**NWCCD Strategy 3.2: Mining Technology Associate of Applied Science Degree Program – Accelerated, Online, and Hybrid Delivery Models**

The Accelerated Delivery Model:

Community colleges’ primary mission is to provide access to higher education to the communities they serve, providing the students that enroll in them with the skills and knowledge necessary to succeed in industries within the community as well as preparing them to transfer to four-year institutions. Not all students, however, need the entirety of the skillsets inherent to an Associate of Arts (A.A.) or Associate of Science (A.S.) degree, or develop the need or desire to pursue baccalaureate programs; rather, they need the immediate skills necessary to either enter into gainful employment or advance to supervisory positions within their current career. The Associate of Applied Science (A.A.S.) programs are designed to educate students with the critical skills necessary to succeed in their chosen profession.

Critics of the community college mission, however, often cite the low retention, completion, and transfer rates of students enrolled in community colleges. Research into the topic indicates that the reason for the low retention and completion numbers is, in part, due to the population that community colleges are designed to serve – namely, individuals from lower socioeconomic backgrounds who come from families in which education was not stressed, or cannot afford the tuition prices of four-year institutions. These individuals are frequently unprepared for the rigors of higher education, or have conflicting responsibilities outside of college that negatively impact the completion of the degree. These conflicts often result in a “cooling out” of students as they find the length of the programs they are enrolled in and the availability of courses that work with their schedule too difficult or time consuming to manage, resulting in a discontinuation of their education.

Research suggests, however, that a high level of engagement frequently leads to successful completion of degrees, as well as a “heating up” of students who then want to pursue baccalaureate degrees. Redesigning current delivery models to capitalize on the initial interest leading to enrollment by maintaining high levels of engagement while accommodating non-academic life, therefore, may result in reversing the trend of low retention and completion.

The accelerated delivery model being tested at the Northern Wyoming Community College District’s Gillette College focuses primarily on one program – Mining Technology – as the primary industry Supersector in the college’s service area is Natural Resources and Mining. Classes within the program have compressed coursework through extended classroom hours, while the courses are scheduled to accommodate shift schedules common to the mines at which students are employed. Preliminary results from this delivery model have been encouraging, with higher retention and completion rates, higher grade point averages, and an increased interest in transferring to four-year institutions for baccalaureate programs.

Targeted Population:

The Accelerated Mining Technology program at Gillette College is designed to attract a particular type of employee. The targeted program applicants are those who have several years of experience working in a mine environment, and want to advance within their company and field. The Mining Technology program is designed to provide the tools and training that will help these students accelerate their career advancement. The Associates of Applied Science in Mining Technology degree program educates students in: a) the knowledge, skills, and abilities needed by foreman/lead/planner positions; b) an educational background that will separate them from other employees vying for the same positions; and c) skillsets that will increase their value to their company and their opportunities within the mining industry.

Chart 1 illustrates the experience growth curve within the mining industry and the targeted student experience level for the Accelerated Mining Technology program.

**Chart 1:** Targeted Student Experience Curve



**Foreman/Lead/Planner Position**

As illustrated above, the process of obtaining a managerial position at a mining company is dependent on two key, interrelated factors – the acquisition of experience over time. The chart shows a line (blue) representing the experience gained by an employee as the years of work increases. Initially, an employee has no knowledge of the work environment or process, and therefore has zero experience. As an employee begins work he or she gains a tremendous amount of knowledge over a short time span, as shown in the steep part of the experience curve. As an employee matures the acquisition of new knowledge plateaus; in other words, the day-to-day activities and processes become familiar and relatively routine. It is typically at this point that an employee might be considered for a supervisory or managerial position (green box), as they have the experience and knowledge to make decisions that benefit the company.

Students who enroll in the Mining Technology Program typically have 7-15 years’ experience (red box), and are unwilling to wait the extra 10 or more years to be considered for a responsible position. The Associate of Applied Science in Mining Technology degree program has been designed to help these highly motivated students attain the skills and knowledge that will help them fast-track their career goals by gaining a level of knowledge employers value and reward. Evidence of the success of this program exists, as several students who have completed the degree have reported increased wages and promotions to supervisory and managerial positions within their companies or within the industry.

Delivery Environment:

The Northern Wyoming Community College District (NWCCD), a two college district, has selected Gillette College as the delivery environment for the accelerated model. Gillette College’s role in the community is to serve the population of Campbell County, Wyoming; with the majority of employment centered in the area mines or in support industries, this facility is ideally situated to develop, test, modify, and delivery a new academic delivery model that best supports both the students and employers.

The Need for Accelerated, Online, and Hybrid Delivery Models:

New academic delivery models utilizing technology are critical in improving the value and efficacy of the community college as a means to effectively train the workforce of the twenty-first century. When compared to four-year universities, both public and private, community colleges consistently have a lower retention and completion rate. While there are many theories as to why this is the case, the most logical, based on thorough research, centers on the population that community colleges are designed to serve.

The original intent behind community colleges was to democratize access to higher education, and as such are designed to service lower socioeconomic sectors. Unlike four-year institutions, which on average serve a younger population that can afford a long period of commitment to education, the population traditionally served by community colleges is often older, with family and professional obligations that conflict with academic schedules. These obligations often lead to a “cooling out” of community college students, who frequently cannot maintain a high degree of engagement in traditional educational delivery models; this conflict frequently results in longer completion times, and more frequently in a discontinuation of education.

The development of new academic delivery models that can accommodate the scheduling needs of both employers’ and students’ schedules while maintaining high levels of engagement in presented curricula is critical to the success of community college in the twenty-first century. Traditional semester-long delivery models have changed little since the founding of the community college level of higher education, and do not necessarily serve the needs of their constituents. Developing and implementing new models of education in addition to the traditional college experience will provide students with a variety of options that best suit their academic and career needs, while capitalizing on students’ strengths and addressing gaps in their education.

As a strategy for keeping community colleges relevant in the 21st Century against for-profit colleges and technical schools, the development of courses that utilize the materials within a textbook without actually requiring students to purchase said textbook is a high priority; the concept is to keep the cost of education reasonable, as the price of textbooks for a full semester often exceeds the price of tuition. Additionally, developing courses for online and hybrid delivery help to adapt college requirements to the schedules of working students; if adult learners are capable of scheduling their study time around the demands of their daily rather than the other way around, they are more likely to persist in their studies and complete their degree program.

For more rural locations, where brick-and-mortar college facilities are often far from the home and the job site, the development of online and hybrid classes is a critical factor in recruiting students and helping them complete their program of study. Reducing the time spent commuting to and from a campus for classes, or even eliminating the need for the commute completely, adapts the learning environment to the needs of the student and may increase their investment in their education. This is particularly true of areas like Wyoming, where winter weather can increase the length of time it takes to travel between towns and the cities in which traditional classroom environments exist. Providing alternative methods for delivering classes may help increase attendance on the part of workers with long shifts, family commitments, and long commutes.

Accelerated Model Overview:

The Accelerated Mining Technology program is divided into nine-week blocks of instruction; though the courses are accelerated in their delivery, the organization and scheduling of the accelerated program extends the program longer than the traditional two-year time frame to approximately three years. The decision to design the program in this format is the result of research conducted under the DOL-ETA High Job Growth Initiative; area mines were surveyed to determine the commonalities in shift scheduling, and the distribution of courses scheduled to best accommodate the needs of shift workers.

The resulting schedule places courses on Thursdays and Fridays, with alternating delivery times to accommodate students’ changing work schedules. For example, one week a student may be scheduled for days and only be available to attend a night class on Thursday, or be scheduled to work nights and only be able to attend a daytime course; the alternative scheduling provided by the Accelerated Mining Technology program allows the student to attend a course with no interruption of their attendance, permitting them to maintain a high level of engagement in their coursework.

Critics could question the efficacy of a delivery model that, despite the accelerated coursework, extends the length of the program beyond the traditional two-year model. However, research conducted with the students indicates that students prefer this delivery format, as it works with their schedules. Compressing the accelerated model into the more traditional two-year time frame would necessitate students taking time off from work, which would negatively impact enrollment, retention, and completion rates. Additionally, questions could be raised regarding the distribution of courses across traditional semester models, such as beginning a block of instruction during the latter half of the Fall semester and completing that block during the Spring; to address this, it should be noted that students prefer this scheduling methodology, as it does not interrupt attendance with long periods of inactivity.

As an example of the differences in scheduling, altering the existing program to conform to traditional semesters would create gaps in instruction or negatively impact student engagement. Under the current scheduling, students are able to “load up” on units at the beginning of a delivery cycle and manage coursework overburden; two weeks of intensive instruction are followed by the Thanksgiving break, followed by two weeks of instruction and a four week holiday break, and rounded off by five week burst through the remainder of the Spring semester. Organizing the courses in this manner allows students to assimilate the material more easily and potentially self-pace for further acceleration. A second example in favor of maintaining the existing program scheduling deals with graduation; students have expressed concerns that they will become disengaged following the graduation ceremony, despite still having a month of additional coursework to complete.

There are several key components about the program design that merit attention. First, the elimination of prerequisite courses allows for a streamlined advising process through the Associate of Applied Science (AAS) degree and the stackable certificates that comprise the degree; this has a benefit of allowing students to enter the program at any point in the comprehensive delivery cycle. Secondly, the existing model maintains student engagement in coursework at high levels, leading to increased retention and completion compared to more traditional schedules. Thirdly, the accelerated pace, combined with enrollment of students from the same mines as students further into the process, has created a sense of comradeship, teamwork, and even a degree of peer mentoring to keep engagement levels high. Finally, students enrolled in the accelerated model have reported a greater ambition to achieve higher levels of education through an increased “thirst for knowledge.”

These findings have led to points for consideration as far as a limited redesign of the program. For example, originally the mathematics requirement was scheduled for delivery during the final block of instruction. As mathematics is a heavy component within much of the coursework, it has benefited the students to have the course moved to the beginning of the instruction cycle. Similarly, it may benefit students to move the Technical Writing component of the program from the second block of instruction to the first portion of the delivery cycle to increase student success rates.

The Stackable Certificate Delivery Model:

The Mining Technology Associate of Applied Science degree program is designed to provide students with the core skills in several critical areas necessary for supervisory and management level positions, both in an accelerated delivery model and in the traditional semester schedule. However, not all students need to acquire the full degree in order to qualify for higher positions within their companies.

In order to address critical skill needs, the Mining Technology program was reviewed and courses identified that address those specific needs; this allowed for the development of three academically recognized certificates that can stand on their own or, when all three are completed, result in the award of an Associate of Applied Science degree.

The three certificates are: the Industrial Operations Management and Supervision Certificate, which provides students with the core skills necessary for supervisory positions within industry through 18 credit hours in six classes; the Mine Management Certificate, which compiles the skills needed to manage mining operations through 21 credit hours in eight courses; and Mine Safety and Technology Certificate, which trains students eight courses and 21 credit hours on essential technical skills and safety regulations. Of these certificates, only the Industrial Operations Management and Supervision Certificate fully lends itself to delivery in online or hybrid formats.

All students enrolled in the Mining Technology program during the DOL-ETA TAACCCT Round 1 grant award have opted to pursue the Associate of Applied Science degree rather than petition the college for award of completed certificates. Policy and procedure are being reviewed to determine if students who have completed the full program can be awarded the certificates retroactively.

Developing a Stackable Certificate for Online Delivery:

Developing and offering a new certificate within a program requires that the proposed certificate be reviewed and approved by the Curriculum and Standards Committee. The process, forms, and instructions are provided in the TAACCCT Round 1 comprehensive documentation under this strategy; however, a brief summary of the development process for an online certificate within the Mining Technology program is presented below.

1. The first step in developing a certificate within an existing program is to review the courses within that program and group them into areas of similarity.
2. Once the ideal format for the proposed certificates has been agreed to by the department chair and the Dean of Technical Education, the appropriate forms for submittal to the Curriculum and Standards Committee must be completed and submitted.
3. The Curriculum and Standards Committee adds the proposed certificate to their schedule; the department chair and the Dean of Technical Education are requested to attend the committee meeting, where the need for the change in curriculum is explained.
4. Upon completion of the preliminary review, the Curriculum and Standards Committee submits recommendations for changes to the proposing department. If no changes are required, the committee implements the proposed changes.
5. The instructors of the courses within the proposed online certificate are requested to develop the course module or modules, in accordance with the Memorandum of Understanding. Once the completed course has been reviewed and approved to ensure the quality of materials for online or hybrid delivery the course is added to the scheduling cycle, whereby students may then enroll.

Developing a Career Pathway:

The most efficient way to develop career pathways under the TAACCCT Round 1 strategies selected by the Wyoming Community College Coalition was do develop Strategy 2.3 and Strategy 3.2 in tandem. Both strategies required the input of industry partners to identify key knowledge, skills, and abilities (KSAs) required by students seeking employment and the development of curricula addressing those needed skillsets. Once established, the career pathways needed under Strategy 3.2 become identical to the transfer pathways to various baccalaureate programs at four-year institutions required by Strategy 2.3, with all guesswork on the part of the student as to which courses are needed removed. After what are dubbed “No Options” pathways are documented and reviewed by program faculty and transfer specialists, they are presented to industry advisory committees for final approval.

Timeframe for Development:

Testing and refinement of the Accelerated Mining Technology degree program covers the period of April 2012 through September 2015 under the DOL-ETA TAACCCT Round 1 grant award. Initially developed under the DOL-ETA High Job Growth Initiative grant, the delivery model has been modified to break the program into three certificates that will stack into an Associate of Applied Science degree. Final testing and modification of the program will be complete in March 2015, with the remaining time used to evaluate the efficacy of the model through data analysis and reporting.