



The National Center for Welding Education and Training, Weld-Ed

Dr. W. Richard Polanin, CMfgE, CWI

Co-Principal Investigator

Summer 2020

The State of Welding Education during Covid-19

As we continue to struggle with the Covid-19 pandemic, we are beginning to see some patterns in the delivery methods and limitations within welding education. The patterns have emerged as we have analyzed the data from our survey sent to welding instructors late in April 2020.

The survey had a very good response rate from welding instructors. The total number of respondents was 333 with 291 totally completed surveys from nearly every state within the United States. The information that follows is a summary of the key findings from the survey.

We believe that welding instructors are always interested in the best possible education and training for their students. Further, with the severe restrictions imposed as a result of mitigation of Covid-19, welding instructors as well as all CTE instructors, were thrust into situations requiring innovation and adaptation.

During the mitigation, online learning became the standard for delivering welding education. For some courses, notably those without a laboratory practice component, the online format seemed to be acceptable. However as revealed by the survey data, often an online format posed serious restrictions to content delivery and student success.

Further, a front page story in the Wall Street Journal June 6, 2020 detailed the problems with the online format. The story "America's Grand Experiment in Remote Learning Fails" reflects the data from our survey and begins by stating "The problems began piling up almost immediately." Among the reasons listed by the authors Tawnell D. Hobbs and Lee Hawkins, for the failure of the process include poor or no internet connection, lack of parental supervision, and students simply ignoring required learning altogether.

State Departments of Health and the Center for Disease Control continue to shift and evolve guidance for returning to classrooms and laboratories. But to assure quality welding education and training, a return to classrooms and laboratories is necessary.

In a letter to the US Assistant Secretary of Labor, John Pallasch, the President and CEO of the American Association of Community Colleges (AACC), Dr. Walter Bumphus states, "Late last month, AACC surveyed its members regarding the capacity of community colleges to transition all CTE and/or registered apprenticeship related technical instruction (RTI) entirely online. It became clear that while community colleges had the capacity to convert courses to online instruction, they also had reservations about doing so and about the negative impact it would

have on training programs across multiple industry sectors. Online learning is appropriate for certain courses and it is an effective tool for learning. However, the universal application of it in CTE and RTI programs does not remove the need for face-to-face labs and experiences that must be conducted in person”.

Certainly, the need for face-to-face instruction is obvious for many CTE courses, especially welding skill building courses. However, what is lost in the cavalier discussion about the need for practice to build requisite skill in many CTE courses is the lack of understanding about student learning preference and the need for socialization. Welding students are kinesthetic learners. Online learning tends to provide exactly the opposite student learning preference of auditory and visual.

In addition, many employers continue to hammer on educators for the need for “soft skills” as their students enter the workforce. Online learning provides minimal opportunity to communicate orally, practice teamwork skills, develop social skills, or exercise appreciation for various viewpoints. Although video conferencing and well-designed chat sessions border upon social interaction, the participants remain isolated with only limited ability to express personal beliefs.

Jeremy Adams, author, high school, and university teacher wrote in a recent editorial titled “Distance learning should not be the future”, “Let us not forget that the wonderment of the classroom, the source of its transformative possibilities, is rooted in the people gathered in the same place, at the same time. The best teachers are not maestros of education apps or virtuoso of virtual instruction. They are savants of human transformation because of their capacity to forge powerful connections with their students to inspire their best effort, and engage them in meaningful and personal ways”.

Many of the key findings from our survey indicate similar thinking by the welding education community. Many of us think that it is not enough to simply deliver welding and related theory but, it is necessary to engage our students through thoughtful and meaningful interaction.

Dr. Brad Polanin, Superintendent of the Riverton Community Unit School District in Illinois, in letter to his students, parents and the community wrote, ”Schools throughout the nation often focus our energy, attention, and efforts on improving academic achievement and standardized-test scores. After all, we are schools and we are here for teaching and learning. But, what often gets overlooked and unnoticed are the life lessons taught by staff members and peers. As with all people in society, students and teachers all come from differing backgrounds and differing experiences, all contributing to the experience of individuals. Experiences within a school can be good or bad, but they all are responsible for forming young lives that will sustain our future”.

During this time of turmoil, we must not lose sight of the diverse mission of welding, manufacturing, and career education in general. Assuredly, it is our responsibility to provide the best education and training to our students in order to prepare each student for a successful career. But it is also our responsibility to provide experiences for our students that will prepare each student for a successful life.

The key findings and comments from the respondents of the survey may provide some suggestions for organizing and developing courses for an uncertain future. We hope that you all stay safe and that the data and commentary provides some useful information in order to prepare for the fall semester.

Key Findings

At the time the survey was conducted (May 2020) 93.3% or 308 schools were closed as a result of Covid-19. Instructors taught in a variety of school settings including Universities (1%), Community Colleges (21%), Technical Schools (22%), High Schools (52%), and Industry (1%).

83.3% of the instructors were providing online instruction. However, only 21% or 66 respondents indicated that student participation in class was between 90% and 100%. 28.9% or 89 respondents indicated that less than 50% of their students were participating.

The predominant video conferencing platform was Zoom with use by 42.5% of the respondents. However, Google platforms (Hangout, Classroom, Meetings) was also commonly used. Many of the respondents confused learning management systems (LMS) with video conferencing platforms.

Yet, 40% of respondents indicated that a LMS was used for part of the instruction with Canvas used by 23.5% and BlackBoard by 11%.

The limited use of an LMS is supported by understanding the development of the type of online content delivered. 56% of respondents said that the online welding content was instructor developed content or instructor developed content with the use of YouTube content. Only 26.6% of instructors used commercially developed products.

Only 5% of respondents indicated that their students were prepared through online instruction as well as in class instruction to enter the workforce. 79% of the respondents indicated that their students were only partially prepared or not prepared well (24%) to enter the workforce.

The limited use of an LMS or video conferencing platform is directly related to the difficulties of online instruction for students. 55.5% of the respondents said that their students did not have access to Wi-Fi or the internet and 18% indicated that their students did not have access to a computer.

Although 93.3% of the respondents indicated their school was closed 20% of the respondents indicated that they were continuing to teach modified laboratory classes (79.5% not teaching labs). Some of the methods used to continue laboratory teaching included using mock-ups of GMAW guns, YouTube video, practice at home and pictures of progress sent to the instructors, aerosol cheese and crackers, and use of videos recorded in the school lab prior to closing.

Few respondents indicated a firm date for restarting classes. About 15% indicated June 2020 for potential opening but, 53% indicated the fall semester would likely be when classes would resume. 21% were unsure when classes would start.

No clear strategy emerged for social distancing in the laboratory. Only 20% of the instructors said the laboratory would be limited to less than 14 students with 65% of the instructors indicating that classes would resume with full student capacity or unknown how many students would be allowed in the laboratory.

The majority of the instructors indicated that their school would rely on state guidance (60.2%) for reopening with 24.3% relying on local or school guidance. Only 6% indicated that they or the school was following the Center for Disease Control guidelines. However, about 49% of the instructors indicated that there was a strategy for disinfecting PPE. Yet, 47.2% of the instructors indicated that it was unknown who was responsible for disinfecting PPE. Further, 48.4% of instructors did not know if additional PPE would be required and 51.8% of instructors did not have a plan for social distancing.

During the time schools have been closed, only 26.7% of instructors said that they participated in any information sharing websites, chats, or webinars. But, 68.6% of instructors said that they would likely or somewhat likely participate in information sharing after returning to the classroom.

Finally, we asked about the resources that would be most beneficial to help improve welding instruction. The responses were varied but a few of the common suggestions included a repository for welding lesson plans, listing of online resources, guidance for reopening schools, and of course, additional funding.

Key Recommendations

With respect to the instructors who participated in the survey, the first key recommendation is obvious, resume face-to-face classes with the appropriate protection in place to allow for the safety of students, faculty, and staff. As the instructors reported less than 50% of their students were participating in the online class format and 79% of the instructors indicated that their students were only partially prepared or not prepared well (24%) to enter the workforce, resuming face-to-face classes is critical to the preparation of our future workforce.

But, underlying the obvious recommendation, is the realization that welding students and likely most CTE students require instruction and motivation from interaction with instructors. However, the data also tends to indicate that many of the instructors were not prepared for or had not received any instruction to allow for successful online teaching.

Further, the lack of reliable internet accessibility, 55.5% of the instructors reported that their students did not have access, suggests insufficient infrastructure. The survey did not seek to determine the socioeconomic condition of the schools from which the data was gathered. Therefore, no generalizations can be made about the reasons for the lack of internet access. What can be said however, is that many schools were profoundly unprepared for the shift to online instruction.

Thus, the second recommendation is equally as obvious as the first, develop a strategy to assure internet access for all students. Whether the use of school sponsored hotspots, or community

developed hotspots, all students need reliable access to assure continued learning during potential future lockdowns. Schools need to determine the feasibility of mobile hotspots or the possibility of lending students cellular ready equipment.

The third recommendation concerns the instructors, provide professional development to prepare instructors for online teaching. Many colleges and universities provide online teaching courses, many leading to an online certification for instructors. Face-to-face classes cannot simply be transferred to a learning management system without thoughtful development of objectives, learning activities, motivation strategies, assessment of progress, and evaluation methods.

The fourth recommendation is standardized guidance. The instructors reported that there was little guidance from federal and local government or school districts for reopening schools. A standard for social distancing, laboratory population, disinfection, responsibility for disinfecting equipment, required personal protection equipment, and student movement needs to be developed and enforced.

A safe learning environment is critical to effective learning. Specific recommendations for class size, student spacing, disinfecting frequency, instructor protection, welding demonstration strategies, and perhaps student testing should be written in plain language and as simple bullet points. Recommendations for safe operation of laboratories during the pandemic should be as visible as the general safety rules posted in nearly every welding laboratory.

The final recommendation is for organizations that develop content for welding instructors. As welding content materials are produced and professional development courses are developed, design the materials for use in the classroom and online. Some additional student learning objectives, strategies for both in-class and online motivation, learning activities that may easily be adapted to an LMS, listings of robust online resources, and secure evaluation methods is a start.

Conclusion

As we enter the next phase of education with uncertainty, preparation is the key to success. Our survey plainly indicates that we were all unprepared for the dramatic shift in content delivery. However, as we continue struggle with the possibility of future disruptions to the education process, we need to be adaptable, innovative, and flexible. Welding education will have to adapt to the possibility of decreased time in welding laboratories. Therefore, effective and efficient learning activities will be critical.

No virtual welding system, at least currently, will take the place of in-laboratory and on-the-job practice. But, adaptability through the development of hybrid welding courses will help to improve the throughput of our students and prepare them for a successful career.

Understanding of the student learning process, effective use of distance learning technology, sharing of educational resources, and continuous improvement through professional development are all needed to assure welding education remains a vigorous contributor to the economic and social success of our students and the United States.

About Weld-Ed

The National Center for Welding Education and Training (d.b.a.–Weld-Ed) is a national partnership between the welding and materials joining industry and the nation’s community and technical colleges and universities that is dedicated to expanding the role and pipeline of welding technicians in industry. Weld-Ed was funded in 2007 as an Advanced Technological Education National Center by the National Science Foundation.

Lorain County Community College (Elyria, OH) is the host site and fiscal agent of Weld-Ed which receives financial and in-kind support from the American Welding Society, American Society for Nondestructive Testing, Lockheed Martin, Lincoln Electric, and 154 industry affiliates. Weld-Ed has ten Regional Center Partners: Chattanooga State Community College (TN), College of the Canyons (CA), Honolulu Community College (HI), Illinois Central College (IL), Lorain County Community College (OH), North Dakota College of Science (ND), The Ohio State University (OH), Texas State Technical College–Waco (TX) Yuba College (CA), and Weber State University (UT). Additionally, Weld-Ed has 73 educational affiliates.

Weld-Ed’s website can be found at www.weld-ed.org

For additional information as well as access to the complete survey results, please contact:

Michael Fox
Interim Center Director
Weld-Ed
Lorain County Community College
1005 N. Abbe Road
Elyria, OH 44035
mfox@lorainccc.edu
440-366-4927