



RESEARCH PAPER

Mediating role of School, Classroom and Students Levels between System and Outcomes for Teachers of Students with Hearing Impairment

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ABSTRACT

This study sought to determine the relationship between teachers' assessments of the quality of educational services (at the system, school, classroom, and student levels) and learning outcomes (cognitive, affective, psychomotor, and new learning) as well as the sequential mediating role of these levels for teachers of students with hearing impairments. This study applied a quantitative perspective to approach the problem. The population of this study included teachers of students with hearing impairment enrolled in government special education institutions in Punjab Province. The sample for this study was chosen using a random sampling technique. As a sample for this study, 300 teachers of students with hearing impairment were chosen. The researchers created an indigenous scale. On a five point Likert scale, each statement was assessed. For the teachers of the students with hearing impairment, a Pearson product moment correlation analysis was done to look into the relationship between the system, school, classroom, student levels, and outcomes. In order to investigate the mediating role of educational effectiveness between system level and outcomes for parents of students with hearing impairment, a structural equation model (SEM) was used.

KEYWORDS Educational Effectiveness, Scale for Educational Effectiveness, Structural Equation Model, Teachers of Students with Hearing Impairment

Introduction

The National Policy for Persons with Disabilities emphasis to empower individuals with disabilities to reach their full potential in all spheres of life, particularly in the social, economic, personal, and political spheres, regardless of caste, creed, religion, gender, or other considerations (NPWD, 2002). Being able to engage in education requires the rehabilitation. Cross-sectoral rehabilitation can be carried out by medical professionals working with experts in social welfare, employment, education, and other disciplines (WHO, 2011). According to the provision on "The Right of Access to Education" in the UN Convention on the Rights of Persons with Disabilities, children with disabilities must have effective access to education and receive it in a way that supports as much social integration as is feasible. This is done by providing helpful services and making appropriate adjustments (EFA, 2000).

Literature Review

Powell and Hyde (2014) reported that while there have been advancements in New Zealand's education system for deaf and hard-of-hearing pupils that parallel those in other industrialized countries' compulsory education systems, the crucial transition to postsecondary education has not seen the same rate or level of growth. Our community and our deaf children will benefit from our continued efforts to create an inclusive educational system that reflects the strong inclusive principles that characterize New Zealand, including fairness, social justice, equity, and respect for diversity.

In order to accommodate individuals with special requirements, especially the deaf, all institutions and programs must offer computerized instructional materials, while also taking into account the ease of use and performance efficacy. In addition to the requirement for an education technology expert for the deaf in each institution, it was also advised that teachers of students with special needs, particularly those who are deaf, receive training in the use of computerized instructional packages (Bagabas, 2016). Diagnosis-informed pedagogy, methods and techniques, diagnosis-informed placement, teacher-made assessments, diverse teaching strategies, behavior management, learner-responsive pedagogy, collaboration and advocacy were emerged themes after exploring the effectiveness of special and inclusive teaching in early childhood education (Majoko, 2018). The reasons affecting deaf education in South Africa include a lack of Deaf Role Models for Deaf Learners, South African Sign Language not being recognized as a subject in schools, and just a few teachers being proficient in South African Sign Language (Parkin, 2010). The value of implementing progress monitoring with deaf or hard-of-hearing kids was seen very favorably by the teachers. They stated that frequent and consistent use of simple to administer and grade tests produced data that was utilized to assess the efficacy of education. They stated that the information was also utilized to inform classroom improvements and discussions about student performance with parents, colleagues, and the kids themselves (Luckner & Bowen, 2010).

According to Lytle, Johnson, and Hui (2005), oral/aural education and hearing restoration are China's top national policy priorities. For deaf pupils, however, a variety of Chinese Sign Language is frequently utilized in classrooms. The primary areas of study in early childhood education are speech and hearing. The curricula for elementary and secondary schools have low expectations for deaf kids and don't provide them with the same academic content as they do for hearing pupils. Higher education opportunities are few. There are no support services like note-takers or interpreters available for mainstreamed students. Programs for deaf educators or interpreters do not exist. There aren't many employment, and the majority of people who are deaf are unemployed. Interviewees for the article who are Deaf talk about their desires, goals, and the changes they have noticed, some of which are due to recent inspiring international partnerships.

Four categories of teacher behavior can be used to categories teaching skills: basic elements of direct teaching; putting quality aspects into direct teaching and touching on active teaching; acquiring quality in active teaching and extending one's reach; and achieving quality and differentiation in teaching using various strategies which are distinguishable and eventually advance from abilities related to direct teaching to more sophisticated skills related to new teaching methods and teaching differentiation (Kyriakides, Archambault & Janosz, 2013). Do the teacher and school elements of the dynamic model have the same impact on high- and low-achieving student groups, reported by Vanlaar et al. (2016) a cross-country research. According to the results, according to the Dynamic Model of Educational Effectiveness, features were useful for the majority of student groups, particularly those with low academic performance. To help guide policy choices when seeking to create equal educational opportunities for all students, particularly for underperforming student groups, a deeper understanding of this relationship is necessary. They contend that various teachers may have varied effects, which could help to explain why students' achievement levels vary between classes and nations. According to research, it's crucial that the best teachers are assigned to the classrooms where the majority of the students who struggle academically are enrolled.

Framework of this study was based and designed through the Dynamic Model of Educational Effectiveness by Bert P. M. Creemers and Leonidas Kyriakides.

Research Hypotheses

- 1: There will be a positive relationship between teachers' perception of effectiveness of educational services (system, school, classroom and student levels) and learning outcome (cognitive, affective, psycho motor, new learning).
2. School level, classroom level and student level will mediate the relationship between system level and learning outcome of the perceptions for the teachers of the students with hearing impairment.
3. School level, classroom level and student level will serially mediate the relationship between system level and learning outcome of the perceptions for the teachers of the students with hearing impairment.

Material and Methods

Quantitative research method was used to conduct this study along with descriptive research design.

Population and Sampling Strategy

The study's participants were teachers of hearing-impaired students enrolled in public special education institutions in Punjab Province. This experiment was conducted using the random sampling methodology. 300 teachers of pupils with hearing problems were chosen as the sample group for this study.

Development of scale for Teachers of the Students with Hearing Impairment

The first section of the questionnaire for the teachers of hearing-impaired students enrolled in public special education facilities in Punjab province asked about the respondents' age, gender, marital status, religion, educational background, work history, designation, area of specialization, and job scale. City, district, school, language, employment status, and compensation. The sample's traits and demographics were defined with the use of all available demographic information. Based on a dynamic model created by Creamers and Leonidas Kyriakides, this quiz was created. There were five sections to the questionnaire. The effectiveness of education at the system level was the focus of the questionnaire's first section. The purpose of the questionnaire's second section was to evaluate the efficacy of education at the school level. The purpose of the third section of the questionnaire was to evaluate the success of classroom instruction. The fifth section of the questionnaire was based on the outcomes, the actual outcomes, and the actual results of all the procedures, whereas the fourth section was at the student level. This section of the questionnaire focused on the successes of hearing-impaired pupils enrolled in government special education facilities in Punjab Province.

Each and every stage of the questionnaire was measured while adhering to the guidelines of the dynamic model and taking the five aspects into consideration. Frequency, focus, staging, quality, and distinction were those dimensions. In order to define the efficacy of education, all questionnaire factors took into account these five characteristics. There were 50 questions on the questionnaire. Researcher recorded the responses of the teachers of students with hearing impairment against five points

Data Collection from Teachers

In Punjab Province, 300 special education teachers working with students who were hearing-impaired and enrolled in government-run special education programs provided the information for this study. The data collection included information on all nine divisions of Punjab Province. To take part in the data collection process, 34 districts were chosen from these divisions. The Punjab government's special education institutions, schools, and

colleges were consulted for the data. The teachers' of special education-related degrees ranged from master's to doctoral levels. Both male and female teachers were involved in gathering data.

Results and Discussion

Table 1
Mean and Standard Deviation of Responses of Teachers Against all Statements of Scale

Sr.	Statements	Mean	St.D
System Level			
1.	The chance to evaluate the goals of the National Policy for Persons with Disabilities is available to all subject-specialist special education teachers.	3.21	1.22
2.	The National Policy for Persons with Disabilities offers all types of pupils with special needs equal educational opportunities.	3.67	1.04
3.	In terms of meeting the needs of the twenty-first century for the education of pupils with hearing impairment, the National Policy for Persons with Disabilities is adequate.	2.98	1.12
4.	With provisions for kids with hearing impairment, the National Policy for Persons with Disabilities expressly addressed the special educational needs of such students.	3.37	1.03
5.	The National Policy for Persons with Disabilities makes clear how important access is for students with hearing impairments to receive an appropriate education.	3.38	1.01
6.	Institutions for special education are situated reasonably close to the homes of kids with hearing impairment.	3	1.19
7.	All buildings are created with kids with hearing impairment in mind, in accordance with the National Education Policy for Persons with Disabilities.	3.20	1.19
8.	According to the requirements of the kids with hearing impairment, qualified and certified special education teachers are provided.	3.90	.93
9.	In the Punjab province, educational facilities are created in accordance with the amount of students who have hearing impairments.	3.12	1.22
10.	For pupils with hearing impairment, high-quality education is provided in institutions at the provisional level.	3.46	.97
11.	Students with hearing impairments are being taught individually in a suitable learning environment.	3.36	1.01
School Level			
12.	Students with hearing impairment are admitted to government institutions under a zero-rejection policy, as stated in the National Policy for Persons with Disabilities.	4.15	.75
13.	On a temporary level, all institutions for hearing-impaired pupils are successfully delivering special education on an individual basis.	3.50	1.01
14.	On a temporary basis, all institutions for students with hearing impairments offer equal educational opportunities to those pupils.	3.73	.92
15.	For the improvement of the professional skills of qualified teachers, consolation teacher training programs are set up.	3.59	1.07
16.	Follow-up studies were developed in accordance with the National Policy for Persons with Disabilities to improve educational activities.	3.40	.99
Classroom Level			
17.	The presentations of all subjects provide an orientation to the lesson.	4.02	.79
18.	The curriculum is explained to students who have hearing impairments.	3.91	.75
19.	For the hearing-impaired kids, a variety of activities are planned in a manageable quantity during the class.	3.93	.76
20.	Each activity in the class has a reasonable amount of time allotted to it.	3.93	.76
21.	In order to develop their problem-solving skills, hearing-impaired students are encouraged.	4.13	.72
22.	The methods of instruction are based on the requirements of the hearing-impaired students.	3.93	.83
23.	The students regularly receive homework assignments.	4.28	.68
24.	Students with hearing impairments can successfully answer the questions using alternative statements or different patterns.	3.75	.96
25.	The children are given adequate opportunity to answer in a polite manner.	4.15	.65

26.	The instructional objectives are connected to the questions.	4.16	.61
27.	Asking questions is appropriate for the classroom.	4.13	.66
28.	The assessment criteria relate to the curriculum's goals.	4.06	.71
29.	The assessment process takes into account the needs of kids who have hearing loss.	3.89	.85
30.	For efficient use of class time when instructing pupils with hearing impairment, classrooms are well-organized.	3.78	.85
31.	The allocation of teaching time among various activities is done with careful planning.	3.83	.86
32.	For the youngsters with hearing impairment, a personalized educational plan is created.	3.58	1
33.	Prior to the teacher demonstrating how to address a practical problem, students are free to come up with their own answers.	3.74	.91
Student Level			
34.	To improve their abilities, kids with hearing impairment are taught problem-solving strategies.	3.74	.86
35.	The objectives for the persistence of the hearing-impaired kids are remembered.	3.93	.71
36.	During the school day, enough time is provided for academic pursuits.	4.03	.76
37.	When hearing-impaired students have trouble understanding a lesson, the teacher offers assistance.	4.21	.65
38.	Students with hearing impairments receive educational supports regardless of their socioeconomic level.	4.18	.77
39.	For the students with hearing impairment, there is no gender discrimination in this educational system.	4.27	.70
40.	Religious discrimination against deaf pupils is not present in our educational system.	4.38	.62
41.	The likelihood of surviving in the social life of students with hearing impairment increases with education.	4.16	.67
42.	For greater understanding, discussions in class are expected to include students who have hearing impairments.	4.03	.77
43.	Students with hearing impairment are given independent projects to help them develop their way of thinking.	3.96	.80
44.	Activities are planned to inspire pupils to attain their personal objectives.	3.99	.77
Outcomes			
45.	The goals and significance of the learning activities are presented to the deaf students.	3.96	.75
46.	The cognitive development of students with hearing loss is at its highest level.	3.99	.74
47.	Hearing-impaired students are prepared to complete the activity.	3.92	.79
48.	Through practice, students with hearing impairment can successfully present their ideas.	3.94	.77
49.	Students with hearing impairments grow in their ability to learn new things.	4.04	.72
50.	Your hearing-impaired child is now able to get a career with a respectable income while receiving an education.	3.53	1.08

Table 2
Intercorrelation between System, School, Classroom, Student Levels and Outcomes for the Teachers of the Students with Hearing Impairment

Variables	1	2	3	4	5
1. System	-	.73***	.54***	.46***	.49***
2. School		-	.67***	.56***	.54***
3. Classroom			-	.80***	.71***
4. Students				-	.76***
5. Outcome					-

* $p < .05$. ** $p < .01$, *** $p < .001$.

The results of correlation analysis shows that system level is found to be significantly positively correlated with school, classroom, student levels and outcome. Whereas school level is also found to be significantly positively associated with classroom, level, student level and outcome. However, classroom level is significantly positively correlated with

student level and outcome, while student level is significantly positively correlated with outcome for the teachers of the students with hearing impairment.

Structural Equation Modeling: Mediation for Teachers

Structural equation model (SEM) was employed to examine mediating role of educational effectiveness including, school level, classroom level and student level between system level and outcomes for *teachers* of the students with hearing impairment. At the same time, the serial indirect effect of school level, classroom level and student level between system level and outcomes for *teachers* of students with hearing impairment was also investigated. Model fit is presented in table 3

Table 3
Model fit Indices of Serial Indirect Effect of School Level, Classroom Level and Student Level between System Level and Outcomes for Teachers of the Students with Hearing Impairment (N = 300).

Model	χ^2	df	χ^2/df	GFI	CFI	NFI	RMSEA	SRMR
Initial Model	331.93	30	11.06	.84	.77	.76	.18	.13
Model Fit	47.01	27	1.74	.97	.99	.97	.05	.04
$\Delta \chi^2$	284.92*							

Note. GFI= Goodness of fit index, CFI=comparative fit index, NNFI = non-normed fit index; RMSEA=root mean square error of approximation, SRMR=Standardized root means square, $\Delta \chi^2$ = chi-square change.

Table 3 displays the fit indices of the serial indirect effect of school level, classroom level and student level between system level and outcomes for both absolute and relative model fit. The first model's absolute fit index revealed that the estimations of the fit were subpar, reading as $\chi^2 (27) = 47.01 p < .05$. In a typical model, the sample size and the number of estimated parameters are thought to have a significant impact on the chi-square statistic, which is used to measure the absolute model fit (Hair et al. 2010). Therefore, in this perspective, researchers advised taking into account various relative fit indices, such as the Goodness of Fit Index (GFI), Cumulative Fit Index (CFI), Normative Fit Index (NFI), Root Mean Square Approximation Error (RMSEA), and Standardized Root Mean Square (SRMR). Some guidelines were suggested to be followed in order to assess the model's fit; for instance, the χ^2/df should range between 0 and 3. To be excellent estimates for the model, the RMSEA and SRMR estimates must be .08 or less, while the CFI, NNFI, and GFI estimates must be .90 or higher (Hu & Bentler, 1999).

The fit indices of the initial model were observed and found that the χ^2/df was 11.04. Whereas the estimates of the RMSEA and SRMR were .18 and .13 while the CFI, NNFI, and GFI were .84, .76, .74 respectively. As a result, the specified criteria for model fit were not met by the present estimations of the relative fit. See figure 1.

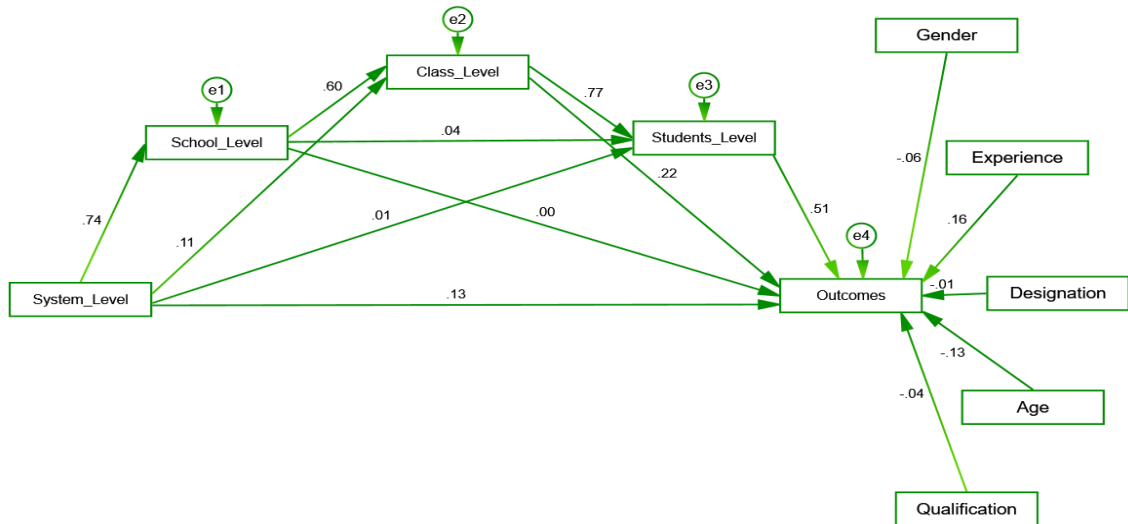


Figure 1 Initial Model of Serial Indirect Effect of School Level, Classroom Level and Student Level between System Level and Outcomes for Teachers of Students with Hearing Impairment.

So, the model modification procedure was started in order to achieve the model fit. Therefore, only those covariances between the covariates (including, age, experience and designations) were drawn which had high correlations (Kenny, 2011). Following the drawing of the covariances between the covariates, the absolute and relative fit indices were once again compared. The GFI, CFI, and NNFI values were .96, .99, and .96, respectively, while the RMSEA and SRMR were .05 and .04, respectively. As a result, the model fit indices and criteria fell into the category of excellent model fit. See figure 2.

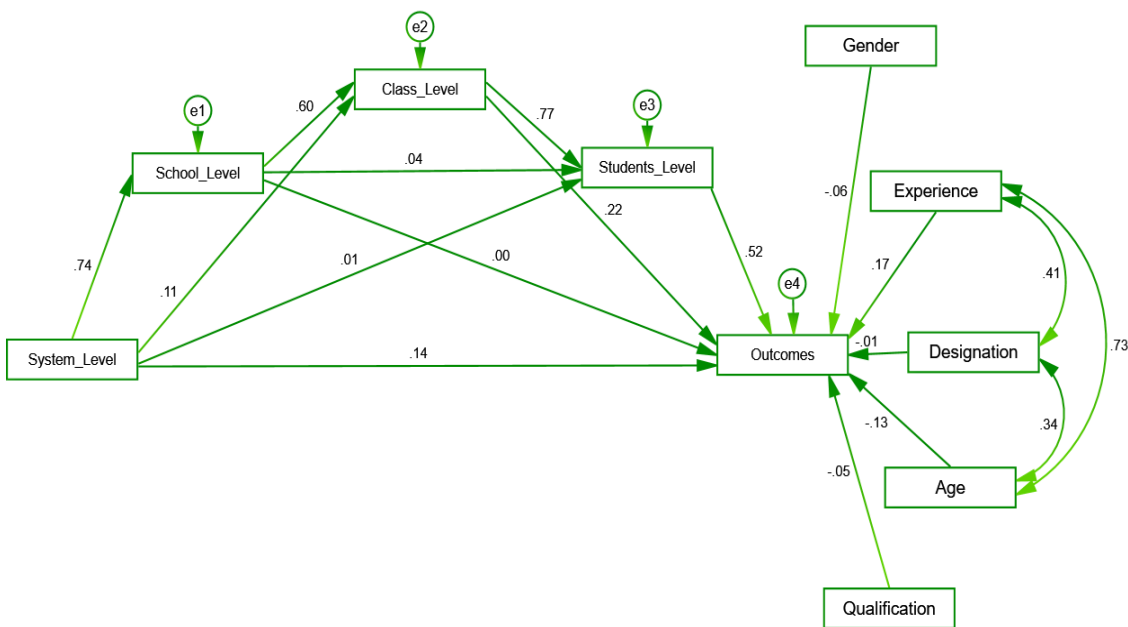


Figure 2 Model Fit of Serial Indirect Effect of School Level, Classroom Level and Student Level between System Level and Outcomes for Teachers of Students with Hearing Impairment.

After than with the model fit, the estimates of direct, indirect and serial indirect effects were analyzed. A sample of 5000 bootstrapped sample was generated in order to validate the indirect and serial indirect effects.

Direct Effects

Direct effects of system, school, classroom, student levels on outcomes for teachers of students with hearing impairment were presented in table 4.

Table 4
Standardized Estimates of Direct Effects of the Paths for System, School, Classroom, Students and Outcomes for Teachers of Students with Hearing Impairment

Variables	School		Classroom		Students		Outcomes	
	β	SE	β	SE	β	SE	β	SE
Predictors	-	-	-	-	-	-	-	-
System	.73***	0.02	.12***	0.07	.01	0.04	.12	0.04
School			.58***	0.16	.03	0.10	.05	0.06
Classroom					.77***	0.03	.12*	0.06
Students							.57***	0.05
Covariates							-	-
Gender of Child							-.11*	0.03
Age of Child							.06	0.03
Class Level							-.004	0.03
Gender of Teachers							.09	0.03
Parent Education							-.01	0.02
<i>Total R²</i>			.557***		.477***		.583***	.650***

The results of the perceptions of the *Teachers* of the students with hearing impairment about the education effectiveness shows that system level is found to be significant positive predictor of school level and classroom levels. Whereas system level is found to be non-significant predictor of student level and outcome. Meanwhile school level is also found to be significant positive predictor of classroom level, while school level is found to be non-significant predictor of student level and outcome. Classroom level is found to be significant positive predictor of student level and outcome. Furthermore, student level is found to be significant positive predictor of outcome of the student.

Specific Indirect Effects

The specific indirect effect of school level, classroom level and student level between system level and outcomes for Teachers of the students with hearing impairment were presented in table 5.

Table 5
Standardized Estimates of Specific Indirect Effects through School, Classroom, and Student between System and Outcome

Mediators	Outcome	
	β	SE
School	.00	.05
Classroom	.03	.02
Student	.01	.03

* $p < .05$. ** $p < .01$. *** $p < .001$

The results of specific indirect effect shows that the school, classroom, and student level non-significantly mediate the relationship between system level and outcome for students with hearing impairment.

Serial Indirect Effects

The serial indirect effect of school level, classroom level and student level between system level and outcomes for Teachers of students with hearing impairment are presented in table 6 and table 7.

Table 6
Standardized Estimates of Serial Indirect Effects through School, Classroom, and Student between System and Outcome

Mediators	Outcome	
	β	SE
School → Classroom	.09*	0.04
School → Student	.01	0.03
Classroom → Student	.05	0.03

* $p < .05$. ** $p < .01$. *** $p < .001$

The results of serial indirect effect shows that the school and classroom levels significantly serially mediated between system level and outcome for students with hearing impairment. Which shows that teachers of students with hearing impairment have a positive perception at the system level, while positive perception of system tends to form positive perception at school level. Whereas positive perception at school level in turns develop positive perception at classroom level, which tends to increase the outcome.

Meanwhile, serial indirect effect of school and student levels is found to be non-significant whereas the serial indirect effect of classroom and student level is found to be non-significant between system level and outcome for students with hearing impairment.

Table 7
Standardized Estimates of Higher order Serial Indirect Effects through School, Classroom, and Student between System and Outcome (N = 500).

Mediators	Outcome	
	β	SE
School → Classroom → Student	.17**	0.04

* $p < .05$. ** $p < .01$. *** $p < .001$

The results of serial indirect effect shows that the school, classroom and student levels significantly serially mediated between system level and outcome for students with hearing impairment. Which depicts that teachers of students with hearing impairment have a positive perception at the system level, while positive perception at system level tends to form positive perception at school level. Whereas positive perception at school level in turns develop positive perception at classroom level. However positive perception at classroom level also develops positive perception at student level, which tends to increase the outcome.

Conclusions

There was a positive relationship between the determinants of educational effectiveness including (system, school, classroom, student levels and outcomes) for the teachers of the students with hearing impairment. School level, classroom level and student level was serially mediate the relationship between system level and learning outcome of the perceptions for the teachers of the students with hearing impairment. It has the potential to reuse in the similar kind of field for knowing the mediating role of school, classroom and students levels between system and outcomes for teachers of students with hearing impairment.

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