



A Career Pathways Needs Assessment for the Wyoming Department of Education

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I. Introduction

The Wyoming Department of Education (WDE) is developing a streamlined system for college and career pathways for students as part of its efforts to better connect the state's employer needs with its education and training systems. In order to build a successful system, the state must analyze the current status of its education/workforce pipeline; this will allow WDE to identify both strengths that can be leveraged along with gaps that must be addressed. WDE has asked The National Center for College and Career Transitions (NC3T), an organization experienced in the development of college and career pathways systems, to conduct this analysis and provide recommendations.

Note that, while every effort was made to provide a full and complete analysis of the college and career readiness infrastructure in Wyoming, the scope of this project limited the amount of information that could be reviewed for inclusion here. Further, it is inevitable that local stakeholders will have more knowledge of various elements of the state's efforts and resources and could provide a more complete picture of local state activities. For these reasons, it is the author's hope that reviewers will provide feedback to this document so that it can be expanded and enhanced, providing a truly valuable resource for the state's strategic planning efforts going forward.

II. Analysis of Workforce Supply and Demand in Wyoming

A. The Education System

Wyoming's formal education system offers elementary, secondary, and postsecondary opportunities for its residents as outlined below.

1. K-12 Education

Across the state, there were 94,002 students enrolled in the K-12 education system in the fall of 2015¹. This includes 45,952 in grades K-5; 21,207 in grades 6-8; and 26,843 in grades 9-12. Of the state's 48 school districts, the ten largest are as follows:

- **Laramie #1:** 14,029 students in grades K-12
- **Natrona #1:** 13,082 students in grades K-12
- **Campbell #1:** 9,177 students in grades K-12
- **Sweetwater #1:** 5,749 students in grades K-12
- **Albany #1:** 3,907 students in grades K-12
- **Sheridan #2:** 3,488 students in grades K-12
- **Lincoln #2:** 2,801 students in grades K-12
- **Uinta #1:** 2,794 students in grades K-12
- **Teton #1:** 2,770 students in grades K-12
- **Sweetwater #2:** 2,710 students in grades K-12

The student population is largely white (78.3%), with a sizeable Hispanic population (14.1%) and a small American Indian population (3.1%). With the exception of those identifying with two or more races (2.1%), no other group registered at more than 2%².

The graduation rate for the 2014-2015 cohort was 79.4%, with 5,445 graduates out of a total cohort of 6,857³. Just over one-third (37.5%) of Wyoming students in the K-12 system were eligible for the federal free or reduced lunch program in the fall of 2015⁴.

a. Focus Area: Career and Technical Education

The state appears to have a robust career and technical education (CTE) program, with 13,702 participants and 3,346 concentrators in grades 9-12, for a total of 17,048 students out of a total cohort of 26,843 – approximately 63.5% of all students touched by CTE in some way. Note that participants are defined as completing at least one course in a CTE program experience, while concentrators are enrolled in or have completed their third course in a sequence in a specific pathway, so the levels of engagement vary.

¹ <https://portals.edu.wyoming.gov/Reports/Public/wde-reports-2012/public-reports/stat-2/fallenrollmentssummarybygradedfordistrictandstateannual>

² <https://portals.edu.wyoming.gov/Reports/Public/wde-reports-2012/public-reports/stat-2/stateanddistrictfallenrollmentbyethnicityandgenderannual>

³ <https://portals.edu.wyoming.gov/Reports/Public/wde-reports-2012/public-reports/gradrates/fedfouryearadjustedstate>

⁴ <https://edu.wyoming.gov/downloads/nutrition/2016/2015-free-and-reduced-eligibility.pdf>

A breakdown of participants, concentrators, and completers in each cluster and pathway are as follows⁵:

CLUSTER	PATHWAY	Participants	Concentrators	Completers
Agriculture, Food & Natural Resources	Agribusiness Systems	373	236	142
	Animal Systems	353	158	60
	Food Products & Processing Systems	123	48	18
	Natural Resources Systems	254	53	24
	Plant Systems	81	50	8
	Power, Structural & Tech. Systems Arch. & Const.	267	149	73
	Subtotal	1451	694	325
Architecture & Construction	Construction	1054	323	186
	Design/Pre-Construction	451	147	78
	Maintenance/Operations	2	0	0
	Subtotal	1507	470	264
Arts, A/V Technology & Communications	Journalism & Broadcasting	557	70	51
	Printing Technology	54	4	2
	Telecommunications	33	3	0
	Visual Arts	340	24	12
	Subtotal	984	101	65
Business Management & Administration	Administrative Support	335	21	11
	Business Information Management	402	59	10
	General Management	253	20	16
	Human Resources Management	3	0	0
	Operations Management	53	10	10
	Subtotal	1046	110	47
Education & Training	Teaching/Training	306	17	14
	Subtotal	306	17	14
Finance	Accounting	458	70	38
	Banking Services	2	0	0
	Business Finance	278	15	13
	Subtotal	738	85	51
Government & Public Administration	National Security	167	0	0
	Subtotal	167	0	0
Health Sciences	Biotechnology Research & Development	52	0	0
	Diagnostic Services	52	85	85
	Health Informatics	2	0	0
	Support Services	344	133	44
	Therapeutic Services	110	48	36
	Subtotal	560	266	165
Hospitality & Tourism	Lodging	34	2	2
	Restaurants & Food/Beverage Services	1623	394	221
	Subtotal	1657	396	223
Human Services	Consumer Services	28	0	0
	Early Childhood Development & Services	698	102	88
	Family & Community Services	40	5	1

⁵ Sent by Christopher Gwerder, Senior Statistician with WDE, on August 11, 2016

CLUSTER	PATHWAY	Participants	Concentrators	Completers
	Subtotal	766	107	89
Information	Information Support & Services	379	36	22
Technology	Network Systems	74	32	17
	Programming & Software Development	389	26	12
	Web & Digital Communications	419	34	9
	Subtotal	1261	128	60
Law, Public Safety, Corrections & Security	Emergency & Fire Management Services	41	23	23
	Law Enforcement Services	2	0	0
	Subtotal	43	23	23
Manufacturing	Maintenance, Installation & Repair	88	27	5
	Manufacturing Production Process Dev.	493	131	108
	Production	849	266	155
	Subtotal	1430	424	268
Marketing	Marketing Communications	29	5	4
	Marketing Management	442	67	24
	Merchandising	25	13	9
	Professional Sales	13	0	0
	Subtotal	509	85	37
STEM	Engineering & Technology	592	176	120
	Science & Mathematics	1	0	0
	Subtotal	593	176	120
Transportation, Distribution & Logistics	Facility & Mobile Equipment Maintenance	614	251	119
	Sales & Service	22	2	2
	Transportation Operations	48	11	1
	Subtotal	684	264	122
	TOTAL	13702	3346	1873

Note that completers are those who have completed a CTE course of study; these individuals may or may not have pursued, or been awarded, industry certifications. According to WDE, the rates of attainment last year for credentials and certifications were as follows:

TYPE	TOTAL ATTEMPTED	PASSED	FAILED	PASS RATE
Credentials	1,891	1,390	501	74%
Certifications	473	345	128	73%

b. Focus Area: Career Academies

The career academy movement has been around for some time, and continues to grow based on its demonstrated successes⁶; research firm MDRC estimates there to be more than 8,000 high schools in the US that host one or more academies within their walls.

Career academies, or pathway programs, provide every enrolled student with relevant, real-world connections to an industry, industry sector, or profession by fully integrating CTE and academic work

⁶ <http://nc3t.com/wp-content/uploads/2014/08/Case-for-Pathways-A-Research-Summary.pdf>

and emphasizing connections to local employers and industry partners. While there is not a full list of Wyoming high schools offering an academy experience, some of the better-known programs include:

- Campbell County High School’s Academies in Energy and Engineering, Health Science and Human Services, Hospitality and Tourism, and Transportation (Gillette, WY)⁷
- Rock Springs High School’s Academies in Energy Resources, Health Occupations, Law Enforcement, and Engineering (Rock Springs, WY)⁸
- Evanston High School’s STEM Academy (Evanston, WY)⁹
- Opening in August 2016: A standalone facility for Pathways in Natrona County WY, serving 11th and 12th graders through half-day program with four academies¹⁰

2. Postsecondary/Adult Education

Wyoming hosts seven community colleges and one four-year university. In addition, there are three private postsecondary institutions granting recognized degrees or certifications: Cheeks International Academy of Beauty Culture, located in Cheyenne, The Institute of Business and Medical Careers (IBMC) College in Cheyenne, and WyoTech, formerly known as Wyoming Technical Institute, located in Laramie. A 2006 law drastically curtailed the number of unaccredited institutions in the state, forcing many suspected “diploma mills” to close or leave.

a. Community Colleges

Wyoming’s seven community colleges are overseen by the Wyoming Community College Commission, and include:

- **Casper College**
- **Central Wyoming College**
- **Eastern Wyoming College**
- **Laramie County Community College**
- **Northern Wyoming Community College District** (includes **Gillette** and **Sheridan Colleges**)
- **Northwest College**
- **Western Wyoming Community College**

These colleges each serve different regions of the state, with all but one (Casper College) serving multiple counties. As of Fall 2015, enrollment in these institutions included¹¹:

College	Full Time	Part Time	Total	Percent
Casper	1719	2130	3849	17.80%
Central	723	1471	2194	10.20%
Eastern	594	1252	1846	8.50%
LCCC	1802	2486	4288	19.90%
Northwest	976	778	1754	8.10%
NWCCD	1398	2972	4370	20.20%
Western	1154	2139	3293	15.20%
Total	8366	13228	21594	
Percent	38.70%	61.30%		100%

⁷ <http://www-cchs.ccsd.k12.wy.us/info/academy/index.html>

⁸ <http://www.advanc-ed.org/oasis2/u/par/accreditation/summary/pdf?institutionId=9439>

⁹ <http://www.uinta1.k12.wy.us/EvanstonHigh.cfm?subpage=1797328>

¹⁰ <http://natronaschools.org/pathways-the-academies-of-natrona-county-information-nights-for-parents/>

¹¹ <http://www.communitycolleges.wy.edu/Data/Sites/1/commissionFiles/publications/reports/enrollmentdata/2015-2016academicyear/fa15-enrollment-report.pdf>

b. University

The state's sole four-year institution is the University of Wyoming, located in Laramie, WY. It has a student body of more than 13,000 undergraduates from around the country and worldwide. It offers 200 areas of study, and features nine distinct colleges¹²:

- College of Agriculture and Natural Resources
- College of Arts and Sciences
- College of Business
- College of Education
- College of Engineering and Applied Science
- College of Health Sciences
- College of Law
- Interdisciplinary
- School of Energy Resources

c. Outcomes

According to the Integrated Postsecondary Education Data System (IPEDS), postsecondary institutions in Wyoming reported completers (those earning a degree or certification) in the following instructional areas in the 2014-2015 school year:

CIP Section	CIP Description	Two Year	UW	Total
01	Agriculture, Agriculture Operations, Related Sciences.	170	140	310
03	Natural Resources and Conservation.	13	51	64
04	Architecture and Related Services.	0	1	1
05	Area, Ethnic, Cultural, and Gender Studies.	4	11	15
09	Communication, Journalism, and Related Programs.	37	94	131
11	Computer and Information Sciences & Support Services.	67	37	104
12	Personal and Culinary Services.	84	0	84
13	Education.	229	387	616
14	Engineering.	38	239	277
15	Engineering Technologies/Technicians.	174	4	178
16	Foreign languages, literatures, and Linguistics.	21	36	57
19	Family and Consumer Sciences/Human Sciences.	0	46	46
22	Legal Professions and Studies.	20	73	93
23	English Language and Literature/Letters.	24	72	96
24	Liberal Arts and Sciences, General Studies & Humanities.	585	4	589
26	Biological and Biomedical Sciences.	48	201	249
27	Mathematics and Statistics.	23	47	70
30	Multi/Interdisciplinary Studies.	49	49	98
31	Parks, Recreation, Leisure, and Fitness Studies.	39	87	126
38	Philosophy and Religious Studies.	0	19	19
40	Physical Sciences.	19	113	132
41	Science Technologies/Technicians.	36	0	36
42	Psychology.	94	124	218
43	Security and Protective Services.	160	82	242
44	Public Administration and Social Service Professions.	25	82	107

¹² https://www.uwyo.edu/registrar/university_catalog/majors.html

CIP Section	CIP Description	Two Year	UW	Total
45	Social Sciences.	86	152	238
46	Construction Trades.	17	0	17
47	Mechanic and Repair Technologies/Technicians.	1369	0	1369
48	Precision Production.	226	0	226
49	Transportation and Materials Moving.	1	0	1
50	Visual and Performing Arts.	143	92	235
51	Health Professions and Related Clinical Sciences.	881	331	1212
52	Business, Management, Marketing, and Related Support Services.	245	332	577
54	History (new)	18	53	71
	Total	4945	2959	7904

B. The Workforce System

Economically, Wyoming is known for its hospitality and tourism, agriculture, mining and energy industries; however, there are several other industries present in the state, many of which offer high-paying positions to workers. The state is interested in further diversifying in the future to counter headwinds in some industries and expand opportunities for residents.

1. Industries and Occupations - Current

According to the Department of Workforce Services, in the fourth quarter of 2015, the following numbers of people were employed in different industries in Wyoming, at varying weekly wages¹³:

Industry	15Q4 Average Monthly Employment	15Q4 Average Weekly Wage
Total, Wyoming	279,408	\$938
Health Care & Social Assistance	35,343	\$978
Accommodation & Food Services	31,743	\$374
Retail Trade	31,289	\$564
Educational Services	30,577	\$799
Public Administration	23,430	\$991
Construction	23,193	\$1,077
Mining, Quarrying, & Oil & Gas Extraction	22,046	\$1,743
Transportation & Warehousing	11,537	\$986
Manufacturing	9,852	\$1,273
Professional & Technical Services	9,488	\$1,380
Wholesale Trade	9,362	\$1,242
Administrative & Waste Services	8,164	\$670
Other Services, Except Public Administration	7,859	\$704
Finance & Insurance	6,891	\$1,222
Information	4,328	\$882
Real Estate & Rental & Leasing	4,245	\$939
Arts, Entertainment, & Recreation	3,713	\$543
Utilities	2,689	\$1,885
Agriculture, Forestry, Fishing, & Hunting	2,634	\$827
Management of Companies & Enterprises	1,024	\$1,773

While this list is sorted by number of employees per industry, note that weekly wages do not necessarily correlate with industry size. Industries such as construction, mining, manufacturing, utilities, and various

¹³ http://doe.state.wy.us/LMI/15Q4_QCEW/15q4t10.htm

management and service industries, offer particularly high wages, and often require employees with more advanced skills and experience levels.

In terms of which professions employ the most, regardless of industry, the following lists show the top 20 occupations in Wyoming as of 2014, first listing occupations that require more than a high school diploma but less than a bachelor's degree, then those that require a bachelor's degree or more.

Occupation	Number employed (2014)	Education Required
Heavy and Tractor-Trailer Truck Drivers	7,696	Postsecondary non-degree award
Bookkeeping, Accounting, and Auditing Clerks	3,957	Some college, no degree
Teacher Assistants	3,205	Some college, no degree
Nursing Assistants	3,065	Postsecondary non-degree award
Automotive Service Technicians and Mechanics	1,947	Postsecondary non-degree award
Preschool Teachers, Except Special Education	888	Associate's degree
Licensed Practical and Licensed Vocational Nurses	783	Postsecondary non-degree award
Hairdressers, Hairstylists, and Cosmetologists	730	Postsecondary non-degree award
Emergency Medical Technicians and Paramedics	657	Postsecondary non-degree award
Medical Assistants	657	Postsecondary non-degree award
Forest and Conservation Technicians	611	Associate's degree
Dental Assistants	590	Postsecondary non-degree award
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	576	Postsecondary non-degree award
Paralegals and Legal Assistants	553	Associate's degree
Computer User Support Specialists	521	Some college, no degree
Telecommunications Equipment Installers and Repairers, Except Line Installers	486	Postsecondary non-degree award
Firefighters	475	Postsecondary non-degree award
Dental Hygienists	465	Associate's degree
Library Technicians	463	Postsecondary non-degree award
Civil Engineering Technicians	415	Associate's degree

Occupation	Number employed (2014)	Education Required
General and Operations Managers	5,520	Bachelor's degree
Registered Nurses	4,853	Bachelor's degree
Substitute Teachers	2,891	Bachelor's degree
Elementary School Teachers, Except Special Education	2,566	Bachelor's degree
Managers, All Other	2,109	Bachelor's degree
Accountants and Auditors	1,941	Bachelor's degree
Secondary School Teachers, Except Special and Career/Technical Education	1,771	Bachelor's degree
Lawyers	1,158	Doctoral or professional degree
Middle School Teachers, Except Special and Career/Technical Education	1,093	Bachelor's degree
Business Operations Specialists, All Other	1,060	Bachelor's degree
Civil Engineers	946	Bachelor's degree
Human Resources Specialists	843	Bachelor's degree
Coaches and Scouts	828	Bachelor's degree
Loan Officers	763	Bachelor's degree
Construction Managers	744	Bachelor's degree
Medical and Health Services Managers	725	Bachelor's degree
Child, Family, and School Social Workers	677	Bachelor's degree
Petroleum Engineers	672	Bachelor's degree
Financial Managers	667	Bachelor's degree

Occupation	Number employed (2014)	Education Required
Educational, Guidance, School, and Vocational Counselors	563	Master's degree

2. Industries and Occupations - Future

While the state’s current primary industries will continue to be important in the future, state economic development leaders are working to increase economic diversity by pursuing the growth of additional industries in the state through internal growth and the relocation of companies from other states. According to interviews with state and local leaders, the current focus is on advanced technology industries including advanced manufacturing, alternative energy, and computer and software enterprises such as data centers. Additionally, Governor Matt Mead has convened a group to develop a 20-year economic development strategy that may provide additional guidance; this entity is not expected to reach and release its conclusions for at least six months however.

Currently, absent any major changes in state strategy around economic development, the Department of Workforce Services projects the number of annual openings in each occupation through the year 2024. The charts below show the number of annual openings each year due to growth and/or replacement, first listing occupations that require more than a high school diploma but less than a bachelor’s degree, then those that require a bachelor’s degree or more.

Occupation	New Hires/Year (to 2024)	Education Required
Heavy and Tractor-Trailer Truck Drivers	131	Postsecondary non-degree award
Nursing Assistants	111	Postsecondary non-degree award
Teacher Assistants	101	Some college, no degree
Automotive Service Technicians and Mechanics	52	Postsecondary non-degree award
Bookkeeping, Accounting, and Auditing Clerks	39	Some college, no degree
Preschool Teachers, Except Special Education	38	Associate's degree
Licensed Practical and Licensed Vocational Nurses	28	Postsecondary non-degree award
Forest and Conservation Technicians	28	Associate's degree
Medical Assistants	27	Postsecondary non-degree award
Library Technicians	24	Postsecondary non-degree award
Emergency Medical Technicians and Paramedics	23	Postsecondary non-degree award
Dental Assistants	23	Postsecondary non-degree award
Hairdressers, Hairstylists, and Cosmetologists	22	Postsecondary non-degree award
Firefighters	16	Postsecondary non-degree award
Wind Turbine Service Technicians	16	Some college, no degree
Phlebotomists	14	Postsecondary non-degree award
Dental Hygienists	14	Associate's degree
Medical Records and Health Information Technicians	13	Postsecondary non-degree award
Geological and Petroleum Technicians	13	Associate's degree
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	12	Postsecondary non-degree award

Occupation	New Hires/Year (to 2024)	Education Required
Registered Nurses	208	Bachelor's degree
General and Operations Managers	140	Bachelor's degree
Substitute Teachers	75	Bachelor's degree

Occupation	New Hires/Year (to 2024)	Education Required
Elementary School Teachers, Except Special Education	73	Bachelor's degree
Accountants and Auditors	57	Bachelor's degree
Secondary School Teachers, Except Special and Career/Technical Education	53	Bachelor's degree
Managers, All Other	51	Bachelor's degree
Coaches and Scouts	34	Bachelor's degree
Middle School Teachers, Except Special and Career/Technical Education	31	Bachelor's degree
Medical and Health Services Managers	29	Bachelor's degree
Civil Engineers	28	Bachelor's degree
Physical Therapists	22	Doctoral or professional degree
Child, Family, and School Social Workers	21	Bachelor's degree
Human Resources Specialists	20	Bachelor's degree
Financial Managers	18	Bachelor's degree
Loan Officers	18	Bachelor's degree
Petroleum Engineers	18	Bachelor's degree
Lawyers	17	Doctoral or professional degree
Educational, Guidance, School, and Vocational Counselors	17	Master's degree
Environmental Scientists and Specialists, inc Health	16	Bachelor's degree

C. Supply and Demand Analysis

One of the challenges of connecting the education and workforce systems is the fact that they use different coding schemes: The education system uses the Classification of Instructional Programs, or CIP, to identify coursework and programs of study, while the workforce system uses Standard Occupational Classification, or SOC, to identify occupations.

Fortunately, the National Center for Education Statistics offers a crosswalk between the two, allowing us to connect Wyoming’s educational outcomes (degrees and certifications) with workforce needs; that analysis is found below.

Note that this is an imperfect analysis: One CIP code can connect to several SOC codes and vice versa. We also cannot ascertain the intentions of those receiving credentials: A history major may not intend to enter the workforce as a historian, but rather go on to law school. Similarly, someone receiving an Associate’s degree in auto repair may be doing so for their own interests, and not to find a job.

Those caveats aside, it can be helpful to look at some comparisons between the educational courses of study completed and the needs of the workforce; this data is presented below.

1. Distribution of Jobs vs. Completers

The chart below lists the primary SOC code categories, listing the number of annual openings projected in Wyoming versus the number of completers of post-high school credentials in the 2014-2015 school year. It does not include high school students completing CTE courses of study; while the number of high school students earning certificates and credentials is found on page 5, the data available does not include SOC or CIP designations, making it difficult to include in the analysis below.

While some SOC categories require high numbers of workers, some or most of those may be unskilled positions, such as 35: Food Preparation and Serving. This chart is intended primarily to show where completers had concentrated, and what level of openings would be available at any level.

SOC Code	SOC Title	Annual Openings	2014-15 Completers
11-0000	Management Occupations	465	482
13-0000	Business and Financial Operations Occupations	222	228
15-0000	Computer and Mathematical Occupations	62	198
17-0000	Architecture and Engineering Occupations	145	429
19-0000	Life, Physical, and Social Science Occupations	164	1166
21-0000	Community and Social Service Occupations	141	123
23-0000	Legal Occupations	40	89
25-0000	Education, Training, and Library Occupations	576	1357
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	116	416
29-0000	Healthcare Practitioners and Technical Occupations	552	1063
31-0000	Healthcare Support Occupations	254	139
33-0000	Protective Service Occupations	174	244
35-0000	Food Preparation and Serving Related Occupations	1,209	46
37-0000	Building and Grounds Cleaning and Maintenance Occupations	372	0
39-0000	Personal Care and Service Occupations	310	74
41-0000	Sales and Related Occupations	904	0
43-0000	Office and Administrative Support Occupations	897	0
45-0000	Farming, Fishing, and Forestry Occupations	69	7
47-0000	Construction and Extraction Occupations	683	19
49-0000	Installation, Maintenance, and Repair Occupations	519	1349
51-0000	Production Occupations	372	227
53-0000	Transportation and Material Moving Occupations	678	1

2. Supply vs. Demand: Specific Occupations

The charts below compare the number of openings in specific positions to the number of completers linked with that position. In both cases, teachers have been combined into their composite groups (using 25-2000 to sum up kindergarten, elementary, middle, and high school teachers for example) since it can be difficult to assign CIP codes to specific levels of teaching. (This may also represent a problem in attributing completers to either K-12 or postsecondary teaching.)

In the first chart, only jobs requiring some level of post-high school training were included, to provide a better comparison with the list of completers. Jobs are sorted by number of annual openings.

SOC	Job Title	Education Required	Annual Openings	2014-15 Completers
25-2000	Teachers, K-12	Bachelor's degree	247	530
29-1141	Registered Nurses	Bachelor's degree	208	542
11-1021	General and Operations Managers	Bachelor's degree	140	262
53-3032	Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	131	0
31-1014	Nursing Assistants	Postsecondary non-degree award	111	2
25-9041	Teacher Assistants	Some college, no degree	101	0
25-1000	Postsecondary Teachers	Bachelor's degree	69	822
13-2011	Accountants and Auditors	Bachelor's degree	57	114
49-3023	Automotive Service Technicians and Mechanics	Postsecondary non-degree award	52	277
11-9199	Managers, All Other	Bachelor's degree	51	0
43-3031	Bookkeeping, Accounting, and Auditing Clerks	Some college, no degree	39	10
27-2022	Coaches and Scouts	Bachelor's degree	34	24
11-9111	Medical and Health Services Managers	Bachelor's degree	29	2

SOC	Job Title	Education Required	Annual Openings	2014-15 Completers
17-2051	Civil Engineers	Bachelor's degree	28	41
29-2061	Licensed Practical & Licensed Vocational Nurses	Postsecondary non-degree award	28	120
19-4093	Forest and Conservation Technicians	Associate's degree	28	0
31-9092	Medical Assistants	Postsecondary non-degree award	27	11
25-4031	Library Technicians	Postsecondary non-degree award	24	0
29-2041	Emergency Medical Technicians and Paramedics	Postsecondary non-degree award	23	19
31-9091	Dental Assistants	Postsecondary non-degree award	23	59
39-5012	Hairdressers, Hairstylists, and Cosmetologists	Postsecondary non-degree award	22	36
29-1123	Physical Therapists	Doctoral or professional degree	22	0
21-1021	Child, Family, and School Social Workers	Bachelor's degree	21	71
13-1071	Human Resources Specialists	Bachelor's degree	20	0
11-3031	Financial Managers	Bachelor's degree	18	39

In the second chart, the list is sorted by number of completers attributed to each SOC code, also listing the number of annual openings projected for that specific job. In this chart, jobs with a high school diploma or equivalent are included. Note that, while some jobs may be listed as requiring only a high school diploma or equivalent, applicants will face better prospects with some type of credential, such as certification for 49-3031, Bus & Truck Mechanics, Diesel Engine Specialists.

SOC	Job Title	Education Required	Annual Openings	2014-15 Completers
25-1000	Postsecondary Teachers	Bachelor's degree	69	822
49-3031	Bus & Truck Mechanics, Diesel Engine Specialists	HS diploma or equivalent	26	604
25-1199	Postsecondary Teachers, All Other	Doctoral or professional degree	5	589
29-1141	Registered Nurses	Bachelor's degree	208	542
25-2000	Teachers, K-12	Bachelor's degree	247	530
49-3021	Automotive Body and Related Repairers	HS diploma or equivalent	6	366
49-3023	Automotive Service Technicians and Mechanics	Postsecondary non-degree award	52	277
11-1021	General and Operations Managers	Bachelor's degree	140	262
51-4121	Welders, Cutters, Solderers, and Brazers	HS diploma or equivalent	74	182
33-1012	First-Line Supervisors of Police and Detectives	HS diploma or equivalent	13	180
25-1081	Education Teachers, Postsecondary	Doctoral or professional degree	2	145
11-9013	Farmers, Ranchers, & Other Agri. Managers	HS diploma or equivalent	ND	133
29-2061	Licensed Practical & Licensed Vocational Nurses	Postsecondary non-degree award	28	120
13-2011	Accountants and Auditors	Bachelor's degree	57	114
19-1029	Biological Scientists, All Other	Bachelor's degree	5	104
29-1128	Exercise Physiologists	Bachelor's degree	0	102
19-3031	Clinical, Counseling, and School Psychologists	Doctoral or professional degree	15	94
27-3031	Public Relations Specialists	Bachelor's degree	5	94
27-1013	Fine Artists: Painters, Sculptors, and Illustrators	Bachelor's degree	ND	87
19-1042	Medical Scientists, Except Epidemiologists	Doctoral or professional degree	ND	77
17-3023	Electrical and Electronics Eng. Technicians	Associate's degree	4	76
23-1011	Lawyers	Doctoral or professional degree	17	73
21-1021	Child, Family, and School Social Workers	Bachelor's degree	21	71
19-3093	Historians	Master's degree	0	71
19-3099	Social Scientists and Related Workers, All Other	Bachelor's degree	0	66

III. The Six Components of a Strong College/Career Pathways System

A. Introduction

In 2014, the Council of Chief State School Officers (CCSSO) launched its Career Readiness Task Force to increase the rigor in career education to meet expectations of the current labor market¹⁴. With support from the JPMorgan Chase Foundation and others, CCSSO, working with Advance CTE, is continuing to advance its Career Readiness Initiative (CRI), and as part of that work has identified six key components of a strong college and career readiness system. These components are detailed below¹⁵, along with information on how, and how well, Wyoming's work connects to those indicators. This analysis will then lead to the recommendations presented in the next section.

B. Employer Engagement (Component 1)

CRI's first objective focuses on employer engagement. They suggest that states "Establish employer-driven processes informed by real-time, projected, and other labor market information (LMI) to determine high-skill, high-demand industry sectors with which career pathways and their associated credentials must be aligned." They propose three criteria for this objective:

- 1a. Identifying high-skill, high-demand sectors: The state and employer community create a structured and dynamic process that uses current and projected LMI to identify high-skill, high-demand sectors and occupations where career pathways should be prioritized and scaled.
- 1b. Aligning skills and competencies with labor market: Formalize and sustain an employer-led, sector-based process to identify the academic knowledge, technical and employability skills required by each priority sector to ensure career pathways and programs are aligned with industry needs.
- 1c. Dynamic review process: Create and support a cross-sector process and feedback loop to review the impact of career pathways to inform their continuous improvement.

1a. Identifying high-skill, high-demand sectors

Wyoming has several state-level entities, including WDE, WCCC, the Department of Workforce Services (WDWS), Wyoming Business Council (WBC), the University of Wyoming, the State Board of Vocational Education, and the Governor's office that are all interested in a strong college and career readiness system, and that have access to information and other resources that could contribute to its development. And these entities do already work together in various capacities, such as sharing seats on the Wyoming Workforce Development Council, the Wyoming Career Readiness Council, and the Governor's long-term economic planning efforts. WDWS also has formal Memoranda of Understanding with WDE, WCCC, and the University of Wyoming that allow for data sharing and collaboration, and offers a great deal of data as a result¹⁶.

¹⁴ http://www.ccsso.org/Resources/Programs/Career_Readiness_Initiative.html

¹⁵ https://www.careertech.org/sites/default/files/files/resources/Needs_Assessment_Framework_May2016_FINAL.docx

¹⁶ http://doe.state.wy.us/lmi/education_we_connect.htm

However, despite these positive elements, there does not appear to be a formalized statewide structure or process in place that regularly convenes the K-12, postsecondary education, employer and workforce development communities to review labor market information, establish priorities for career pathways, and disseminate that information across the education and workforce spectrum to inform stakeholders at the local and regional level.

This type of structure could either be legislated into being or created through intergovernmental and external MOUs, and it would formalize a system of taking existing economic development planning and labor market data and interpreting it in a way that would be actionable for the state's education and training systems, thereby aligning all elements of the workforce development system to the state's current and projected needs.

1b. Aligning skills and competencies with labor market

Career and technical education programs of study funded by the Perkins Act, which includes all CTE in Wyoming, are required to meet specific guidelines, including a state review of the programs with regular audits, input into the programs from local business communities through advisory boards and other mechanisms, alignment to opportunities within industries and professions, and an assessment to gauge real-world preparedness, which often occurs through participation in industry-recognized certifications. The state has also instituted a set of content and performance standards for career and technical education that emphasize career-ready practices¹⁷. Further, WDWS provides data on employer needs based on regular hiring surveys and other activities.

However, the fact that much of the guidance on industry needs takes place at the local level means that the quality of information, and the processes used to acquire it, likely varies quite a bit from site to site. As a result, career preparedness efforts also likely vary. It may be wise to supplement these efforts with state-level guidance and training on the specific knowledge and skills required within different pathways, developed with the support of sector groups and/or individual business partners. This would provide consistency, and could still be enhanced and customized through local efforts.

1c. Dynamic review process

In order to receive Perkins funds for a program of study, local secondary and postsecondary eligible recipients need to submit a local plan. The plan must correspond to the time period covered by the state plan (either a six-year plan or a transition plan followed by a five year plan), and the program is required to submit performance data on an annual basis. In addition, secondary and postsecondary programs are required to survey business and industry annually, and to host advisory boards. However, there are no such requirements for career academy programs unless they receive Perkins funds for their CTE elements.

There are strong efforts to make performance data available. This occurs through WDE's detailed annual Perkins reports, thorough reporting on activities and outcomes by WCCC, and a rigorous review and dissemination of data by WDWS. Each of these entities provides valuable information to stakeholders and the public that can and should continue to be used in the system's "feedback loop," and could be appended with additional information on local, regional, and statewide industry needs and knowledge and skill requirements.

¹⁷ <https://edu.wyoming.gov/downloads/standards/2015/2014-CVE-WyCPS-FINAL.pdf>

The recently-reconstituted Wyoming Workforce Development Council may prove to be a contributor in this area: It has established regional entities, aligned with the footprints of the state's community colleges, which are beginning to act as conveners and agents.

C. Rigor and Quality in Career Pathways for ALL Students (Component 2)

CRI's first objective focuses on rigor and quality in career pathways. They suggest that states "Use policy and funding levers to improve the quality and rigor of career pathways - including scaling down or phasing out those that don't lead to credentials with labor market value - and make those pathways widely available to and accessed by all students in all secondary settings, especially in underserved populations." They propose two criteria for this objective:

- 2a. Quality and rigor in pathways: Policies and processes are in place to ensure all career pathways endorsed by the state develop the core academic knowledge, technical skills, and employability skills students need to be successful in college and the 21st century work place.
- 2b. Equity and access in rigorous pathways: Policy and funding levers to expand and equalize access to high-quality career pathways for all students are in place and fully utilized.

2a. Quality and rigor in pathways

Setting, and meeting, a set of high quality standards in CTE and pathway programs is an indispensable element of a strong career readiness system. The K-12 system does have CTE curriculum standards¹⁸ and a set of program quality standards¹⁹ it uses in approving and reviewing programs across the state, while the community college also does regular reviews of its programs on a five-year rotating basis²⁰. And data on CTE outcomes at both the secondary and postsecondary levels indicate that Wyoming's system is largely effective. From the 2014-15 Perkins report on secondary education:

- 29.5% of concentrators proficient or advanced in reading (ACT test)
- 38.1% of concentrators proficient or advanced in math (ACT test)
- 74.5% technical skill attainment
- 93.1% graduation rate
- 96.1% placement rate

Data on community college outcomes, by campus, are collected and analyzed by WDE and available from the WCCC website for the 2014-15 year²¹.

While a thorough review of CTE quality across the state is beyond the scope of this report, such a review should be undertaken as one of the first steps in building a strong workforce pipeline, and will be reflected in the recommendations as such.

2b. Equity and access in pathways

Wyoming has worked to ensure that all students have access to high-quality, rigorous program of study. As a very rural state, Wyoming has worked to provide a multitude of courses, including CTE courses,

¹⁸ <https://edu.wyoming.gov/educators/standards/career-vocational/>

¹⁹ <https://edu.wyoming.gov/in-the-classroom/career-tech-ed/course-sequencing/>

²⁰ <http://communitycolleges.wy.edu/reports-1.aspx>

²¹ <http://communitycolleges.wy.edu/Data/Sites/1/commissionFiles/publications/reports/performance-indicator-report/final.performanceindicatorreport.2015.pdf>

available through its distance learning, system, the Wyoming Switchboard Network²². In addition, all seven of the state's community colleges offer dual and concurrent enrollment opportunities for high school students, and many of the dual enrollment classes can be accessed virtually²³. One of the challenges noted here is the requirement for educators to hold a Master's Degree in order to teach concurrent enrollment courses, which makes it difficult to find enough instructors.

The state's CTE efforts carry a strong focus on serving underrepresented populations, including minorities, individuals with disabilities, the economically disadvantaged, single parents, displaced homemakers, limited English proficient, migrant, non-traditional students (ex: males in nursing), and those in the corrections system. Progress with each of these targeted audiences is highlighted in the state's annual Perkins reporting, which shows that CTE participation is generally representative of the state's population and that this representation has remained stable over time.

D. Career-Focused Accountability Systems (Component 3)

CRI's first objective focuses on career-focused accountability systems. They suggest that states "Incorporate robust career-focused indicators in state K-12 accountability systems that measure and value successful completion of high-quality career pathways, attainment of credentials with labor market value, participation in work-based learning, and enrollment in postsecondary education or apprenticeships." They propose three criteria for this objective:

- 3a. Career-focused indicators publicly reported: The state collects and publicly reports a robust set of career-focused indicators that measure and value student access and equity within career pathways.
- 3b. Career-focused indicators have accountability weight: The state has incorporated a robust set of career-focused indicators into its K-12 accountability system that count towards school and district accountability metrics.
- 3c. Student recognitions and incentives for developing and demonstrating career readiness: Secondary students are recognized and rewarded for developing and demonstrating career readiness.

3a. Career-focused indicators publicly reported

Currently, high school students in Wyoming participate in the following assessments (from the WDE State Assessment web page)²⁴:

- ASPIRE is a new product in the ACT line of college and career readiness assessments. It assesses students' achievement in English, math, reading, and science. This assessment will be administered to all 9th and 10th graders for the first time in the spring of 2016.
- ACT Plus Writing is the capstone of the ACT college and career readiness system. It measures students' general learning outcomes in English, math, reading, writing, and science. This assessment is given once a year to all students in the 11th grade.
 - WorkKeys is an optional assessment for students in grades 11 and 12, and is used to assess a student's job skills.

²² <http://wyomingswitchboard.net/Home.aspx>

²³ <https://communitycolleges.wy.edu/dual/home.aspx>

²⁴ <https://edu.wyoming.gov/educators/state-assessment/>

- Wy-ALT is given once per year to students with significant cognitive disabilities in grades 9-11 in ELA, mathematics and science.
- COMPASS is an optional computer-adaptive college placement assessment. Students are to be given the opportunity to take this assessment at least one (1) time during their senior year.

Additionally, the state CTE office, due to Perkins reporting requirements, annually collects detailed information on CTE outcomes, including:

- Number of CTE Concentrators and Participants
- Academic Attainment: Reading
- Academic Attainment: Mathematics
- Technical Skill Attainment
- Secondary School Completion
- Student Graduation Rates
- Secondary Placement in employment, post-secondary/advanced education, or the military at follow-up
- Non-Traditional Participation
- Non-traditional Completion
- CTSO Participation
- Participation in Job Training & Work Based Learning
- Occupational Plan by Grade

Data on community college outcomes, by campus, are collected by WDE and available from the WCCC website for the 2014-15 year²⁵.

3b. Career-focused indicators have accountability weight

Currently, career-focused indicators are not included in the state's K-12 accountability system, nor are they included in the state's graduation requirements²⁶. CTE classes may count as electives when calculating the number of credits students have earned but are not required, nor is there any special endorsement connected to career readiness.

In terms of class- or program-level assessments: While Wyoming has historically had a statewide assessment of technical skill attainment, the prior statewide assessment of CTE skills was designed to tap generic workplace skills solely and is not industry-specific. Wyoming has developed a multi-step, multi-year, phase-in of a new CTE assessment system, and since 2008 has been integrated industry-recognized certifications and other industry standards into the assessment schemes of various programs of study; see the 2014-15 Perkins report for more.

3c. Student recognitions and incentives for developing and demonstrating career readiness

As noted above, career readiness indicators are not included in the state accountability system, nor are they incorporated into graduation requirements or diploma endorsements. Students can be recognized through individual programs, and many in CTE are taking industry certifications or working to meet other industry standards as part of their efforts to complete CTE classes and programs of study. Students may also be recognized through their participation in, and achievements through, various

²⁵ <http://communitycolleges.wy.edu/Data/Sites/1/commissionFiles/publications/reports/performance-indicator-report/final.performanceindicatorreport.2015.pdf>

²⁶ <http://sos.wy.state.wy.us/Rules/RULES/5218.pdf>

Career Technical Student Organizations (CTSOs)²⁷, but these have no impact on graduation or accountability systems.

E. Scaled Pathways that Culminate in Credentials of Value (Component 4)

CRI's fourth objective focuses on scaled pathways that culminate in credentials of value. They suggest that states, "Working with local districts, scale career pathways that span secondary and postsecondary systems, offer focused career guidance and advisement, blend rigorous and engaging core academic and career-technical instruction, include high-quality work-based learning experiences, and culminate in postsecondary or industry credentials of value." They propose three criteria for this objective:

- 4a. Scale high-quality career pathways: Develop and execute strategies to scale career pathways that connect students to postsecondary education and career opportunities in high-skill, high-demand sectors.
- 4b. Expand career guidance systems and work-based learning opportunities: Ensure that evidence-based career advisement systems and demand-driven work-based learning opportunities are integral components of career pathways that connect classroom learning with the work place.
- 4c. Credentials have value: Adopt and operationalize policies that require career pathways to culminate in postsecondary degrees or validated credentials with labor market value.

4a. Scale high-quality pathways

While some elements of the state's career preparation system are easily scalable, such as the distance learning opportunities offered by its community college, there is little evidence of a concerted effort to scale up successful programs or scale down unsuccessful/out of date programs. Certainly some information gets shared between schools, both through formal and informal channels and through state connections; one example of this is WYSTEM, an online resource cataloging STEM education initiatives²⁸. Further, program review and reporting efforts allow the state to identify which programs are having an outsized impact on student outcomes. But beyond these conventional means, it does not appear that there have been any efforts to scale up specific models or a concerted effort to share practices across districts or systems.

4b. Expand work-based learning and career guidance systems

The current career guidance system faces challenges: Funding for state sponsorship of a national career exploration system expired a few years ago, leaving nothing in its place (though some or many schools have secured licenses for their own use. Further, the ratio of counselors to students is approximately 400:1 (actually better than the national average of 500:1) and, given counselors' other responsibilities from test administration to crisis counseling, it is unclear how much counseling any one student receives on their postsecondary or career options. Note, however, that many CTE or career academy teachers provide guidance within their areas of expertise, as evidenced by the fact that, according to the 2014-2015 Perkins report, 65.7% of CTE completers had an occupational plan.

However, there are some promising developments on the career guidance front. The state has recently begun development of a web/mobile app to assist middle school students with career exploration²⁹, which promises to be a good first step in providing a scalable resource at a critical period in students'

²⁷ <https://edu.wyoming.gov/in-the-classroom/career-tech-ed/student-organizations/>

²⁸ <https://edu.wyoming.gov/in-the-classroom/career-tech-ed/wystem/>

²⁹ https://docs.google.com/document/d/1QlOgUFnCpeHrbS5LxJAK2q-5GQES-_j6aaXcH9IXUeM/edit

academic careers. Further, building on the idea that every caring adult in the building should be able to provide some guidance to students, WDE is advancing a program in which each school has one highly trained teacher or administrator, who will then train the rest of the staff on how to support students in postsecondary and career planning.

In addition, at the postsecondary level, most community colleges (five out of seven) have established career centers, as does the University of Wyoming.

In terms of engaging business partners as experts, the state requires that every district or college CTE program have an advisory board with a minimum of 2-5 business members, meeting at least two times per year to share information and gather feedback. And in terms of connecting students to work-based learning opportunities, the 2014-15 Perkins report notes the following results for its CTE concentrators:

Job Training Type	Count	Percent
Job Shadowing	854	32.4%
Work-experience internship	569	21.9%
Community service learning	577	21.6%
School-based enterprises	300	11.4%
Mentorship	164	6.2%
Other**	39	4.2%
Cooperative Education	112	1.5%
Apprenticeship	25	1.0%

WDE does not yet have data reflecting student completion of registered apprenticeships; however, it has expressed interest in working with the Department of Labor to look at apprenticeship programs offered, completers of those programs and workforce needs in specific occupational and regional areas.

On the community college front, all colleges report multiple types of partnerships with employers, professional groups, and other community organizations³⁰, which undoubtedly come on top of class- and program-level engagement; however, there are no summative reports on these activities.

Without a detailed survey, it would be difficult to tell exactly how these experiences aligned with their programs of study, or what role employers played (such as whether or not they led the assessment of students). However, research shows that almost any substantive experience that students have with employers is beneficial and leads to positive future personal and career outcomes.

4c. Credentials have value

Wyoming has done a very good job of connecting the K-12 and community college systems. According to the state's Perkins report, the vast majority (92.2%) of high schools reported having an articulation agreement in place with one or more Wyoming community colleges; this included 100% of schools with enrollment between 251-550 and 551 students and above. At a statewide level, the colleges affiliated with WCCC all offered both dual and concurrent enrollment opportunities for Wyoming high school students, with concurrent classes taking place on high school campuses, and dual classes happening either virtually or on the campus of participating community colleges. For the 2014-15 school year, WCCC reported an unduplicated headcount of 4,021 taking concurrent classes and 1,184 participating in dual enrollment classes³¹.

³⁰ <http://communitycolleges.wy.edu/Data/Sites/1/commissionFiles/publications/reports/partnership/partnership.report.2015.draft.pdf>

³¹ <http://communitycolleges.wy.edu/Data/Sites/15/dualfiles/documents/post-secondary-education-options-2014-2015.pdf>

In terms of industry-recognized credentials, as noted previously, Wyoming's K-12 system has developed a multi-step, multi-year, phase-in of a new CTE assessment system, and since 2008 has been integrated industry-recognized certifications and other industry standards into the assessment schemes of various programs of study; see the 2014-15 Perkins report for more. Further, the state's community colleges identify industry-recognized credentials for all relevant classes and encourage participation. For some examples, see the "Wyoming Community College Commission 2014-2015 Academic Program Review Report³²."

F. Align State and Federal Funding Streams (Component 5)

CRI's fifth objective focuses on alignment of funding streams. They suggest that states "Reorganize and intentionally align state and federal funding streams from education, workforce development, and economic development sources to effectively deliver career-focused programs to all students." They propose two criteria for this objective:

- 5a. **Asset mapping:** All federal, state, and private funding streams are inventoried to find opportunities to better align the state's education and training pipeline in response to the needs of its labor market.
- 5b. **Braided funding:** Funding streams are effectively braided at state, regional, and local levels to fully leverage all relevant funding opportunities to implement integrated career pathways.

5a. Asset mapping

There are a limited set of funds that go into college and career readiness from state and federal sources. The largest source is the federal Perkins Grant; in fiscal 2016, that amount is \$4,214, 921, with up to 15% of those funds held at the state level for administration and leadership activities, and the rest going to school districts (60%) and community colleges (40%)³³. In addition to these funds, there is a federal allocation through the Gear UP program that supports college exploration and preparation for up to 2,000 underserved students³⁴, as well as federal funding for math and science partnerships that can link directly to college and career readiness in STEM areas³⁵.

At the state level, The State of Wyoming provides school districts with additional funding for CTE courses using the Education Resource Block Grant Model. WDE offers \$250,000 in competitive grants for innovative education models through the Wyoming Trust Fund for Innovative Education; these funds can be used specifically for CTE or pathways initiatives³⁶. The state has also offered a CTE Demonstration Project Grant, which is a competitive state grant to fund expenses associated with the planning, development and implementation of a new or expansion of existing high school CTE programs³⁷. At a local level, schools and districts may choose to allocate additional funds for CTE or pathways activities.

A possible new source of funding for pathways initiatives may come through the recently passed federal Workforce Innovation and Opportunity Act (WIOA), which allocates funding specifically for youth at the K-12 levels for career awareness and preparation; however, these funds are directed primarily at out-of-

³² <https://communitycolleges.wy.edu/Data/Sites/1/commissionFiles/publications/reports/annualprogramreviewreports/annual.academic.program.review.2014-15.pdf>

³³ <https://careertech.org/Wyoming>

³⁴ <https://edu.wyoming.gov/beyond-the-classroom/college-career/gear-up/>

³⁵ <https://edu.wyoming.gov/beyond-the-classroom/grants/math-science-partnership/>

³⁶ <https://edu.wyoming.gov/beyond-the-classroom/grants/innovative-education/>

³⁷ <https://edu.wyoming.gov/beyond-the-classroom/grants/project-grant/>

school activities, so they may be seen as supporting of complementary programs rather than providing additional revenues for in-school activities. And finally, there are numerous grants available for CTE and pathways initiatives; the recent JPMorgan Chase Foundation activity in this area is just one example.

5b. Braided funding

The state has a formal model for career and technical education that is aligned to the requirements of Perkins funding (the state's single largest source of support). Additional funds may support existing work or alternative models, but will almost certainly be aligned with the Perkins requirements given their importance to schools, districts, and the state. There are undoubtedly numerous examples of local fundraising activities and community support for CTE and pathways efforts, but these will likely support Perkins-underwritten efforts and will therefore align to existing sources of funding.

G. Ensure Cross-Institutional Alignment (Component 6)

CRI's final objective focuses on ensuring cross-institutional alignment. They suggest that states "Foster greater collaboration between K-12 and postsecondary systems to adopt policies and processes in schools, technology centers, academies, and institutions of higher education to ensure cross-institutional alignment of programs and pathways that smooth transitions for students and minimize institutional barriers." They propose two criteria for this objective:

- 6a. Mapping the career preparation delivery system: All parts of the delivery system – comprehensive high schools, technology centers, career academies, postsecondary institutions – are mapped to identify redundancies, inefficiencies, and misalignments, as well as best practices.
- 6b. Aligning the career preparation delivery system: The various components of the delivery system are aligned and function synergistically to provide a seamless pathway to career preparation.

6a. Mapping the career preparation delivery system

There are a limited number of providers involved in the state of Wyoming. At the K-12 level, almost all CTE and pathways work happens within a comprehensive high school environment, and at the postsecondary level, there are only seven community colleges, all tightly connected through the Wyoming Community College Commission³⁸, and one four-year university. There are a handful of private postsecondary institutions, but the bulk of students go through the public institutions.

These entities work closely together, as evidenced by the articulation agreements in place, the coordination through statewide efforts such as the Workforce Development Council, and the strong dual and concurrent enrollment activity reported by WCCC. There are also anecdotal reports on the sharing of advisory boards between secondary and postsecondary institutions, but no data is available on this point. There is also data on the postsecondary and career activities of high school graduates available from WDWS³⁹, indicating the ability of the state to track such activities.

Despite this close coordination, there does not appear to be a "master map" aligning secondary programs, postsecondary programs, and workforce needs that would ensure the needs of employers are

³⁸ <http://communitycolleges.wy.edu/home.aspx>

³⁹ http://doe.state.wy.us/lmi/education_we_connect.htm

being addressed, particularly in skilled, high-wage areas, and that students are not being prepared in areas that would lead to low wages or a lack of opportunities.

6b. Aligning the career preparation delivery system

As noted in 6a., there does not seem to be a master map of the education/workforce pipeline; however, a great many of the necessary components are in place, including the close relationship of all necessary entities and the ability to generate information on labor market needs and to track long-term student outcomes. Stakeholders are poised and capable of establishing such a map and then using it to align secondary and postsecondary education efforts in a way that will meet employer needs and provide the greatest opportunities for youth and adult workers.

IV. Recommendations

The following recommendations are based on the analysis of the structure and processes of Wyoming's college and career readiness system. Consideration is given throughout to the fact that the Department of Education, along with other state agencies and related entities, are facing a challenging budget environment due to difficulties in the energy and mining industries⁴⁰, so a focus on lower-cost or alternately funded strategies is maintained throughout.

A. Employer Engagement (Component 1)

1. Develop a statewide information system

While WDWS is gathering and disseminating detailed information on labor market needs and emerging trends, there is no formal system for distributing that information to CTE program leaders. (Again, some or many may already be accessing it independently, but not all, and not consistently.) It should be feasible to identify each program by cluster and pathway, and then align those identifiers to specific careers or career groups, and then proactively and regularly send that information to the appropriate K-12 targets. Both WDWS and WDE collect needed information, but the fact that workforce data uses Standard Occupational Classification (SOC) codes and education data uses Classification of Instruction Program (CIP) codes means that existing crosswalks will have to be utilized.

2. Define required skills

Defining the technical, academic, and employability skills that students need is a critical role for CTE programs and their business partners, but this is likely not happening universally or consistently, and sources such as O*NET might either be unknown or, at the opposite extreme, overwhelming. For high-demand, middle- or high-skilled positions, WDE or WDWS might convene employers and/or sector groups to define the critical skills that applicants need in order to be successful and share that information with program leaders. Alternately, state offices might develop the interview and focus group protocols needed to get that information from local partners, and send information on the process to their local CTE leaders.

3. Establish a feedback loop

Industries, careers, and economic development priorities change on a regular basis. It is therefore important that state leaders institute a regular review process to keep skill sets and labor demand profiles current. They might also begin regularly surveying employers to make sure the information continues to be current, and to ask about their experiences in screening and hiring new applicants.

⁴⁰ http://billingsgazette.com/news/state-and-regional/wyoming/wyoming-education-officials-brace-for-budget-cuts/article_ca369e15-1c94-5201-925a-5be14dcf3b9b.html

B. Rigor and Quality in Career Pathways for ALL Students (Component 2)

1. Do a statewide survey of program quality practices

While the state does require an application for new programs, annual data reporting, and periodic reviews, there does not seem to be a single source for information on the prevalence of proven practices across the state. WDE might therefore either review applications and reviews already submitted, or conduct a survey of CTE programs, in areas such as:

- Alignment of academic knowledge, technical skills, and employability skills identified by employers as necessary for entry-level success to current and projected high-skill, high-demand sectors.
- The course of career pathways, such that all career pathways begin broadly, focusing on career awareness and exposure; progress to more occupationally-specific courses; and offer multiple entry and exit points to enable students to change paths as their interests and goals evolve.
- Recruiting of industry professionals with sought-after technical knowledge and skills and demonstrated teaching ability.
- What policy barriers and streamlined certification procedures could make teaching more attractive to such candidates.
- How sites handle professional development and what incentives they use to enable core academic and career-technical teachers to earn credentials in high-skill, high-demand fields and strengthen their instructional practices in related pathways.
- How sites maintain career pathway quality, instructional rigor, and connection with priority industry needs.
- Whether districts have discontinued career pathways that fail to meet minimum standards for quality, rigor, and cross-education alignment, or that do not demonstrate a connection to priority industry needs.

2. Establish quality standards for career academies

Like most states, Wyoming has seen the career academy movement grow organically, with schools deciding on their own to pursue the model and making it happen. At this point, however, the field has formalized a bit, and there are proven models, criteria, and practices for the development and management of successful academies. WDE should explore this field and either provide information and recommendations to those who are interested in launching a career academy, or establish its own set of standards and practices and hold current and new academies to those standards.

C. Career-Focused Accountability Systems (Component 3)

1. Collect and report on career readiness indicators

Through Perkins reporting, WDE has meaningful data on multiple indicators for career readiness; however, that data is only being collected on students within CTE, and it does not appear to be shared widely (particularly with business partners and state leadership and stakeholders). In order to develop a universal career readiness system, this information stream must be made more prominent and must apply to all students, not only those within CTE courses. This aligns with the CTE assessment task force's recommendations.

2. Incorporate career readiness into meaningful criteria

Currently, several CTE programs of study culminate in a professional certification; WDE should continue to expand in this area, and find other opportunities for bringing additional weight to the attainment of career readiness standards. It would be extremely helpful to have some factors incorporated into the statewide accountability system (particularly to increase administrator focus in these areas) or even incorporated into graduation requirements.

3. Develop a recognition model for career readiness

Wyoming should consider opportunities for recognizing both students and schools for achievements in career readiness. Students might receive a diploma endorsement or a financial incentive (such as a career-ready version of the Hathaway Scholarship); schools might receive some financial or other resource incentive, or a special designation for graduating a certain percentage of students who are proven to be career-ready.

D. Scaled Pathways that Culminate in Credentials of Value (Component 4)

1. Develop or license a fully-featured career exploration system

It is unfortunate that the state lost funding for its license of a statewide career exploration system; these types of online systems allow for interest inventories, career and industry exploration, college reviews, development and maintenance of an online portfolio, and even connections to employers for internships and other work-based learning opportunities. WDE should search for funding that would allow the reinstatement of such a system.

2. Continue to expand counseling efforts

The state has already begun an effort to implement a “hub and spoke” model of training every teacher and administrator to provide career guidance and counseling to students. This effort should be continued, and virtual models should be explored to supplement efforts in rural sites.

3. Establish models and standards for business engagement

One of the great challenges in effective business engagement is that teachers have never had an opportunity to learn about the ways in which they can incorporate business partners into instruction. WDE should consider developing information on partnership models and quality standards, and possibly research and publish case studies showcasing effective practices and their outcomes. As a corollary, they may also wish to provide training to both educators and businesspeople on effective partnership strategies to help them better connect and establish strong relationships.

E. Align State and Federal Funding Streams (Component 5)

1. Review current federal funding options

While Wyoming is already connected to key federal funding programs such as the Perkins Act, WDE and others should closely review new legislation, such as the new Workforce Innovation and Opportunity Act and the Every Student Succeeds Act, for additional opportunities. Both of these acts emphasize career pathways and may provide new funding connections aligned with Wyoming’s efforts.

2. Explore and pursue private/nonprofit/foundation options

There are a great number of organizations interested in skills development, workforce issues, STEM and technology education and other related topics who could be approached to support innovation projects or new initiatives. JPMorgan Chase Foundation's \$75 million investment is just one such example of corporate and foundation interest in this area (albeit a very large example). Wyoming's work in developing a strong career readiness pipeline, both through established programs like CTE and career academies as well as through innovative projects like the Coders of the West pilot program⁴¹ should prove to be attractive to different groups of donors.

3. Train locally for local fundraising

Large government, corporate, or foundation funders can be wonderful partners and can make great things possible, but WDE and its partners should not overlook the local, county, and regional partners who can support local initiatives. WDE should consider providing training to CTE program leaders and district officials on fundraising and grantwriting, and find ways to help them identify potential local nonprofit, foundation, and business funders in their areas.

F. Ensure Cross-Institutional Alignment (Component 6)

1. Develop a map of the workforce pipeline

Stakeholders in Wyoming such as WDE, WCCC, and WDWS have already developed strong working relationships, many of which are governed at the state or local levels by written Memoranda of Understanding. However, there does not appear to be a holistic map of the workforce pipeline, and where these entities, and their relationships, fit into the picture. Developing such a map may reveal gaps that need to be addressed in creating a seamless pipeline, and one should be explored and developed.

2. Develop a feedback model for ongoing review

Developing a map of the workforce pipeline would be a critical step; however, to make such a resource invaluable on an ongoing basis, the parties should institute an annual or biannual review to consider if there have been any changes in the population, institutions, or economic objectives, and reconfigure and act on the map as necessary.

⁴¹ <https://docs.google.com/document/d/1ptCn6Qk2hceGGJZU56eyhBZG8IK8IJ3Z2clrafyn6tA/edit>