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Development of a Reading Comprehension Test for Elementary level Hearing Impaired Students

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Abstract

Reading comprehension has an important place in lifelong learning. It is an interactive process between the reader and the text. Students with hearing impairment need reading comprehension skills at all educational levels and for all school subjects. Determining the level of hearing impaired students' reading comprehension skills is the subject of testing. Tests used to measure students' success are expected to provide accurate and reliable information. Therefore, the aim of this study is to develop a valid and reliable reading comprehension test appropriate for elementary level hearing impaired students reading comprehension learning outcomes. The participants in the study were 15 sixth graders from a school of special education, indicating that this multiple choice reading comprehension test is valid and reliable. The value of Content validity ratio of each item was greater than 0.50, which indicates that each item was statistically significant and usable in practical context. Estimated values of item difficulty ranged from 3.00 to 7.00 which indicate that items were neither too easy nor too difficult and fulfill the criteria of item standardization. Discrimination index of items ranged from 0.20 to 0.1 that indicates that items were good and excellent by the aspect of item discrimination. The reliability value was up to the standard which indicates that the English Reading Comprehension test was reliable.

Keywords: Reading Comprehension, Test, Development, Validity and Reliability

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Introduction

The ability to integrate prior information with reading texts is known as reading comprehension, and it is the intended outcome of reading. Reading comprehension plays a significant role in lifelong learning. The reader and the text are involved in an interactive process. The reader's experiences, skills, motivation, and reading objectives all influence comprehension. According to Kintsch (2005), it necessitates recognising and comprehending the key concepts in texts as well as drawing conclusions from them and prior knowledge. For every academic topic and at every educational level, students require the ability to comprehend what they read. Testing and assessment are used to determine the reading comprehension proficiency of the students.

According to Yu, Wu, & Huang, (2018), exams have gained significance recently because of their formative evaluation functions in aiding students' learning. Multiple-choice exams are the evaluation instruments that instructors utilise the most. A highly valid and trustworthy test's results are reusable, can be used by many individuals at a cheap cost, and can be generalised. Tests are the most popular tool for determining students' understanding of a subject or idea after interviews, according to research (Supovitz, 2012). One crucial method of assessing learning results is through testing. Assessing how well training and education are working is one of the purposes of testing. As a result, it is not appropriate to think of education, training, and testing as distinct processes.

It is crucial that testing be valid and dependable. When creating exams, the majority of teachers don't take test development standards into account. As a result, exams that are flawed and unreliable and do not consistently evaluate students' achievement are commonly created. The information provided by tests used to gauge pupils' progress should be accurate and trustworthy. Using the data gathered from test results, learning activities may be identified and decisions concerning student safety measures can be made simultaneously. Only these exams appear to be useful instruments for evaluation. There are several factors that must be taken into account while developing tests. Validity and reliability are crucial (Gani, Imtiaz, & Krishnasamy, 2020).

Antia et.al., (2020) says that the degree to which measurement findings are free from random mistakes or the consistency between distinct measurements of the same concept are both considered aspects of reliability. One of the fundamental requirements of scientific study is reliability, which is decided by correlation coefficients (r), which range from 0 to 1. How well a test captures the targeted attribute without combining it with other personal characteristics is a measure of its validity. "A test is only valid if its aim is identified," argues Hughes (2003, p. 26).

The majority of research has demonstrated that children with hearing impairments do noticeably worse in reading than children with normal hearing. Studies have indicated that these children's reading abilities are still not equal to those of hearing youngsters.

These children still lag behind their hearing peers in reading, even if their average reading abilities are better now than they were in the last generation, Children with hearing impairments also differ significantly in their reading abilities (Worsfold et. al., 2018). Previous research revealed that a large number of hearing-impaired individuals misunderstand the grammatical constraints that determine sentence construction. Additionally, they don't classify sentence types to determine word meanings. The

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deficiencies in the syntactic processing of the sentences are the reason for the hearing-impaired children's low reading comprehension ability (Quinn. 2021).

Word order, functional words, concordances, grammatical rules, and word meanings are all syntactic cues that we must take into account in order to comprehend the reader's sentence. Top-down and bottom-up processes are therefore necessary for the integration of text comprehension. It has been noted that those who are hard of hearing comprehend sentences using a semantic strategy (Joseph, Nation, & Liversedge, 2013). This technique entails concentrating just on the substance of words and phrases, disregarding any additional information inside the sentence and the grammatical-syntactic relationships between words. The fundamental methods by which these children comprehend written sentences are recognising high-frequency content words, disregarding low-frequency and functional words, and applying a prior representation of sentence meaning known as the keyword strategy.

The employment of a reading technique based on top-down processing for the content words may also be the root cause of the difficulty hard-of-hearing and hearing-impaired youngsters have understanding unexpected sentences, according to research. For comprehension, the reader's experience, word knowledge, and bottom-up syntactic processing are crucial, especially when the message is conflicting or has no contextual support. However, prior knowledge or inferring the meaning of the content words for likely phrases suffices; in other words, processing the syntactic structure is not necessary to comprehend them (Priebe, Keenan, & Miller, 2012). Applying the bottom-up model of reading to students with hearing impairments aims to develop reading abilities starting with the fundamentals of individual letter sounds and the written symbols that correspond to them (graphemes) and progressing to more intricate language structures such as words, phrases, and sentences. Students who might not have had much exposure to spoken language and its associated sounds can benefit greatly from this method, which places a strong emphasis on phonological awareness and decoding abilities. There are many reading comprehension tests available to assess reading comprehension abilities but hardly any reading comprehension test available to assess reading comprehension of hearing impaired elementary level students based on a bottom-up model of reading. Therefore, the purpose of this study is to develop and validate a reading comprehension test for elementary level hearing impaired students.

Methodology

This study employed a quantitative type of research. The researcher used the developmental technique. Developmental research is recognised as the systematic investigation of creating, refining, and assessing instructional programs, procedures, and outputs that must meet the standards of effectiveness and internal consistency, as opposed to merely instructional development.

Development of Test

The English Reading Comprehension Test (ERCT) has been developed to assess the English reading comprehension abilities of elementary-class hearing-impaired (HI) students. The scale is based on the curriculum of classes 1 and 2, as it is internationally recognized that after two years of schooling, children are expected to acquire sufficient reading fluency and comprehension. Without these foundational skills, further learning becomes highly challenging. The test consisted of two partsLanguage Comprehension and Perceptual Comprehension.

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Table of Specification

The researcher constructed Language comprehension based on cognitive aspect i.e., s of reading comprehension to assess comprehension on the bottom-up model of reading. The language comprehension part of the test is based on syntactic and semantic levels of reading comprehension while the perceptual comprehension part is based on (literal, reorganization, and inference) of the elementary level hearing impaired students. The teacher must employ graded assessments for this purpose, supported by established scoring techniques or a table of specifications. The specification given in table 2 was used as the English Reading Comprehension test (ERCT) standard.

Table 3.1: Table of specification

Sr#	Description of part	Students learning outcomes (SLOs)				
		Levels of Comprehension				
		Literal	Re-Organization	Inference	Total Comprehension SLOs	Part wise
1	**Word recognition**	3	5	8	16	15%
2	**Sentences comprehension**	2	3	5	30	30%
3	**Perceptual comprehension**	2	2	2	36	55%
4	**Total**	7	10	15	82	100%

Participants: The participants of the study were both male and female students of Grade 7 and 8 enrolled in one school of department of special education Punjab, Faisalabad during the School-Year 2025-2026. There were two sets of participants involved in the study. A sample of 15 students, with different levels of intelligence, from the highest to the lowest participated in the item-generation. The second set of the participants with 15 students was utilized for the administration of the initial instrument. Total enumeration was used. All of the Grade 7 and 8 students of a school were the participating groups. On the other hand, seven experts served as the teacher-respondents for the scale content validation.

Validity of Test: The validity of ERCT was established prior to data collection. Seven field professionals were among the experts: two Associate professors of English and education at college education department, Punjab, one assistant education officer and one Deputy district education officer at school education department, Punjab, dealing with curriculum development and evaluation and three senior special education teachers of hearing impaired field. If reading passages are tough, students will be unable to activate their prior knowledge and will become phrase dependent (Hedgcock & Ferris, 2018). As a result, it is critical to ensure that a passage is of a suitable difficulty level for the students being evaluated, as well as that it includes contextually relevant content (Sandom, 2013). In this regard, item and text analysis is the most appropriate technique to check the

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difficulty level and discrimination power of the different multiple-choice questions of the reading comprehension test. The item analysis is the most important phase of the test development process as item retention and item elimination are mostly based on the item analysis (Danuwijaya, 2018). As a result, text analysis was utilized to assess the appropriateness of text related to Students' level, The topic of the text, The content of the text ,The aim of the text , Cohesion , Main idea , Supporting ideas , Text length, Heading-text relationship, difficulty of wording and orthographic rules. As a result, the consistency rate of text analysis was 0.98. Moreover, item analysis related to relevance, clarity and coverage was asked from experts and the consistency rates for the ERCS was 0.93.

Reliability of test: To ensure reliability, comprehension test was pilot tested on 15 Grade 6 students apart from the subjects of the study but with same features and studying in Grade 6 under similar conditions. Reliability of the instrument was investigated by using Cronbach's Alpha. If the coefficients yield more than .7, the test is regarded as acceptable, and if coefficients yield more than 0.8, test is rated very good (Mohajan, 2017). The Cronbach Alpha reliability coefficient of the final comprehension test reveals that the comprehension test was internally consistent. The result of Cronbach Alpha reliability coefficient of the final comprehension test is reported in table 3.2.

Table 3.2: ***Cronbach alpha Values for Reading Comprehension Test***

S.#	Comprehension tests	Question's type	Cronbach Alpha value
1	Comprehension test	MCQs	.894

The result reported in above table 3.2 shows that reading comprehension test is internally consistent (Cronbach's Alpha=.894)

Conclusion

According to all the statistics of the test, the English Reading Comprehension test (ERCT) for Elementary level Hearing Impaired students performed well and achieved its main objective. The value of Content validity ratio of each item was greater than 0.50, which indicates that each item was statistically significant and usable in practical context. Estimated values of item difficulty ranged from 3.00 to 7.00 which indicate that items were neither too easy nor too difficult and fulfill the criteria of item standardization. Discrimination index of items ranged from 0.20 to 0.1 that indicates that items were good and excellent by the aspect of item discrimination. The reliability value was up to the standard which indicates that the English Reading Comprehension test was reliable.

Educational Implications: Based on development, validation and reliability the ERCT is a best tool to be used to assess reading comprehension of elementary level Hearing impaired students. As hearing impaired students have below average reading comprehension abilities so the ERCT can also be used to explore reading comprehension of hearing impaired at any level of education as ERCT is constructed on botteon-up model of reading and on literal, interpretive and reflective levels of reading comprehension.

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