PREPARING LEARNERS FOR CERTIFICATION THROUGH SHIELDED METAL ARC WELDING EDUCATION

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Certification has become an essential benchmark for employability in technical and vocational fields, especially in trades like welding. In countries with competency-based education systems, certification such as the National Certificate (NC) Level II in Shielded Metal Arc Welding (SMAW) validates that a learner has met industry standards and possesses both the theoretical knowledge and practical skills required by employers. Preparing learners for such certification requires more than just classroom instruction—it demands a comprehensive training approach that blends technical competencies, workplace readiness, and assessment familiarity. Effective SMAW education, when aligned with certification standards, not only enhances students' employment prospects but also boosts their confidence and motivation to pursue lifelong learning in the trades.

Shielded Metal Arc Welding remains a cornerstone in welding education due to its broad industrial application, relatively low equipment cost, and accessibility. It is commonly used in structural steel work, shipbuilding, pipeline construction, and equipment repair. Because of its importance, many technical-vocational institutions focus on SMAW as a core welding competency, ensuring that students develop mastery over multiple weld positions, joint types, and electrode selections. However, being trained in SMAW is not enough. What distinguishes job-ready learners is whether their training is directly aligned with the standards and competencies required by certification bodies.

A structured SMAW curriculum that prepares learners for certification typically includes both theoretical and practical components. The theoretical portion covers the principles of electricity, welding safety, types of joints, electrode classifications, weld

defects, and blueprint reading. Practical training, on the other hand, exposes learners to welding in various positions such as flat (1G), horizontal (2G), vertical (3G), and overhead (4G), which are commonly tested in certification assessments. These learning experiences must be scaffolded, starting with basic pad welding and progressing to groove welds, pipe welding, and multi-pass welds. Along the way, instructors must consistently evaluate learners using criteria similar to what certification assessors use—such as weld bead appearance, penetration, uniformity, and absence of defects.

According to Putra (2024), the use of project-based learning modules in SMAW training provides a valuable bridge between classroom learning and certification readiness. When learners complete real-life fabrication projects such as building metal tables, racks, or frame structures, they apply the competencies assessed in certification while gaining contextual understanding. These projects help learners develop problem-solving skills, improve their ability to follow specifications, and refine the quality of their welds. More importantly, students learn to take initiative and become self-directed in managing tasks—traits that are beneficial not only in certification testing but also in actual work settings.

Preparing learners for certification also involves familiarizing them with the testing environment and expectations. Certification assessments often take place in authorized testing centers where learners must demonstrate their skills independently and under time constraints. This scenario can be intimidating, especially for those who lack confidence or have had limited exposure to formal assessment protocols. To mitigate this, schools and training institutions should incorporate mock certification tests into their programs. These simulations allow learners to practice under realistic conditions, identify areas of weakness, and receive feedback for improvement. Additionally, instructors should guide students through the entire certification process—from registration and documentation to performance testing and result evaluation—so they feel fully supported.

Another critical element in certification readiness is the qualification and training of instructors. Teachers must be up-to-date not only with technical content but also with the actual structure and requirements of the certification exams they are preparing students for. Continuous professional development, partnerships with industry practitioners, and involvement in competency-based training standards all contribute to improved instruction. Furthermore, instructors must cultivate a growth mindset in their students, encouraging resilience in the face of welding failures, promoting attention to detail, and fostering pride in quality workmanship.

Certification also demands that learners demonstrate not just skill but safety consciousness, professionalism, and the ability to work independently. These traits should be embedded in everyday instruction. Instructors can simulate jobsite conditions by requiring students to follow full PPE protocols, complete job hazard analyses before starting projects, and maintain clean and organized workstations. Incorporating time management and job planning exercises further prepares learners to perform effectively during certification and in real-world welding jobs.

Certification in Shielded Metal Arc Welding (SMAW)—such as TESDA's NC II or international credentials based on standards like AWS, ASME IX, or ISO 9606—remains a critical milestone for welders entering the workforce. Earning these credentials is more than a badge: it demonstrates that a candidate meets recognized benchmarks for safety, technique, and quality. Preparing learners effectively for certification therefore demands an intentional educational design that mirrors the rigors of certification assessments while building both skill and confidence.

A well-crafted SMAW education program aligns classroom lessons, practical exercises, and assessment practices with the competencies outlined in certification standards. Students must learn to interpret technical drawings, set up equipment correctly, select appropriate electrodes, and execute welds in standard positions (1G through 4G), all of which are typically required by certifying bodies. Initial practice often

begins with pad welds and tacks, then advances through groove and multi-pass welds. Throughout this progression, educators must assess performance using criteria similar to that used in certification testing—checking for penetration, bead uniformity, and absence of visual defects.

Mock assessments have proven especially useful in building learner readiness. Simulating certification conditions—timed tasks, independent performance, PPE enforcement—helps reduce test-day anxiety and better prepares students mentally. By encountering certification-style evaluations in class, learners gain familiarity and resilience, increasing their chances of success. Moreover, instructors who base feedback on actual certification rubrics support learners in refining both technique and mindset.

Digital tools further complement hands-on training. Studies have shown that self-directed learning modules—such as Android-based or virtual reality interfaces—help students grasp welding theory, safety procedures, and equipment setup before stepping into the welding booth. These platforms conserve workshop time for applied practice and reinforce learning through visual and interactive content.

Instructor expertise is another fundamental factor. Educators must stay current with certification standards and testing protocols, consistently comparing student output to official criteria. Professional development—collaborating with assessors, attending training updates, and reviewing competency frameworks—ensures instructors can coach learners effectively.

Finally, certification readiness includes the development of professionalism and safety habits. Learners should consistently demonstrate correct PPE use, job hazard analysis, time management, and workplace housekeeping—practices not often captured by welding quality alone but essential in both certification and employment contexts.

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