Promoting Equality through Bicycling Education in the United States

By Martin Pion, B.Sc. and Andrew R. Cline, Ph.D.

While transportation professionals typically focus on road engineering, oft-overlooked elements are child and adult bicycling education programs. This paper focuses on such programs in the context of a complete and comprehensive approach to bicycle safety and an overarching goal of improving equality of access to public roads.

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With the advent of such initiatives as Safe Routes to School and Complete Streets, the focus of transportation engineers is changing to include walking and bicycling.

For example, a comprehensive eight-page illustrated report by Miller, et al. in the March 2013 *ITE Journal* described the present Dutch commitment to bicycling.[1] The numerous examples of bicycle-related infrastructure included an acknowledgment of the importance of bicycle education.

Thus an essential complement to infrastructure is the need to promote soundly based bicycling education programs, some examples of which are discussed in this paper. They are presented in the context of the so-called five E's, analogous to the four E's of highway safety, to which has been added an overarching sixth E, Equality.

The Six E's

Before discussing specific bicycling education programs, we list the six E's, noting the original five: Engineering, Education, Enforcement, Encouragement, and Evaluation. The need for a sixth, overarching E was first stated by Gutierrez and Eichstaedt in a groundbreaking article published in 2007, as listed below:

- "**Equality** – state laws that treat cyclists (the same as) other road users
- **Engineering** – sound transport agency road and special facility development
- **Education** – widespread traffic skills training such as the Bike Ed (and *CyclingSavvy*) program
- **Enforcement** – consistent and fair police and court treatment of bicyclists
- **Encouragement** – public campaigns aimed at promoting cycling
- **Evaluation** – ways for government to measure the effectiveness of the other E's."[2]

Cyclists educated to interact in a safe and predictable manner with motorized traffic are likely to be better accepted as part of the normal traffic stream. The better that cyclists are accepted by other road users, the greater the safety and equity that they will enjoy when accessing the public road system.

In the context of Equality, it should be noted that in all 50 states and the District of Columbia, "a bicyclist riding upon a roadway is accorded the same rights and is subject to the same duties as the driver of a (motor) vehicle."[3]

We discuss in detail selected bicycle education programs, starting with two aimed at children, followed by two geared to adults.

Bicycling Education for Children

Many child bicycle education programs have been produced over the years, such as NHTSA's "Bicycle Safer Journey."[4] Figures 1 and 2 illustrate best practices and different approaches in Holland and the United States.

The *ITE Journal* article referenced notes that "Transportation safety education is ingrained in the culture. Schools provide bicycle traffic education to Dutch children starting at about age 5 and continuing through about age 12, at which time the students take a national exam to demonstrate that they know how to ride safely in traffic."[1] Dutch officials state that "the nation's per capita traffic fatality rate is the lowest in the world ... achieved without the use of cycling helmets."[1]

An online video, "Bicycle Training in the Netherlands," shows 12-year-old children being tested on their bicycling knowledge and proficiency.[5] The 6-km (3.7-mile) test route in Utrecht includes separate bike paths, a counterflow on-road bike route, special traffic light controlled junctions, and roundabouts, as well as regular roads.

This test is the culmination of years of school-based bicycle education, beginning when children are in kindergarten. An in-depth September 2013 article in the *Boston Globe* noted: "Universal in-school bicycle education guarantees that every Dutch child can comfortably ride in traffic. By the time they get their driver's license, they've used bicycles as their primary form of transportation for years—and that habit continues into adulthood."[6]

The Dutch and U.S. cycling environments differ significantly. In addition to those mentioned in the article, Dutch bicyclists are prohibited from using the road when an alternative bicycle facility exists. Thus at a roundabout, cyclists must use a separate bike lane around its perimeter. This is reminiscent of former mandatory side path laws in the United States. However, in Holland cyclists actually enjoy priority over motor vehicles at the intersection of the bike lane and road where the road enters or exits the roundabout. This is illustrated at 2:27 minutes into the 3:10-minute video *Bicycle Training in the Netherlands*, from which the screen shot in Figure 1 was captured.

Source: Bicycle Training in the Netherlands http://tinyurl.com/nrvmhms.

Figure 1. *Children enter a roundabout in Utrecht during the annual bike test for 12-year-olds. The motorist on the right near a yield sign has stopped for the cyclists.*

Turning to American bicycling education practice, beginning in the early 1980s and for more than a decade, hundreds of 13-year-old school children participated in a comprehensive bicycling education curriculum developed and taught in Palo Alto, CA, USA middle schools by Diana Lewiston, a dedicated educator and experienced on-road bicyclist.[7] Her curriculum built on the work of John Forester, whom she earlier assisted.[8] The classes were offered as a physical education elective, lasting for 45 minutes each school day for three or four consecutive weeks.

A novel idea introduced by Lewiston was using walkie-talkies adapted to mount on each student's bicycle helmet or headband connected to a transceiver around the waist. When the group arrived at a chosen signalized intersection, Lewiston's assistant would demonstrate the maneuver by riding through the intersection first. Each student would then follow in turn while being given feedback by Lewiston via walkie-talkie. To make identification simpler, each student wore a number on his or her back, similar to the procedure described previously for the children tested in Holland (see Figure 2).

Source: Photo by Paul Kitagaki Jr., San Jose Mercury News, California, June 1, 1988.

Figure 2. *Students of Diana Lewiston's bicycle safety class listen for instructions from Lewiston via walkie-talkie.*

Each session lasted 45 minutes, the first two being introductory. These sessions were followed by four devoted to bike mechanics. The next two sessions were spent on the parking lot, with introductory remarks, assignment of walkie-talkies, and bike-handling practice. The final nine days were spent on streets with increasing average daily traffic counts, ending with an on-road riding test.

Lewiston adopted the five basic traffic principles taught by Forester, which may be paraphrased as:

1. Drive on the right, in the same direction as motorists;
2. At intersections, position yourself according to your destination;
3. Between intersections, position yourself according to your speed, slower vehicles on the right;
4. Yield when changing lanes or moving sideways; and
5. Yield to cross traffic when it has priority.[9]

In her curriculum, Lewiston writes that many adults' bike-riding skills are frozen in time, causing grown-ups to ride in the manner they did when they were children. Thus education programs like hers are important for encouraging both good teenage traffic behavior and, later, adult behavior. In addition, much of what is learned about interacting with motorists as a bicyclist is applicable later to safe driving practice.

Lewiston's experience and conclusions suggest that a key ingredient lacking in the United States is acquisition of the skills and knowledge to use the existing road system safely for bicycling, whether on-road facilities exist or not. However, Lewiston has observed about her students that "I cannot assume there was any change when they were riding outside class, particularly if they were riding with others. Habits are not automatically changed as a result of the class but from repeatedly practicing the new behaviors until they become natural when they ride."[10]

Adult Cyclist Training Programs

Although many adult bicycle educational programs have existed over the years, two leading programs are discussed for the purposes of illustration.

The League of American Bicyclists (LAB) was the first to offer a comprehensive bicycling education program nationwide. Its current foundational adult course, called *Traffic Skills 101* (previously *Road I*), of 9 hours minimum duration, covers bicycle mechanics and bicycle handling techniques and emergency maneuvers, plus on-road training.[11] This is comparable to Lewiston's course for children.

When LAB was headquartered in Baltimore, MD, USA, its foundational adult bicycling education course was *Effective Cycling*, developed by Forester. As originally taught by Forester in the mid-1970s, the course length was 30 hours: 10 sessions of 3 hours each. It was offered by De Anza Community College in Cupertino, CA, USA for college credit. For the later 9-hour version, a comprehensive 41-minute video, for which Forester provided technical assistance, accompanied the course.[12]

LAB dropped the name *Effective Cycling* for its core curriculum after Forester withdrew his support following a disagreement with the League's change of direction from education to support of bikeways.

Beginning in 2010, the Florida Bicycle Association launched a program called *CyclingSavvy*, which is gaining recognition nationally.[13] Certified LAB Cycling Instructors Keri Caffrey and Mighk Wilson started *CyclingSavvy* in Orlando, FL, after concluding that the *Traffic Skills 101* course

needed a major overhaul and should focus exclusively on bicycle handling and traffic safety. It is a structured 9 and a half-hour course with virtually no time allocated to bicycle mechanics, unlike both LAB's *Traffic Skills 101* and Lewiston's former course.

By way of introduction, adult students attend a 3-hour classroom session called *Truth & Techniques of Traffic Cycling*, extensively illustrated with graphics and video. This is followed by a 3-hour parking lot session called *Train Your Bike*. To participate in the 3½-hour on-road bicycling *Tour of the City*, which includes navigating difficult intersections alone after prior instruction and demonstration, the student must first have completed both of the other two sessions.

CyclingSavvy instructor training is comprehensive, as illustrated by the course conducted by Caffrey and Wilson in St. Louis, MO, together with Karen Karabell, who introduced *CyclingSavvy* to St. Louis and is one of four *CyclingSavvy* instructors currently active in the metropolitan region.

Before the course, Caffrey, Wilson, and Karabell rode the route, which included a major intersection featured subsequently in a video posted online. This shows the instructors at about 3 p.m. on Thursday, June 2, 2011, bicycling in single file on Kingshighway Blvd., a busy multilane arterial, while crossing I-64/40 in St. Louis. While traversing the intersection, Karabell, at the rear, used a helmet-mounted video camera facing forward while Caffrey, leading, used a rear-facing camera, to record cyclist–motorist interactions. The video was subsequently posted online.[14] It shows the three cyclists integrating seamlessly into the traffic stream while demonstrating lane control, behavior specifically supported by the sixth E: Equality. This is illustrated in the still photo in Figure 3, captured from the online video.

Figure 3. *The screen capture from the video shows Caffrey (leading in white shirt), Wilson (orange), and Karabell crossing I-64/40 after turning left onto Kingshighway Blvd., a major multilane arterial in St. Louis. The main view is from a rear-facing helmet camera worn by Caffrey. The inset is from Karabell's forward-facing camera.*

During the actual instructor course, before each major feature such as the one above, a student uses colored chalk on the sidewalk to map out the route and how they will navigate it. This is called "chalk talk," a feature introduced in the *CyclingSavvy* program that helps to prepare participants before they bicycle individually through a challenging intersection (see Figure 4).

Figure 4. *Cline demonstrates "chalk talk" at the CyclingSavvy on-road instructor training session in downtown St. Louis in June 2011. His task was to show the preferred route for navigating the Kingshighway Blvd. and I-64/40 intersection.*

A major goal of the recently formed American Bicycling Education Association is promoting the *CyclingSavvy* adult traffic cycling program nationally.[15]

Comparing Some Dutch and U.S. Bicycling Statistics

Cycling programs are very different in the United States and Holland, with mandatory cycling education in Holland but not in the United States. Moreover, cycling fatality rates are far lower in Holland as compared to the United States. Although the safety performance of the Dutch system cannot be specifically attributable to education, it would appear that education plays a part.

To help to put this discussion into context, it is worth noting some key differences between the United States and Holland. Both geography and culture are important, in addition to the profound impact of the private motor car, which developed earlier in America. These differences remain today, as shown by the following data for the mode share of bicycling in the two major Dutch cities mentioned above and two in the United States as a function of worldwide rankings (in parentheses):

- Amsterdam, Holland 40 percent (#4)
- Utrecht, Holland 33 percent (#8)
- Portland, OR, U.S. 6 percent (#157)
- St. Louis, MO, U.S. 0.9 percent (#452)

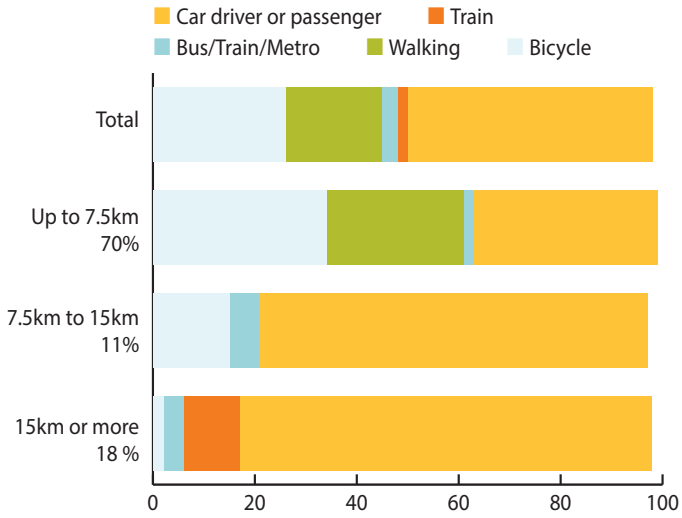
Figure 5, reproduced from Cycling *in the Netherlands 2009*, shows the Dutch mode share for different trip purposes as a function of trip distance.[16] For trips up to 7.5 km (4.5 miles), the bicycle is almost as popular as the car, being chosen 34 percent of the time, compared to 36 percent for car driver or passenger.

Despite the bicycling mode share in Holland being significantly higher than in the United States, bicycle fatality rates are significantly lower than in U.S. cities.

This is illustrated in Table 1, where *F* is the 10-year bike fatality total per 100,000 population, normalized for mode share.

The table provides some interesting comparative data as regards bicycling fatalities, which, in the United States at least, are typically only recorded when a motor vehicle is involved. It should be noted that these data are aggregates for the entire bicycling population.

There are significant differences between the highest and lowest estimates for bike fatalities for the four cities listed, although they are smaller for the Dutch cities:



Source: Mobiliteitsonderzoek [Mobility Study] Nederland 2007, AVV.

Figure 5. *Journey According to Main Transportation Means and Distance Category 2007*

Table 1. *Bicycle Fatality Rates for the Netherlands and the United States*

	Population	P Population in 100,000	Year	BF10 Bike Fatality Total 10-yr period	BF10-P BF10 per 100K population	BMS max Bike Mode Share max. %	F (min) Min. 10 yr Bike Fatality per 100,000 population normalized for mode share	BMS min Bike Mode Share min. %	F (max) Max. 10 yr Bike Fatality per 100,000 population normalized for mode share
The Netherlands				**2004-2013**					
Amsterdam	810,767	8.11	2013	53	6.5	40	**0.16**	22	**0.30**
Utrecht	328,164	3.28	2013	14	4.3	33	**0.13**	21	**0.20**
USA				**2002-2011**					
Portland, Oregon	609,456	6.09	2013	21	3.4	6	**0.57**	2	**1.72**
St. Louis City, Missouri				**2002-2011**					
10-year highest fatality rate	318,416	3.18	2010	5	1.6			0.9	1.74
				2003-2012					
10-year lowest fatality rate	318,416	3.18	2010	2	0.6	0.9	**0.70**		
F = BF10-P/BMS									
(10 yr Bike fatality per 100K pop) / Bike Mode Share %									
St. Louis City BMS = 0.9%									
for 2010 (only 1 datapoint)									

Sources: Dutch population data from the Dutch Central Bureau of Statistics (CBS, or Statistics Netherlands); population data for U.S. cities from http://www.citypopulation.de/U.S.A-Cities.html; fatality data for bicyclists in Amsterdam and Utrecht from the Dutch Centre for Water Transport and Environment (Rijkswaterstaat Water Verkeer en Leefomgeving), provided by Marien de Wit, senior security advisor, WVL; Portland bike fatality data from the 2011 Bicycle Counts Report, Portland Bureau of Transportation, February 2012, available online at https://www.portlandoregon.gov/transportation/article/386265; St. Louis bike fatality data from records maintained by the Missouri State Highway Patrol, Patrol Records Division, available online at http://www.mshp.dps.missouri.gov/TR15Map/index.jsp; bicycling mode share in major cities worldwide from http://www.cityclock.org/urban-cycling-mode-share/.

- Amsterdam 2.0:1
- Utrecht 1.5:1
- Portland 3.0:1
- St. Louis 2.5:1

Comparing *F* (10-yr bike fatality rate normalized for population) for Holland and the United States and choosing the worst-case Dutch numbers and best-case U.S. numbers still significantly favors the Dutch, with their rate being at least half that of the United States (0.2-0.3 vs. 0.57-0.7).

Conclusion

Most national bicycle transportation-related efforts to date have been directed toward road infrastructure, with some exceptions.

More emphasis on bicycling education programs aimed at both mature school children and adults is needed to balance this. Children especially could benefit from this form of independent mobility, simultaneously freeing parents from being the family chauffeur for some trips in the United States.

There are currently increasing hurdles in the United States in implementing a school-based program like the one described here. They include increased concern over the threat of litigation due to the possibility of a child being injured or killed, even though the risks are small; more rigid control of public school curricula, leaving little room for experimentation; and a reduction in the time allocated to physical education in schools, even though lack of exercise and obesity are now recognized as major health problems starting at an increasingly younger age.

However, as with the four E's of highway safety, a comprehensive approach to bicycle safety is needed to achieve a safe and equitable bicycling program in the United States. This approach should include a greater emphasis on child and adult bicycle education programs like the ones described in this paper. **itej**

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