

Teaching Methods

Teaching landscape construction at the University of Tennessee

D.B. Williams

SUMMARY. Student-built landscape construction projects at the University of Tennessee serve to give students practical experience, provide workable solutions to landscape needs on the University of Tennessee agricultural campus, and provide ideas to visitors on landscape construction. Success has been based on a growing population of students interested in construction, a teacher well experienced in construction, a list of more than 20 completed projects, the ability to attract funding over the usual teaching budget, and the ability to gain administrative approval of projects.

For most universities like the University of Tennessee, teaching landscape construction in any of its various forms is a rather recent development. No doubt we are still searching for the right mix of teaching methods, student needs, industry wants, and available technology.

Professor, Department of Ornamental Horticulture and Landscape Design, 252 Ellington Plant Sciences Building, University of Tennessee, Knoxville, TN 37996-4500.

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Landscape construction instruction at the University of Tennessee is not unique (Stearn, 1995) but our success is worth sharing with other university teachers. Our undergraduate (UG) degree is the Bachelor of Science in Ornamental Horticulture and Landscape Design. The name implies a focus more narrow than typical programs in horticulture but many land grant schools are teaching much of what we teach, it just comes in a different package. While all of our UG majors (260 in Spring 1999) work for the same degree, they may choose a concentration in business, horticultural science and management, landscape design, or public horticulture. A separate concentration in landscape construction has not yet been developed although it has been considered. Students in all concentrations may choose one or more of the courses offered to juniors and seniors in landscape construction:

OHLD 350—Basic Landscape Construction, 3 credit hours.

OHLD 360—Practicum in Landscape Construction, 3 credit hours.

OHLD 450—Specialty Landscape Construction, 3 credit hours.

OHLD 460—Professional Practices in Landscape Construction, 3 credit hours.

Traditionally, horticultural courses at the University of Tennessee have a lecture and laboratory component that runs simultaneously throughout the semester. At the University of Tennessee, OHLD 350 is essentially a lecture course in the fall and OHLD 360 is a laboratory course following in the spring. Students have an option of taking the lecture course without the lab but cannot do the opposite, mainly because of the following factors:

- Student numbers surpassed 50 in

the lecture course making it very difficult to accommodate that many students in construction exercises under one teacher.

- Even though the spring semester starts in January, the semester includes more favorable conditions for outside work than does fall. January and early February are often unfavorable, but that time can be spent in an indoor shop preparing units for later use outdoors.
- About half of the students in OHLD 350 elect not to take OHLD 360 resulting in a more manageable class size but still about maximum for the one lab taught with a teaching assistant, especially when one considers procurement of materials and student supervision.
- When students spend their time only on actual construction it is easier to provide continuity from start to finish of construction projects. This includes procurement and management of tools and materials as well as students knowing that on Thursday they start where they left off on Tuesday. Construction periods are 3 h each and twice per week for three semester credit hours.

What happens in the laboratory course has evolved over ≈15 years keeping in mind that student numbers were much smaller in the beginning, construction activities were more basic, and included single fence panels, a portion of a deck, a section of irrigation line, or stacked stones for a wall all with the understanding that when the course was over all materials would be taken apart and stored for reuse later. Gradually it became evident that the University of Tennessee agricultural campus could really use some construction projects that would stay in place. This included patios for lunch outdoors, benches at a bus stop, a screen for an unsightly view, a retaining wall to stop erosion, or structures needed for the horticultural gardens (paths, arbors, hanging basket supports, gazebo, bridges, benches, etc.). Even with enough students to really get something done, there were at least two major problems: money to buy materials and project quality.

Funding from the normal college budget was never available for these projects. At times there were various



Fig. 1. Students work in teams of four to five students, often solving problems during actual construction.

Institute of Agriculture funds that could be found. Fortunately during the 1980s the institute began to get development funds from private sources where the specifications for the gifts could include campus improvement, although campus improvements were seldom the specific reason for the gifts. However, even that gradually changed. One success lead to another. Once campus improvements became noticed by students, staff, and visitors, the next request to the administration to use gift funds became easier. Best of all, funds specifically designated for campus improvements began to arrive and some were specifically designated for the construction class. When it is only materials that are to be bought, a gift of \$10,000 goes a long way. Students are not paid and of course they pay usual tuition for college credit, however, tuition funding is not available for purchasing materials.

Another problem was that real construction projects had to be workable and satisfactory solutions to real needs because the projects were to remain in place. Generally there was a need to get approvals from various university units. The University of Tennessee physical plant might be involved when utilities would be affected. The Institute of Agriculture (the top level of administration) Director of Services was involved unless the project was totally on agricultural experiment station lands. Then the Dean of the

Tennessee Agricultural Experiment Station and the Superintendent would be involved. The actual project design was often submitted for approval, but past reputation was often the only proof needed by the administration for approval.

Having a teacher with construction experience and confidence is essential to building a successful, long-lived project. The challenge is made even greater by having many inexperienced students. Fortunately, at least in recent years, some students come with construction skills that they pass on to other students, often by serving as captains of the individual construction crews of four to six students.

The current teacher of OHLD

350 and 360 is a fully skilled craftsman, who built his own 3500-ft² (3250-m²) home using a total of \$205 in labor costs. Construction taught this teacher that nearly any construction problem had several solutions and this philosophy is transmitted to students. Also, most of the students have been to this home and know how it was built. This confidence in construction is conveyed to students giving them a confidence that what they are building will work when finished, even though they are not sure at the halfway point.

Finished construction projects on the University of Tennessee agricultural campus include outdoor use areas by nearly every building with the largest using 11,000 bricks for a patio surface. Many projects have been built in the trial gardens, display gardens and research areas operated by the Department of Ornamental Horticulture and Landscape Design with the Agricultural Experiment Station. Often the construction projects preceded the development of gardens and became the framework around which the gardens were built (Fig. 1). For example, a brick-on-sand walk, 225 ft (69 m) long and 6 ft (1.8 m) wide, was built before the establishment of a woody plant test garden. The walk then determined the arrangement of plantings.

Besides serving the obvious purpose of construction experience,

Fig. 2. One student demonstrating to two others the cutting of a compound angle.



projects are also intended as a source of ideas for visitors by illustrating workable solutions to construction projects (Fig. 2). Visitors often ask for building plans, but we do not develop working specifications that can be used to duplicate our projects. Plans are intentionally varied from one project to another to provide a variety of ideas to students and visitors. Hard surfaces may range from brick, concrete unit pavers, stone, exposed aggregate concrete, to wood. Even when bricks are used, the pattern is seldom the same from one project to the next. Bench styles also vary, but they are made mainly of wood. The 1998 class project was the largest and most expensive so far. It consisted of walks, planters, board fences, hanging basket supports, a kiosk, and an outdoor teaching area with seating for 125 adults. Material costs were over \$9,000.

Construction education usually means implementing designs generated by the teacher and other designers; not very different from the real world. It is useful for students to get experience estimating materials which is often done even though the teacher is likely to modify their estimates before making a purchase. Once, when students calculated the number of bags of dry concrete mix needed for all the various posts, it came to 35. The amount purchased was 72 bags and all but one were used. The students had

based their needs on neat 8-inch (20-cm) diameter holes when in fact they often dug 10- or 11-inch (25- or 28-cm) holes and in some cases even had to adjust the hole location by several inches.

Large volumes of sand, gravel, stones or bricks are usually delivered to the site by the vendor even though they may have to be moved again to get them to the exact work area. One might think that materials are purchased as needed to avoid theft, but in all the years of teaching construction, no materials have every been stolen from the job site. We lock up tools and expensive items only between class periods giving students free access to all the tools we own without using a checkout and inventory system.

We know that an increasing number of our graduates accept employment or start their own business in construction but we have never quantified the value of our construction courses. We feel satisfied, however, knowing that our students take great pride in their work now and for many years later. It is also gratifying that some of our graduates are financially supporting the next classes of construction students!

Literature cited

Stearn, D. T. 1995. On-site instruction for landscape contracting students. *HortTechnology* 5(1):78-80.