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AUTHOR Koenke, Karl
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ABSTRACT

The Inventory of Teacher Knowledge of Reading was administered to a sample of 60 freshmen, 60 juniors, and 60 seniors in elementary education at the University of Illinois. In addition, it was administered to 60 experienced teachers who had not attended the University of Illinois as undergraduates. An analysis of variance of the test scores was significant (F=74.7) and a Newman Keuls showed that the scores of the freshmen, juniors, and seniors were significantly different, Seniors' and experienced teachers' scores did not differ. Items were assigned to the knowledge categories identified by the test authors. Fifty percent of the items were assigned to three knowledge categories by three reading specialists. These categories were reading readiness, word perception, and comprehension-critical reading. KR20 coefficients were too low to suggest use of knowledge categories as subscales. Items with the best characteristics were identified for use as a possible short-form. (Author/MKM)

Karl Koenke
Associate Professor
University of Illinois
ERIC/RCS
305 Education Building
Urbana, Illinois 61801

ASCERTAINING KNOWLEDGE OF READING WITH THE ARTLEY-HARDIN INVENTORY

Karl Koenke
University of Illinois
and
ERIC/RCS

In a recent publication, Kingston, Brosier, and Hsu (1975) reported the first validation of the Inventory of Teacher Knowledge of Reading (ITKR) by Artley and Hardin (1971).

However, since the subjects used by Kingston, et al, were either enrolled in classes at the University of Georgia or associated with it in some fashion, it behooves teacher educators and reading specialists from other institutions to inaugurate their own validation studies.

This then is a report of a validation of the Inventory using students enrolled in Elementary Education at the University of Illinois and experienced elementary school teachers from Central Illinois. In addition, consideration is given to identification of Inventory item categories since the results of the factor analysis conducted by Kingston, et al, did not yield sub-scales. Finally, consideration is given to the selection of items which might be used in a short-form of the Inventory.

Procedure

During the 1974-75 academic year, the Inventory of Teacher Knowledge of Reading was administered to 60 University of Illinois freshmen, 60 juniors, 60 seniors, and 60 elementary school teachers currently employed in the school districts of Central Illinois. An attempt was made to randomly select the undergraduates from the total at each of the three levels; however, not all of the first 60 students would or could come to take the test. In all instances where this occurred, alternates were randomly chosen from the remaining students at that particular level.

The undergraduates were all female and enrolled in the elementary education curriculum at the University of Illinois, Urbana-Champaign. The 60 freshmen were selected from the 219 entering freshmen and tested during the orientation and registration period. The 60 juniors were selected from among the 175 third-year students then enrolled.

Testing was conducted as the juniors completed the integrated general elementary methods course and observation of teacher practice in the schools. The 60 seniors were selected from among the 156 fourth-year students then enrolled. They were tested six weeks after the semester started; that is, during the time that they were concurrently enrolled in three eight-week methods courses and just prior to leaving for a half semester supervised teaching experience. Two of the methods courses were required: Fundamentals of Reading Instruction and Language Arts in the Elementary School.

It is, therefore, possible to think of the freshmen as without a college education, the juniors as having both two years of a liberal arts education and an introduction to the elementary schools, while the seniors have most of the methods course-work, including reading, but lack experience.

The experienced teachers, however, were not randomly selected although they represent those teachers who were entering the Master of Education program and enrolled in their first graduate reading course. Half of the sample came from an advanced off-campus developmental reading class and the other half from several sections of the first graduate course in remedial reading. Other characteristics of the experienced teachers are as follows: (a) they were all female; (b) they had two to thirty years experience; and (c) they had taken their undergraduate work at other institutions. The few experienced teachers in the classes who had taken undergraduate degrees at the

University of Illinois were not included in the study since the usual M.Ed. student at the University of Illinois was not at the University of Illinois as an undergraduate.

The instrument which was the focus of this research is, as previously mentioned, Artley and Hardin's Inventory of Teacher Knowledge of Reading. This 95-item test without a technical manual, seems to be the only open, published test for teachers of reading. Since Kingston, et al, discuss the background and characteristics of the Inventory nothing more will be undertaken here in that regard.

Results of Statistical Analysis

Table 1 presents for each of the four groups range, median, mean, standard deviation, and both KR20 and KR 21 reliability coefficients.

Table 1 about here

It is apparent that test scores increase as education increases, that medians and means are quite similar so the distributions are not skewed, and that reliability coefficients are generally in the .70's.

A comparison of the scores of the four groups using an analysis of variance produced significant $F = 74.7$. The Newman-Keuls method for the use of the modified q statistic was used to prove the nature

of the group differences after the significant overall F was obtained. The results indicate that in all but one instance each set of scores differs from all others. The one exception is as might be expected from inspection of the means presented in Table 1: Seniors and experienced teachers scores on the Inventory do not differ significantly. It is interesting to note that Kingston, et al, also found that the scores of their undergraduates ($\bar{X}$ = 54.45) and the scores of their elementary school teachers ($\bar{X}$ = 54.11) did not differ.

Another result of this study which is similar to that of Kingston, et al, is the level of the KR 20 reliability coefficients. They calculated a .74 for students with reading courses and a .79 for students without. The seniors with a reading course in this study had a .73 while both the freshmen and juniors without reading courses had a .78. It is only the reliability coefficients of the experienced teachers which differ (.82 to .91), and the smaller standard deviation (9.6 to 14.3) of the sample in the present study might lead one to believe that an attenuated range of scores earned by the experienced teachers in the present study contributed to the lower reliability coefficient

From the selected item analysis data presented in Table 2, it is apparent that three items functioned similarly across all groups.

Table 2 about here

Item # 3 was known by 10 percent of each group and two items, #47 and #95, were answered incorrectly by more than 30 percent of each group. The findings of Kingston, et al, agree but items #71, #80, and #88 are also considered difficult.

As might be expected, especially since the analysis of variance was significant, the freshmen have the greatest number of items which caused difficulty among the test-takers and the fewest number of items passed by 90 percent of the takers. On the other hand, the seniors and the experienced teachers, although not showing a difference in the number of items failed by 30 percent or more, do differ in the number of items passed by 90 percent or more of the takers, the seniors succeeding on 20 items while the experienced teachers succeeded on but 11 items. A test of the significance of the difference between the two percentages, 20/95 = .21 and 11/95 = .115, led to the calculation of $t = 1.81$. A significant difference is not claimed, however, since a t value of 1.96 is needed for significance at the .05 level.

Results of the Logical Analysis

Although Artley and Hardin write that their Inventory contains items which sample knowledge in Reading Readiness, Word Perception, Comprehension and Critical Reading, Evaluation, Diagnosis, Correction, Goals of Instruction, Differentiated Reading Instruction, and Silent

and Oral Reading; they do not list the items in each knowledge category. This is precisely the information a user needs, however, to make some judgments about the Inventory.

The items of the Inventory were therefore assigned to one of the knowledge categories identified by Artley and Hardin. The results are shown in Table 3. It should be noted that three reading

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Table 3 about here.

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specialists independently categorized the items, and when differences arose a majority opinion was used to assign the item to a category.

It is apparent after studying Table 3 that the Inventory is heavily weighted in favor of Reading Readiness, Word Perception, and Comprehension-Critical Reading. With 16 items per category, these three categories account for 48 items or 50% of the test. In contrast, Evaluation, Diagnosis and Correction items were displayed jointly in Table 3 because they were assigned respectively eight, six and two items.

Even though Kingston, et al, found so many components in their factor analysis of the Inventory that they despaired labeling any sub-scales, an attempt was made to establish the reliabilities of the knowledge categories using the seniors' data. The KR20 reliability coefficients for the knowledge categories ranged from .00 to .475; that is, so low as to cause doubt as to the usefulness of the knowledge categories as independent scales.

Since the lack of reliability of the sub-scales may be due in part to the low reliabilities of the items within the sub-scales, an inspection of the item analysis data was undertaken to ascertain which items had low Point Biserial Correlation Coefficients. Low was defined as .25 and below, mediocre as .26-.39 and high as .40 and above. It should be kept in mind that .80 is the highest Point Biserial Coefficient obtainable (Description and Interpretation of MERMAC System: Item Analysis).

The results of the inspection of the item analysis data are as summarized in Table 4: only 29 items (30.6%) meet or exceed the

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Table 4 about here

.25 cut-off, and only four of these exceed .40. Furthermore, only three of the knowledge categories have five or more statistically acceptable items, while none of the Diagnosis items and only 3 of the 16 (18.75%) Reading Readiness items meet the criterion.

The final logical analysis of the data to be undertaken was a comparison and contrast of the item analysis data of the juniors, the seniors, and the experienced teachers. The objective was to find items which might be used for a short screening test. The only items which were eligible were those which had a Point Biserial Coefficient above .25 at the junior level and at either the senior, or experienced teacher levels. In addition, the proportion of correct

responses had to rise from junior to senior or experienced teacher. Twenty items met these criteria. Table 5 includes the item list, the the assigned knowledge category, proportion of test-takers correctly responding to the items, and the Point Biserial Correlations.

Table 5 about here

Conclusions and Implications

The conclusions and implications of this study are as follows:

1. The Inventory is a valid measure of teacher knowledge of reading in that it discriminates among groups of females with varying degrees of professional training.
2. The reliability estimates were generally in the .70's for this sample. That is considered low for published tests.
3. The low reliability may be due in part to the low item correlations. As Groff (1973) has suggested in his review of the Inventory, differences of professional opinion regarding the "truth" may in part be the cause of this condition.
4. Whether or not more instruction is needed for in-serivce or preservice teachers is a question not answered by this study. However, the fact that both Kingston, et al

and the present study found scores of students with reading methods and scores of experienced elementary school teachers to be similar should be the basis for reflection among reading specialists.

5. Although Inventory items were assigned to the knowledge categories identified by Artley and Hardin, the low sub-scale reliability estimates seem to preclude the use of independent sub-scales for diagnostic purposes.
6. The fact that 50 percent of the Inventory items were assigned to but three knowledge categories: Reading Readiness, Word Perception, and Comprehension-Critical Reading, should alert the potential user to the possible mismatch between the emphasis placed on an objective in the reading course and the emphasis placed upon that objective in the Inventory.
7. If the need for a short-form of the Inventory were felt the present data would support the choice of the items displayed in Tables 4 and 5. The Table 4 items might be better for inexperienced teachers with a reading course, while the Table 5 items might be most appropriate for either experienced teachers or volunteers in Right-to-Read training programs.

References

Artley, A. Sterl, and Hardin, Veralee B. Inventory of Teacher Knowledge of Reading. Columbia, Mo.: Lucas Brothers, Publishers, 1971.

"Description and Interpretation of the MERMAC System: Item Analysis." Mimeo. University of Illinois. Undated. 9 pages.

Groff, Patrick. "Reviews: Artley, A. S. and Hardin, V. B.," Inventory of Teacher Knowledge of Reading, Reading World, Volume 12, Number 4, May, 1973, 296-98.

Kingston, A. J., Brosier, G. F., and Hsu, Y. "The Inventory of Teacher Knowledge of Reading--a Validation." The Reading Teacher, Volume 29, Number 2, November, 1975, 133-136.

Table 1

Sample Size, Range, Median, Mean, Standard Deviation, Reliability of All Groups

Group	N	Range	Median	Mean	SD	Reliability Coefficient	
						KR20	KR21
Freshmen	60	25-68	44.00	44.45	9.50	.781	.746
Juniors	60	37-73	54.00	55.08	9.06	.776	.726
Seniors	60	43-83	64.50	64.95	7.84	.734	.672
Experienced Teachers	60	47-84	66.50	66.13	9.64	.822	.792

Table 2

Items Passed By 90% or Failed By More Than 30%

Group	N	Items passed by 90 percent or more	Items failed by 30 percent or more
Freshmen	60	3	13, 26, 27, 31, 38, 40, 47, 48, 50, 58, 59, 71, 75, 78, 79, 80, 84, 86, 88, 91, 93, 95
Juniors	60	3, 11, 17, 20, 32, 52, 82	26, 27, 31, 37, 47, 60, 69, 71, 78, 80, 88, 95
Seniors	60	1, 3, 4, 6, 8, 9, 11, 12, 14, 17, 24, 32, 34, 52, 54, 57, 67, 72, 73, 82	37, 47, 80, 95
Experienced Teachers	60	1, 2, 3, 5, 11, 14, 21, 32, 51, 67, 82	47, 69, 88, 95
TOTAL	240		47, 95

Table 3

Items in Logically-Derived Reading-Knowledge Categories

Reading Readiness	1, 9, 11, 19, 23, 34, 40, 57, 63 66, 68, 70, 76, 83, 89, 95
Word Perception	2, 3, 6, 8, 12, 14, 17, 27, 39, 44 50, 61, 62, 82, 86, 88
Comprehension & Critical Reading	10, 15, 22, 26, 30, 33, 41, 42, 46, 52 65, 69, 77, 87, 90, 94
Differentiated Reading Instruction	24, 37, 45, 48, 49, 55, 67, 71 73, 75, 79, 81
Evaluation, Diagnosis, Correct	4, 21, 25, 32, 38, 43, 51, 56- 20, 28, 64, 74, 80, 92-16, 18
Goals of Instruction	5, 7, 13, 35, 53, 58, 60 91, 93
Silent and Oral Reading	29, 31, 36, 47, 54, 59, 72 78, 84, 85

Table 4

Seniors ITKR Items with Point Biserial Coefficients of +.26; Regardless of Proportion of Correct Responses (N = 29)

Reading Readiness			Word Perception			Comprehension Critical Reading			Differentiated Reading Instruct.		
Item	Prop	P Bi	Item	Prop	P Bi	Item	Prop	P Bi	Item	Prop	P Bi
63	.67	.30	2	.85	.32	10	.75	.35	71	.40	.30
83	.87	.38	3	.98	.36	15	.70	.28	73	.90	.34
89	.70	.39	44	.68	.35	26	.53	.49			
			50	.43	.49	42	.73	.32			
			82	.95	.27	52	.90	.28			
			88	.43	.35	65	.68	.34			
						77	.77	.33			
						87	.53	.45			
Evaluation			Correction			Goals			Silent-Oral Reading		
38	.52	.48	16	.33	.27	13	.45	.27	31	.32	.35
51	.72	.27				35	.68	.37	78	.63	.26
						53	.80	.38			
						58	.37	.37			
						91	.50	.33			

Table 5

An ITKR Short-Form Items with Point Biserial Coefficient +.26 For Juniors and Either Seniors or Experienced Teachers

Identity		Juniors		Seniors		Experienced Teachers	
Item	Know. Cat.	Prop.	Pt. Bis.	Prop.	Pt. Bis.	Prop.	Pt. Bis.
2	WP	.73	.37	.85	.32	.90	.27
13	G	.50	.56	.45	.27	.65	.52
22	CC	.60	.30	.83	.23*	.77	.32
26	CC	.23	.27	.53	.49	.63	.31
30	CC	.63	.37	.65	.24*	.68	.34
42	CC	.68	.27	.73	.32	.63	.19*
44	WP	.53	.30	.68	.35	.75	.11*
45	DRI	.58	.30	.75	.07*	.82	.35
48	DRI	.42	.29	.72	.22*	.68	.56
50	WP	.43	.41	.43	.49	.57	.41
53	G	.70	.33	.80	.38	.68	.27
55	DRI	.55	.33	.68	.16*	.77	.29
58	G	.40	.59	.37	.37	.65	.52
66	RR	.58	.27	.68	.06*	.70	.31
70	RR	.55	.51	.77	.04*	.63	.30
74	EDC	.57	.33	.70	.06*	.62	.30
77	CC	.57	.36	.77	.33	.77	.33
88	WP	.18	.27	.43	.35	.22	.49
89	RR	.52	.31	.70	.39	.67	.37
90	CC	.57	.26	.78	.25*	.68	.43

*Point Biserial Cor. Coef. is .25 or below.

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Abstract

The Inventory of Teacher Knowledge of Reading was administered to a sample of 60 freshmen, 60 juniors, and 60 seniors in Elementary Education at the University of Illinois. In addition, it was administered to 60 experienced teachers. An analysis of variance of Inventory scores was significant (F = 74.7) and a Newman Keuls showed that the scores of the freshmen, juniors, and seniors were significantly different. Seniors and experienced teachers scores did not differ. Items were assigned to the knowledge categories identified by the Inventory authors, but KR20 coefficients were too low. (.00-.45) to suggest use as sub-scales. Items with the best characteristics were identified for use as a possible short-form.