user may also select a specific pathway and the map will update to show where the districts are that offer the selected pathway
  - A user may click on a district name on the map to go to a district information page
  - The district information page includes
    - Contact information for the district and ROP
    - A list of all CE pathways in the district and the high schools that offer them
    - The number of students in the pathway at that high school (which is the previous year's de-identified enrollment data provided by CDE)

While limited in scope, this tool does address a few of the use cases, including:

Students (and parents) need tools that enable them to:
A. Explore CE programs available at their high school (or neighboring high schools)

B. Explore CE programs available at local community colleges

G. Make connections to community colleges (e.g., career center or admissions office)

K12 District Leaders/Administrators additionally need tools to:

B. Identify opportunities for aligning with college programs

College Program Directors need tools to:

B. Identify opportunities for aligning with high schools

Orange County and Concentric Sky are open to other regions using the same technology to showcase their own local data. There would be a small annual maintenance/licensing cost (TBD but somewhere around $10k) and the cost of any region-specific data requirements or enhancements. To use the existing product as is, the region would need to:

1. Populate their pathways in an Excel template
2. Do an inventory of the TOP4 programs at the colleges
3. Populate the contact information
4. Provide a working URL for every TOP4 program for every college.

The Bakersfield College Program Pathways Mapper, also developed with support of the CCCCO and by Concentric Sky, provides information on careers associated with their college's

programs, including videos, typical wages, and the labor market demand in California. Each Pathway allows the user to explore a set of program maps that show a semester-by-semester path from program entry to completion.

Each pathway page combines career exploration information with the specific course maps offered by the college. Degrees, high unit certificates, and low unit certificates are listed for selection.

Selecting an education path leads to a page for that program's information, including a video, program learning outcomes, and salary, demand, and related careers data from the Bureau of Labor Statistics.

Below this is the Program Map, where each semester's courses are laid out in toggled (map or list) view. Certificate programs show the pathway to completion and career. Associate degree pathways show the pathway to transfer to a UC or CSU.

All courses are listed with their units and whether Core or General Ed. Each course may be selected to view its description. When there are several courses that will fulfill a requirement in the course map, the user is given a list and may choose a course to view its description.

This tool was the most favorably viewed by K12 stakeholders as supporting their students' education planning needs. The particular use cases addressed are:

Students (and parents) need tools that enable them to:
- B. Explore CE programs available at local community colleges
- D. Research careers (especially those aligned to high-demand jobs in the region)
- E. Explore the education requirements for careers of interest
- F. View pathways that lead to education goals, including specific coursework requirements and where those courses are offered

Developed to be scalable and shareable, with opportunities for customization (e.g., logo, colors), the tool is being adopted by 28 other community colleges in the state. Use of the tool requires a $50k investment from each college to fund the project management and data development/cleanup process led by Concentric Sky, which begins with a readiness assessment. Tools have been developed to make the system self-service for the colleges (e.g., tools to update the mapping data) to minimize the need to fund additional support from the technology vendor after implementation. Additionally, integration with course catalog software such as eLumen and currIQunet is being developed for more efficient data management.

Orange County has had conversations about combining their tool with Bakersfield's into a cohesive offering of CE exploration and with the same technology vendor developing both tools, it seems like a realistic goal. With additional development, it could be possible to combine the activities in both systems. For example, a user could start out in the Orange County Program Finder to locate colleges offering a program of interest. They might then go to a pathway page with career information, and then to a particular college's coursework maps.

Adding a regional entry point for students to identify colleges offering an award type and adding the ability for students to view CE coursework maps that span high school to college (for dual enrollment or comprehensive career planning) could be added layers of functionality to develop iteratively.

Recommendation 4: Link to career exploration tools research

A number of the user needs identified by stakeholders address a larger scope of tools to support students as they navigate pathways from high school to college and into careers. Many of the use cases and requirements, such as students needing to explore careers, could be accommodated through a variety of existing career exploration and career services platforms. Tools in this category are being researched though Workgroups 1a and 3. Most tools in this category address the following student user requirements, though with varying levels of attention/quality:

B. Explore CE programs available at local community colleges
   - This is often offered as a separate education exploration module with search and filtering tools (e.g., find schools offering certificate programs in an industry sector). College profiles may contain information about all of the programs offered.
   - Tools like CaliforniaColleges.edu and California Career Zone include all postsecondary schools in the state. Many tools allow a paying client to customize which schools are included/highlighted.
D. Research careers (especially those aligned to high-demand jobs in the region)
   - This is the baseline for career exploration tools. Different products organize these activities in different ways. Most start with assessments and match students to careers or career clusters based on the results. Students can then research careers through a variety of career profile tools (e.g., descriptions, videos, list of related careers).
   - More promising tools provide updated local labor market data as well as information on the number of job openings in the area
   - Many of these tools allow a client to customize which priority sectors or other organizers to use to guide students to high-demand careers in the client's location.
E. Explore the education requirements for careers of interest
   - Career profiles may list the education requirements for the different occupations related to that career. For those education requirements, there is often the ability to view a list of schools that offer those programs.
G. Make connections to community colleges (e.g., career center or admissions office)
   - College profiles usually have contact information sections that can be customized to include a college's desired reference(s).

Addressing the additional scope identified by stakeholders will require connecting to the career exploration tools research being conducted and determining if additional tools need to be

developed/acquired. Currently, none of the career exploration tools being researched showcase pathway mapping from K12 to college programs.

Recommended Next Steps

1. Establish decision-making/stakeholder group to guide and inform activities moving forward.
2. Review the Tool Evaluation Rubric to finalize requirements, prioritize use cases and inform a phased plan for development and implementation.
3. Document the phased development and implementation plan.
4. Review existing tools with the prioritized Tool Evaluation Rubric.
   a. Both Concentric Sky tools
   b. Career exploration tools that address the high-priority use cases
5. Document where no product meets specific requirements.
6. Set up meetings with vendors/owners of tools that address priorities and for each
   a. Document where the tool meets needs and where additional enhancements are required.
   b. Research costs and time required to develop additional enhancements.
7. Enter into required agreements with vendor(s), if cost /timing of enhancements is acceptable.
   a. If cost/timing of enhancements exceeds benefit of leveraging existing tool(s), develop full technical specifications to inform a bid process for technology developers (i.e., cast a wider net)
8. Develop a project plan and establish a project management team to work with the vendor(s) to implement solution.

Appendix A: Tool Evaluation Rubric - K12 to CC Pathway Mapping Tool

This document details the feature requirements identified through stakeholder engagement/discovery sessions. Features without a clear consensus have pending designations for Must-Have vs. Nice-to-Have.

A. System/Tool Features

Detail the tool's features and how they address the project's use cases and requirements.

Requirement	Must-Have	Nice-to-Have	Notes
General Requirements			
Tool is accessible to multiple audiences (e.g., publicly available)	X		
Tool has differentiated tools, views, or navigation by user role or purpose (e.g., looking for high school courses vs. looking for college courses; educator/reporting tools available only to those users)	X		
Tool has a relational database with required elements that can be defined and managed easily in the future when changes are needed	X		Specific user roles and permissions related to maintaining data is TBD and includes implementation considerations described in section 3
An online form is available to report incorrect or old information		X	
Feature Checklist: College Pathway Search/Information			
User can search for colleges that offer programs in a pathway of interest	X		
User can apply filters to the college locator, such as distance, award types offered, and sector	X		
User can view details about the programs offered at each college (e.g., awards offered, courses offered)	X		

Requirement	Must-Have	Nice-to-Have	Notes
User can search, filter, or locate a community college sector, TOP4 code or TOP6 code and view the courses offered and where (both at colleges and high schools)	X		
Pathways clearly show requirements to completion and related paths/options (e.g., certificate awards or completion with transfer to a 4-year school)	X		
CC pathway includes course sequences, pre-requisites, and course description	X		
Feature Checklist: K12 Pathway Search/Information			
User can search by district and view the courses offered, including course descriptions, key features of courses, and at which schools offered	X		
User can search by a pathway to view district/schools offering pathway programs	X		
Feature Checklist: Career/Labor Market Information			
Career profiles, including salary and hiring demand information, related careers, and required education embedded within the tool itself			No consensus on priority. Desire to have one place where students can explore all related information in a coherent way.
Feature Checklist: K12 to CC to Career Connections			
User can view articulation information between a high school pathway and programs offered at colleges	X		
User can search for programs at colleges that offer dual enrollment opportunities (e.g., by pathway, by high school, by college)	X		
Tools that allow users to see connection in a pathway from HS courses to CC courses to awards/goal (including 4-year transfer) to careers	X		
User can view the careers related to programs/pathways, with link(s) to career exploration sources (e.g. CA Career Zone, Career Coach)	X		A variety of tools are used by schools today.

Requirement	Must-Have	Nice-to-Have	Notes
Tools that allow a student to build a course plan with completed/current/planned courses at both the HS and CC			Priority unclear.
Tools that connect HS students and counselors to career counselors at CCs			Priority unclear.
Feature Checklist: Educator Tools/Reports			
Reports that show HS educators what pathway(s) at their school the students are enrolled in			Available from districts or CALPADS (TBD)
Reports that show HS where students are taking CC courses (dual enrollment tracking)			If student-level data is collected, additional data and user policies will apply. Priority unclear.
Reports that show where former HS students are taking CC courses			If student-level data is collected, additional data and user policies will apply. Priority unclear.
Prospective student CRM for outreach			(See above) Priority unclear.
Data exports			Priority unclear.

B. Accessibility and Usability Features

Detail the tool's user friendliness and accessibility.

Considerations:
- What elements will make the tool user-friendly?
- What are users' technology literacy skills? What considerations or accommodations may need to be made?
- Will desired features/requirements comply with current educational policies and laws, such as the Americans with Disabilities Act?

Requirement	Must-Have	Nice-to-Have	Notes
Tool is user-friendly; fewest clicks possible	X		
The tool aligns with student and staff technology literacy skills	X		
The tool aligns with audiences' content literacy skills (e.g., appropriate	X		

Requirement	Must-Have	Nice-to-Have	Notes
accommodations made to guide audiences in their use of the system)			
The tool complies with best practices in user design	X		
The tool meets all applicable ADA requirements	X		What are the specific requirements based on regional or district policies?

C. Implementation Considerations

Detail the parameters of the cost to acquire, use, and maintain the tool/system as well as the parameters of the cost and effort to implement the new tool(s). Identify whether a requirement is a "must-have" (can't do without) or "nice-to-have" (not a deal breaker).

Considerations:
- What are the parameters of purchasing or licensing an existing tool?
- What are the parameters of designing and developing a custom tool?
- What are the parameters of ongoing maintenance costs, including staff support, data management, etc.?
- What will be required to maintain data?
- What is the timeline for deployment?

Requirement	Must-Have	Nice-to-Have	Notes
Vendor agreements if applicable	X		What are the requirements for working with an existing vendor?
Governance process for the system	X		Who will develop and oversee?
Managing access to the system	X		Who is responsible and how is this managed?
Training for users	X		
Staff needed for implementation and maintenance of the database and the tool	X		
Agreements to collaborate and provide data between the region and each individual college and district (e.g., data from CATEMA)	X		