

Student Examination in the Virginia Hunter Education Program

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Whether mandatory or voluntary, hunter education courses conclude with student examinations. With rare exception, such as to accommodate an illiterate student, the examination is a short answer, written test of what the student knows about safety basics, firearm functioning, ethics, outdoor skills and other aspects of the basic course. Youngsters, who are the prime target of hunter education courses in North America, are conditioned to concluding courses with exams, and program administrators need a convenient way of assuring that certificates are accurate. It might seem a simple matter to design an exam to fill these expectations, but testing and other measures of learning are highly controversial aspects of education. Some questions the educator asks include: (1) Should the examination measure attitude change toward the subject, adequacy of knowledge, attainment of sufficient skills, or all of these?, (2) Is the exam readable at the appropriate age level?, (3) Are the test items representative of the subject matter presented in the course?, (4) Do the test scores accurately reflect students knowledge?, and (5) Are the test items of appropriate difficulty? The administrator of hunter education in any agency is concerned not only with educational quality of the course and the examination, but also he has to be certain that only those students who have little interest or aptitude in hunter safety fail. At peak times of the hunter education year, there are usually too many demands for courses, materials and facilities in the state or region, which makes repeating a course to help a few lagging but interested students pass a rigorous exam unattractive in financial, time-management and political terms. Creating a student examination that meets the critical standards of both the educator and the administrator is not easy.

In Virginia, the hunter education program administrator expressed concern that the standard examination might need revision and requested us to conduct a substantial review as part of an overall evaluation of the program (Bromley and Hampton 1981). A thorough analysis of the old exam has been accomplished and a new exam has been developed. This paper presents the process we used.

As will be made clear below, the Virginia Hunter Safety Coordinator, James N. Kerrick, Chief of Education Harry L. Gillam, and Education Lieutenants Foster, Heslep, Hinchey, Miller, Pittman, and Wirt all made substantial contributions to the project. Without financial support from the Virginia Commission of Game and Inland Fisheries and the personal support of the hunter education administration team, development of the new student exam would not have been possible. We gratefully acknowledge also the support of National Rifle Association and the National Wildlife Federation through fellowships to E. L. Hampton. Special thanks are due Dr. Robert Frary of the Virginia Tech Learning Resources Center for his expertise and counsel in the more technical aspects of testing.

Adequacy of the Current Examination

Following the old adage, "if it ain't broke, don't fix it," our first task was to see if the existing student examination met educational and administrative standards. The existing exam was evaluated for readability, item grammatical structure, reliability, item to total score correlation, and content validity.

The readability analysis indicated that students on a fourth grade level and higher should be able to comprehend the questions on the exam. This was a positive finding for the exam since the Virginia Hunter Education Program is designed to accommodate 12-year-olds and older students.

Test item grammatical structure was evaluated using guidelines given by Brown (1976). Fifty percent of the test items contained wording flaws.

An item analysis (Nunnally 1978) was conducted on several hundred completed examinations in order to assess reliability and item to total score correlation. Reliability is an estimate of the "repeatability" of the test administered under similar conditions. The KR-20 reliability formula (Nunnally 1978) yielded a value of 0.762, a fairly high and satisfactory value.

The item analysis revealed 7 items which did not correlate highly (> 0.2) with total scores. These items contained appropriate concepts, but were either too easy or contained poor wording.

Any good examination must be content valid, that is, the test composition must reflect the same relative emphasis as the course. For example, if the hunter education course contained 40% safety material, then 40% of the test items should deal with safety. To assess content validity, the hunter edu-

cation course was divided into 8 sections: Hunters and Hunting, Safety Basics, Guns and Ammunition, Shooting Basics, Gun Handling, Muzzle Loading, Bow Hunting, and Outdoor Skills. This is essentially the format used in the Instructor's Manual prepared by the Education Division. The current student examination was then evaluated for content using the time allotments for each section provided in the suggested course procedure. Finally the relative importance of each content area, as indicated by the opinions of the administrative team was calculated. A worksheet containing the 8 subject matter sections was prepared and given to the Education Lieutenants and the Hunter Safety Coordinator. Subject matter sections were ranked from 1 to 8, with 1 being the most important. An average rank was computed for each subject area. Using a modified Delphi technique, the Lieutenants and Safety Coordinator were then asked to agree upon a content percentage of each subject matter section for a new, soon to be developed student examination. The results of all of the above calculations are presented in Table 1. Substantial discrepancies existed among the content estimates of the current student exam, the student manual, the instructor's manual, and the desired exam, particularly for the Safety Basics, Bow Hunting, and Outdoor Skills sections.

In summary, the existing exam was found inadequate on several grounds. Although it was readable and scores were similar for different classes, half the exam questions were worded inappropriately, 7 questions were too easy or did not have significant item to total score correlations, and the relative weights given to some of the various subject areas in the exam did not match the importance of those areas in student and instructor manuals or that desired by course administrators. Consequently, a new examination was needed.

Table 1. Content of Current and Desired Student Examination

Content Area	Percent of Material			
	Current Exam	Student Manual	Instructor Manual	Desired Content
Hunters, Hunting & Regulations	14	17.5	8.33	20
Safety Basics ^a	34	7.2	16.67	25
Guns & Ammunition	10	12.4	12.5	10
Shooting Basics	4	17.5	12.5	10
Gun Handling	14	6.2	16.67	15
Muzzle Loading	4	8.2	8.33	5
Bow Hunting ^a	20	8.2	12.5	5
Outdoor Skills ^a	None	22.7	12.5	10

^a Areas of greatest discrepancy.

Development of the New Student Examination

The evaluation of the existing examination helped establish guidelines for the new exam and stimulated the hunter education administrative team to participate in the project. Each member was asked to develop a list of exam questions covering each section of the course. The resulting 676 questions were considered raw material. Redundant questions were eliminated, leaving 433 unique questions. Careful editing for grammatical consistency and content further reduced the pool to 232 items. On the average, it takes a skilled test maker between 30 minutes and 1 hour to write a thoroughly satisfactory test question, given all the constraints. Obviously, test item creation was a laborious and time consuming task.

Next, we pilot-tested the new test questions. Four, 50-question exams were developed using 200 of 232 questions. The exams were administered in 1 district to students of both rural and suburban backgrounds. An item analysis was conducted on the 872 tests we received. The analysis was facilitated by using op-scan answer sheets in conjunction with a sophisticated, computerized examination scoring and analysis system available at the Virginia Tech Learning Resources Center. The statistical breakdown on each test item was scrutinized to identify questions which were answered consistently and correctly by most students. Then the proper content weight for the 8 subject areas was used to select the final 50 questions from the pool of acceptable items.

The new exam was designed to have an average score of 88, a passing score of 70%, and a failure rate of 5%. The old exam had an average of 88 and a passing score of 70%. The failure rate estimate for the old exam was judged by the administrative team to be approximately 5%.

Since development of the new exam, the Education Division has decided to revise the Instructor's Manual to conform to the desired content of the exam. Therefore, the process of developing the new exam has had a positive effect on restructuring the Hunter Education Program to conform to the wishes of the people most involved in delivering the Hunter Education course, the Safety Coordinator and Education Lieutenants.

Conclusion

We have presented a brief, generalized view of the process of evaluating and developing an examination for the Virginia Hunter Education Program. We strongly suggest that other Hunter Education administrators closely examine their current Hunter Education test and testing procedure. If certification of students is based on performance on some standard test, then the test should be a valid and reliable measure of student achievement.

On a final note, test development is a highly complex, time consuming task which is best left to experts in the field of educational testing.

Literature Cited

- Bromley, P. T., and E. L. Hampton. 1981. Considerations in evaluating hunter education programs. Proc. Annu. Conf. Southeast. Assoc. Fish & Wildl. Agencies. 35:689-694.
- Brown, E. G. 1976. Principles of educational and psychological testing. Holt, Rinehart and Winston, New York. 504pp.
- Nunnally, J. C. 1978. Psychometric theory. McGraw-Hill Company, New York. 699pp.