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ABSTRACT

Road safety education needs to be a vital component in the school curriculum. This paper describes a planned road safety education support materials curriculum developed to aid educators in the Wiltshire County (England) primary schools. Teaching strategies include topic webs, lecture, class discussion, group activities, and investigative learning through a problem solving approach. Materials provided for the teacher include: a detailed instructional guide, lesson plans, vocabulary lists, activity sheets, unit quizzes, answer keys, and supplementary resources. The paper also reports on a validation study conducted during the pilot testing phase of the curriculum development process. Students (N=32) were randomly selected and assigned in equal numbers to experimental and control groups in each of two schools. The control group was given a posttest only, while the experimental group was given the road safety instruction and a posttest. Analysis of the test data found a significant difference between those pupils who had received the road safety support materials instruction and those pupils who had not. Recommendations based on the development, pilot testing, and statistical analysis of the road safety materials are provided. (Contains 17 references.) (LL)

DEVELOPMENT OF A BRITISH ROAD SAFETY EDUCATION SUPPORT MATERIALS CURRICULUM

by

Linda H. Bouck

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INTRODUCTION

While Britain has one of the lowest overall traffic accident rates of any European country, recent roadway fatality statistics in Britain indicated that road accidents are a major cause of death in child pedestrians. The number of child pedestrian accidents ranks as one of the highest in the European Community. (British Road Federation, 1991; Transport & Road Research Laboratory, 1991).

In 1988, over 45,000 children under the age of 16 were injured in road accidents, 8,900 were seriously injured children and 462 were child fatalities. Analyses of serious road accidents reported to police revealed that children were most at risk when on foot -- 63% of children who were seriously injured or killed were pedestrians. Serious accidents more than double as children reach school age and are exposed to greater risk as pedestrians and cyclists. Studies indicated that 85% of the serious accidents involving children happened in urban areas on weekdays when children were returning home from school (Department of Transport [DPT], 1990b). Pedestrians were also more likely to have sustained injuries which resulted from traffic accidents in residential areas, in addition, to accidents that occurred more than 50 meters away from a pedestrian crossing (DPT, 1990a). Boys were more at risk than girls. It appears that children were more at risk than adults due to a number of factors. These included: undeveloped perception, inexperience, small physical size and a tendency to cross in an unsafe place (DPT, 1990b, p.2; Aucott, 1987). Furthermore, children were often more concerned with play and recreational interests rather than traffic safety risks.

During 1990, in Wiltshire County, England, there were 73 fatalities, 4 of which were children. Analyses of related statistics also revealed that there were 713 seriously injured road users, 71 of which were children and 2,837 slightly injured victims, of which 318 were children (Wiltshire County Council, 1990).

Monthly accident rates in Wiltshire County were the highest in September, a month when children were in school. Friday, the last day of the school week, had the highest number of reported accidents. Highest hourly accidents in the county occurred during 7:00-8:00 a.m. and 4:00-6:00 p.m.

Road accidents remain a major cause of death and injury to children (DPT, 1990b, p.2). Because of concern about these child pedestrian accidents and other traffic fatalities, the British government has initiated engineering, enforcement and educational strategies intended to reduce accident fatalities by 33% by the year 2000. All counties in England are encouraged to utilize these three strategies in efforts to reduce county fatalities.

Research studies have shown that children need to develop a healthy attitude toward road safety-related concepts, as well as good decision-making skills, during their formative years. The development of decision-making skills is necessary to assist children as they become more independent of parental guidance in the natural maturation process. Helping children discover and understand road safety education concepts during the formative years assists them in fostering healthy lifetime habits.

A landmark safety education study conducted by Singh and Spear (1987) in British schools and colleges has indicated the need for more planning and coordination of road safety education programs in schools (Harland, 1990). As a result of these findings, a five-year safety education demonstration trial project was started during 1989 in Sheffield and Hertfordshire. This educational research project was still progress at the time this monograph was written and was scheduled to have the necessary demonstration trial data gathered by conclusion of 1994.

Road safety education needs to be a vital component within the school curriculum at all Key Stage Levels. In the past, road safety has been taught using little uniformity and rather sporadic instructional methods depending upon the content knowledge, school term and available time allotment of classroom teachers, road safety officers and police authorities. However, a road safety curriculum is relevant to and can be linked with a number of subjects in the National Curriculum

of England and Wales. These subjects include, but are not limited to, technology, science, mathematics, English, art, history and geography.

British teachers have enormous demands placed on them during the school year and futhermore, many teachers feel overloaded with the many detailed requirements of the National Curriculum. With these obligations, teachers have little time for creative classroom unit planning. Road Safety Officers can play a pivotal role with their traffic safety expertise by recommending to educators cross-curricular or interdisciplinary road safety curriculum components in various subject areas, that meet the needed requirements of the National Curriculum. Thus, the RSOs promote important road safety issues that are unique, while practical and relevant to the mandates of the National Curriculum.

Statement of the Problem

England's most vulnerable road users are children. "Road accidents are [a] major cause of death and injury to children" (DPT, 1990b, p.2). One child in 15 is injured in a road accident before his/her sixteenth birthday. Moreover, these needless injuries and fatalities demand immediate attention.

Purpose of the Study

The purpose of the study was to develop a road safety education support materials curriculum. The Wiltshire County Road Safety Unit desired modification of the current approach which was used in the teaching of traffic safety concepts to primary school students. The study also was undertaken to aid educators in creating an innovative, practical road safety curriculum while meeting requirements of the National Curriculum for the Key Stage 2 Level (8-11 year old) students in the primary schools of Wiltshire County.

This monograph discusses the development of a coordinated and planned road safety education support materials curriculum for the Wiltshire County Road Safety Unit. Prior to the development of this curriculum, information was gathered from numerous road safety professionals throughout England. In addition,

Wiltshire County road safety information was gathered from Mr. John Miller, Head of Road Safety, and other experienced district Road Safety Officers (RSOs) of the county. Recommendations were sought from various of Wiltshire County Education Advisers. Consultations were arranged with Headteachers and Key Stage 2 Level teachers of the Colerne and Box Highlands Primary School previous to and during the development of the curriculum.

Curriculum Research

This prototype support materials curriculum was designed to be integrated with other subjects of the National Curriculum and to address various road safety concerns at the Key Stage 2 Level. This level was selected because pupils at this age are in a high risk-taking stage of child development, particularly, boys.

The Engineering Council and Standing Conference on Schools' Science and Technology (1985) emphasized the need for real-life problems in science and technology instruction.

Platt (1989) suggested that road safety learning activities in science can support various Attainment Targets of the National Curriculum and that science is a subject that teachers can use to assist in the development of "pupils' ability to plan, carry out, interpret results and findings, draw inferences and communicate exploratory tasks and experiments" (p.12). This is essentially an investigative learning approach.

Sellwood (1991) stated that "problem-solving is central to an investigative approach to learning. Problem-solving assists in the development of thinking skills and is a means by which children form important learning patterns" (p.4). According to Bruner (1966) problem solving provides an opportunity for pupils to reflect upon what they have learned from an activity, and its processes, to arrive at a drawn conclusion using reflective thinking. A problem solving approach also contains an important progressive element so that basic concepts are transferable and lead to an upward spiral of more challenging levels of learning. The transferability element is vital; pupils should not simply learn the present exercise,

but be able to transfer the concept to other related and more complex learning situations (Nisbet & Shucksmith, 1984). The problem solving approach was originally found to be effective in science, technology and mathematics; more recently, it has become cross-curricular in nature.

According to Aucott (1989):

> Safety education belongs in the whole school curriculum...It has been shown that pupils learn very little from using work sheets on their own; the most effective methods of teaching/learning are through active participation in the learning process. This links directly to the criteria with the National Curriculum which emphasizes that education should involve'explorations and investigations'... (p.2).

Cross and Pitkeithly (1988) also supported the cross-curricular, "hands-on" instructional curriculum approach and indicated that it would assist pupils in understanding the concepts of time, speed and distance. These researchers stressed the need for the integration of traffic safety concepts in English, science, maths, art and other subjects.

Darlington (1990) indicated the need for practical, real-life learning situations. Conversely, he stated that "road safety schemes which omit the realism of the 'live scenes' will not succeed" (p.18).

Curriculum Design

The six-unit road safety instructional guide is intended to act as a cross-curricular support materials package. Each unit is designed to be used as a supplement to other subjects. The instructionals guide is also written in a detailed manner so that those teachers who have little knowledge of road safety education can teach it from the lesson plans provided in the unit. However, more experienced teachers will most likely want to adapt the units to their own teaching styles. The curriculum units adopt a variety of teaching strategies to relate to various learning styles. Strategies include topic webs, lecture, class discussion, group activities and investigative learning through a problem solving approach. Wiltshire Local Education Authority and its education advisers endorsed this integrated problem

solving approach to teaching and provided curriculum, time, and support in developing this approach in their schools (Wiltshire County Council, 1991).

Unit titles include "Historical Influence of the Roman Empire on England;" "Perception;" "Conspicuity;" "Sign Colours, Shapes and Symbols;" "Mass, Speed and Control;" and "Safety Risk Management." Each unit is designed to be used separately for applicable Programmes of Study and corresponding Attainment Targets as designated in the National Curriculum. Within each unit, instructional materials are provided for the teacher. These materials include detailed lesson plans, vocabulary lists, activity sheets, unit quizzes, answer keys and supplementary resources. The lesson plan format within each unit includes the applicable Key Stage Level, National Curriculum Attainment Targets, subjects, aims, objectives, time, materials required, activities, lesson summary, and the unit summary.

Moreover, this curriculum contains a differentiation element so that learning activities will be effective for a wide range of pupils. In addition, the curriculum adopts a problem solving approach to develop an understanding of basic road safety concepts. Concepts discovered by students in the classroom are also applied to "real life" road safety situations.

Curriculum Pilot Test and Statistical Analysis

A Post-Test Only Control-Group experimental design (Borg & Gall, 1989) was implemented during the pilot test phase of the curriculum development process. The pilot test was conducted during the 1992 Spring Term at Colerne and Box Highlands Primary Schools in Wiltshire County. Thirty-two Key Stage 2 Level pupils in the pilot test were randomly selected and assigned to the experimental and control groups in each of the two schools. There were equal numbers of students in each group. The control group was only given the posttest, while the experimental group was given the road safety instruction and a posttest.

The posttest data from the corresponding group in each of the two schools was pooled and tabulated. An analysis of the group mean and standard deviation between the groups was conducted. The combined control group mean of 35.7 was

found to be a lower group mean score when compared to the combined experimental group mean of 83.3. The combined control group standard deviation of 25.3 was determined to be a higher group score when compared to the combined experimental group standard deviation of 10.6.

A statistical pooled *t*-test was run on the posttest data from the pilot test. A pooled *t*-test revealed an actual probability level of 6.91 at the $p<.01$ level with 30 degrees of freedom. A *t*-test value of 2.45 was required for significance at the $p<.01$ level with 30 degrees of freedom. Therefore, analysis of the test data found a significant difference between those pupils who had received the road safety support materials instruction and those pupils who had not received the instruction. The results favored those pupils who had received the road safety instruction.

Conclusions and Recommendations

The road safety education support materials curriculum was developed, pilot tested, analyzed and found to be statistically significant. This curriculum was designed to assist the road safety administrator in developing a unique road safety curriculum to be used at the primary school level. The project also was undertaken to aid educators in creating an innovative, practical road safety curriculum while meeting requirements of the National Curriculum for the Key Stage 2 Level students in Wiltshire County. The curriculum was pilot tested in two Wiltshire County primary schools. A Post-test Only Control-Group experimental design was used in the study to determine if the curriculum made a difference. Analysis of the post test data found a significant difference at the $p<.01$ level.

After the development, pilot test and statistical analysis of the road safety support materials curriculum, the researcher made the following recommendations:

1. Link the road safety curriculum to another student activity such as the Good Citizenship Competition of the Working Party. This is an annual event in Wiltshire County that pupils enjoy yet, tests the pupils' safety education knowledge through various safety-related scenarios.

2. Design other road safety curriculums to reflect individual community traffic safety concerns.

3. Replicate the road safety curriculum pilot test in more Wiltshire County schools and increase the sample size of pupils in the study.

4. Continue to gather direct input from Education Advisers, headteachers and teachers when designing other road safety curriculums. This is necessary if the curriculum is expected to be implemented and utilized effectively in the classrooms.

5. Continue to involve the Senior Road Safety Officer (Education), district RSOs, and the Police Officers (Education) in future county traffic safety education curriculum development projects.

6. Develop additional road safety curriculums for the other Key Stage Levels of the school curriculum to further imbue good decision making skills in efforts to reduce child casualties and fatalities in Wiltshire County, England.

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