



RESEARCH PAPER

Examining the Mediating Role of School, Classroom and Student Variables on the Link between Systems and Outcomes for the Heads of Educational Institutions for Students with Hearing Impairment

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ABSTRACT

The purpose of this research was to investigate the relationship between heads' of institutions perception of effectiveness of educational services (system, school, classroom and student levels) and learning outcome (cognitive, affective, psycho motor, new learning) and to investigate the serial mediating role of school, classroom, and students levels between the relationship of system level and outcome for the heads of institutions of the students with hearing impairment. Quantitative paradigm was used to conduct this research. Heads of Govt. special education institutions in Punjab Province were considered as a population of this study. To choose the sample for this investigation, a random sampling procedure was used. The sample for this study consisted of 55 heads. The researchers came up with an indigenous scale. On a likert scale of 1 to 5, each statement was evaluated. Pearson product moment correlation analysis was carried out to investigate the relationship between system, school, classroom, student levels and outcomes). 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. There was a positive relationship between the determinants of educational effectiveness including (system, school, classroom, student levels and outcomes) for the heads of institutions of the students with hearing impairment.

KEYWORDS Educational Effectiveness, Hearing Impairment, Structural Equation Model

Introduction

In accordance with UNCRPD Article 26, Habilitation and Rehabilitation entails taking appropriate steps, such as providing peer support, to assist people with disabilities in achieving and maintaining their highest level of independence, as well as their fullest level of physical, mental, social, and vocational ability, as well as their full inclusion and participation in all facets of life. A multidisciplinary assessment of each person's requirements and assets should serve as the basis for organizing, improving, and expanding comprehensive rehabilitation services and programs, which should be started as soon as possible. The provision of assistive technologies and tools should be a part of these services and programs as well (UNCRPD, 2006).

Rehabilitation is the process of assisting a person in achieving the best degree of function, independence, and quality of life possible, according to Spectrum Health Lakeland (2020), rehabilitation aids in bringing the person back to their ideal state of health, functionality, and well-being but does not remove or reverse the harm brought on by illness or trauma.

Literature Review

A range of support services are offered to deaf children in Cyprus who are enrolled in regular schools, including one-on-one and group sessions, in-service training for designated teachers, modifications to the way instruction is delivered in the classroom, the presence of co-coordinators (special teachers of the Deaf), psychological support and counselling, acoustical treatment of the classrooms, and the provision and administration of personal amplification. Alternative teaching strategies, curriculum changes, and adaptations were proposed as ways to fulfil the requirements of deaf children in an integrated setting. Many of the deaf youngsters made the point that they need one-on-one or small group instruction in order to follow the curriculum (Hadjikakou, Petridou and Stylianou, 2005).

The goals of the National Policy for Persons with Disabilities include making sure they are involved in designing and executing educational, training, and rehabilitation programs for themselves, their families, and their communities (NPWD, 2002). The effect of school-related factors is influenced by the institution's existing circumstances and the nature of its issues. Situational effects of school-related elements have been discovered. At particular, it was discovered that at schools with poor classroom teacher quality, the effects of developing a school policy for teaching and evaluating that policy at the school level were stronger. Additionally, it was observed that changes in how schools function did not significantly affect changes in the effectiveness status of schools because there was time stability in that status (Creemers and Kyriakides, 2009).

All institutions and programs must provide electronic instructional materials while also taking into account the convenience of use and performance efficacy in order to accommodate people with special needs, particularly the deaf. It was recommended that teachers of students with special needs, especially those who are deaf, undergo training in the use of computerized instructional packages in addition to the requirement for an education technology expert for the deaf in each institution (Bagabas, 2016). Kyriakides, et al., (2019) presented a study on the topic of using a dynamic approach to school improvement in order to support educational quality and equity. An experimental study appears to show that employing a dynamic approach to school reform can boost equality as well as the quality dimension of school effectiveness.

Children with hearing loss and hearing children perform differently in areas like executive function, memory, and visual-spatial processing, according to research by Marschark and Knoors (2012). It's critical that educators and other professionals recognize that deaf children are not merely hearing youngsters who are hard of hearing. Then educational approaches and materials can fully reflect the interests and needs of the students.

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

Hypotheses

- 1: There will be a positive relationship between Heads' 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 heads of institutions 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 heads of institutions 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 participants in the study were Heads of institutions for deaf students enrolled in government special education institutions in Punjab Province. This experiment was carried out using a random sample technique. 55 heads of institutions made up the study's sample.

Development of scale for Heads of Institutions of the Students with Hearing Impairment

The demographic data of the respondents, including their age, gender, marital status, religion, education, work experience, designation, job scale, job status, salary, city, district, school, and language, was included in the first section of the questionnaire for the heads of the government special education institutions in Punjab province. All demographic data was used to define the sample's characteristics and demographics. Creamers and Leonidas Kyriakides' dynamic model served as the foundation for the questionnaire. Five sections made up the questionnaire. The first section of the questionnaire focused on the system-level efficacy of education. In order to evaluate the efficacy of education at the school level, the second section of the questionnaire was based on academic level. The purpose of the third section of the questionnaire was to assess the efficacy of instruction at the classroom level. The fifth portion of the questionnaire was based on the outcomes, the real outcomes, and the real results of every process, while the fourth section of the questionnaire was at the student level. This section of the questionnaire focused on the academic success of students who had hearing impairments and were enrolled in government special education institutions in Punjab Province. Every step of the questionnaire was evaluated while adhering to the guidelines of the dynamic model and accounting for the five aspects. These parameters included the following: frequency, focus, stage, quality, and distinction. These five variables were taken into account in all of the questionnaire's factors that determined how effective education was. A total of 49 questions made up the questionnaire. Researchers recorded the responses of the heads of students with hearing impairment against five points given below.

Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree

Data Collection from Heads of Institutions

For this study, information was gathered from 55 heads of the institutions for hearing-impaired students enrolled in government special education institutions in Punjab Province. Eight divisions from the Punjab Province were included in the data gathering. D.G. Khan, Gujranwala, Faisalabaad, Multan, Lahore, Bahawalpur, Sahiwal,

and Sargodha were among those divisions. From these eight divisions, sixteen districts – Gujranwala, D. G. Khan, Khanewal, Bahawalpur, Layyah, Faisalabad, Sargodha, Rajan Pur, T. T. Singh, Hafizabaad, Sialkot, Lahore, Multan, Lodhran, Okara and Mian Wali – were involved in the data gathering process. The information was gathered from government special education centres, schools, and colleges in Punjab. The data gathering includes both male and female institution leaders.

Results and Discussion

Table 1
Mean and Standard Deviation of Responses of Heads against Statements of Scale

Sr.	Statements for Principals	Mean	StD
System Level			
1	The institutions' enrollment rate has gone up.	4.38	.62
2	Mother tongue is the current subject of national strategy.	3.42	.99
3	The demands of pupils with hearing impairments can be met under the nation's present policy.	3.05	1.11
4	There is close cooperation among the parties involved with kids with hearing impairment to advance the national educational policy.	3.25	1.09
5	The vision and objective of the policy are available for evaluation by all principals.	3.16	1.08
6	To successfully accomplish school goals, administrators, teachers, and staff collaborate well.	4.25	.70
7.	A robust system of oversight exists for the educational services.	3.62	1.01
8.	For pupils who have hearing impairments, sign boards are present at the institutions.	3.62	1.06
9	For pupils with hearing impairments, the atmosphere of educational institutions is accessible.	3.82	.91
10	The learning environment is inviting and easily accessible.	4	.84
School Level			
11	After observation, the school's educational strategy is reassessed.	3.84	.83
12	Planning for schools takes social trends into account.	3.67	.82
13	The national policy and school policy are related.	3.85	.80
14	The school's staff sets objectives for students to achieve.	4.04	.92
15	The school gives teachers time for professional development.	3.80	1.03
16.	For students who have hearing impairments, goals have been developed that are attainable.	3.89	.71
Classroom Level			
17	To help them learn more about the pupils with hearing impairments, teachers of hearing impairment receive ongoing training.	4	.88
18	Teachers and students who have hearing impairments can communicate.	4.11	.66
19	What students are expected to learn is explained to them by the teacher.	3.87	.84
20	During the lecture, everything is organized well.	3.85	.83
21	In order to help students build a comprehension of the course material, teachers employ effective teaching strategies.	4.02	.81
22	Students with hearing loss are able to put their academic skills to use in the real world.	3.67	.90
23	Teachers of kids with hearing impairments have flexibility in how they employ available tools.	4.04	.72
24	There is transparency in the assessment process for pupils who have hearing impairment.	3.60	.99
25	Teachers set up the classroom well-in advance of each class period.	3.89	.71
26	Every teacher keeps track of their students' progress.	4.11	.79
27.	The academic learning of pupils with hearing impairments is assessed using a variety of techniques.	3.93	.81
28.	Teachers who work with pupils who have hearing loss devote as much time as is necessary to instruction.	3.91	.87

29.	For the students who have hearing loss, extracurricular activities are also planned.	4.16	.63
30.	For effective learning, quiet classrooms are offered.	3.85	.93
31.	The pupils with hearing loss are given a supportive learning environment.	4.05	.78
32.	For efficient learning, adequate classrooms are offered.	3.80	.91
Student Level			
33.	For students with hearing impairments, several programs are set up to improve their physical and cognitive abilities.	3.85	.93
34.	For the tenacity of the hearing-impaired kids, a network of support is developed.	3.62	.85
35.	The instructional duties are given enough time to be completed.	3.87	.88
36.	Everyone who suffers hearing loss has the same opportunity to take part and ask questions to have a better understanding.	4.09	.73
37.	Students with hearing impairments receive services regardless of their socioeconomic situation.	4.04	.84
38.	For the sake of the hearing-impaired kids, gender equality is guaranteed.	4.13	.69
39.	Students with hearing loss are not subject to any discrimination based on their social or economic standing.	4.27	.71
40.	The social skills of students with hearing loss are developed to the fullest extent possible.	4.09	.80
41.	Hearing-impaired students are expected to learn in comfortable surroundings.	4.15	.52
42.	Students who struggle with hearing are inspired to develop their creative skills.	4.09	.65
43.	The kids who have hearing impairments are inspired and encouraged by role models.	3.95	.87
Outcomes			
44.	Students with hearing impairments can reach their full potential in this educational environment.	3.71	.85
45.	Due to this educational structure, the hearing-impaired child is a trustworthy citizen.	3.69	.81
46.	After finishing school, hearing-impaired students are seen as better citizens.	4.09	.48
47.	After graduation, those with hearing loss start working.	3.62	.99
48.	These educational offerings have increased the number of employment prospects for your hearing-impaired child.	3.49	.92
49.	After graduation, students with hearing loss frequently pick up new skills.	3.89	.83

Table 2
Intercorrelation between System, School, Classroom, Student Levels and Outcomes for the Heads of the Institutes of the Students with Hearing Impairment (N = 55)

Variables	1	2	3	4	5
1. System	-	.65***	.56***	.43***	.37***
2. School		-	.81***	.60***	.35***
3. Classroom			-	.73***	.51***
4. Students				-	.60***
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 heads of the institutes of the students with hearing impairment.

Structural Equation Modeling: Mediation for Heads

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 the *heads* of institutes for 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 the *heads* of institutes for the 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 the Heads of Institutes for the Students with Hearing Impairment. (N = 55).

Model	χ^2	df	χ^2/df	GFI	CFI	NNFI	RMSEA	SRMR
Initial Model	120.33	22	5.47	.77	.60	.56	.29	.16
Model Fit	31.83	21	1.52	.90	.96	.93	.08	.08
$\Delta \chi^2$	88.50*							

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, as $\chi^2 (28) = 83.23 p < .05$. 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 5.47. Whereas the estimates of the RMSEA and SRMR were .29 and .16 while the CFI, NNFI, and GFI were .77, .60, .56 respectively. As a result, the specified criteria for model fit were not met by the present estimations of the relative fit. See figure 1

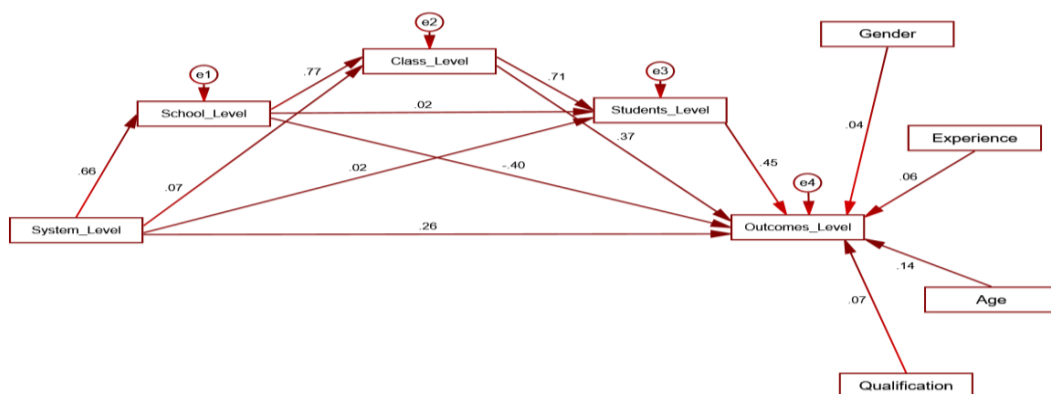


Figure 1 Initial Model

So, the model modification procedure was started in order to achieve the model fit. Therefore, only those covariances between the covariates (including age and experience) which had high correlation (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 .90, .96, and .93, respectively, while the RMSEA and SRMR were .08 and .08, respectively. As a result, the model fit indices and

Model Fit of Serial Indirect Effect of School, Classroom and Student Levels between System Level and Outcomes for the Heads of Institutes for the Students with Hearing Impairment.

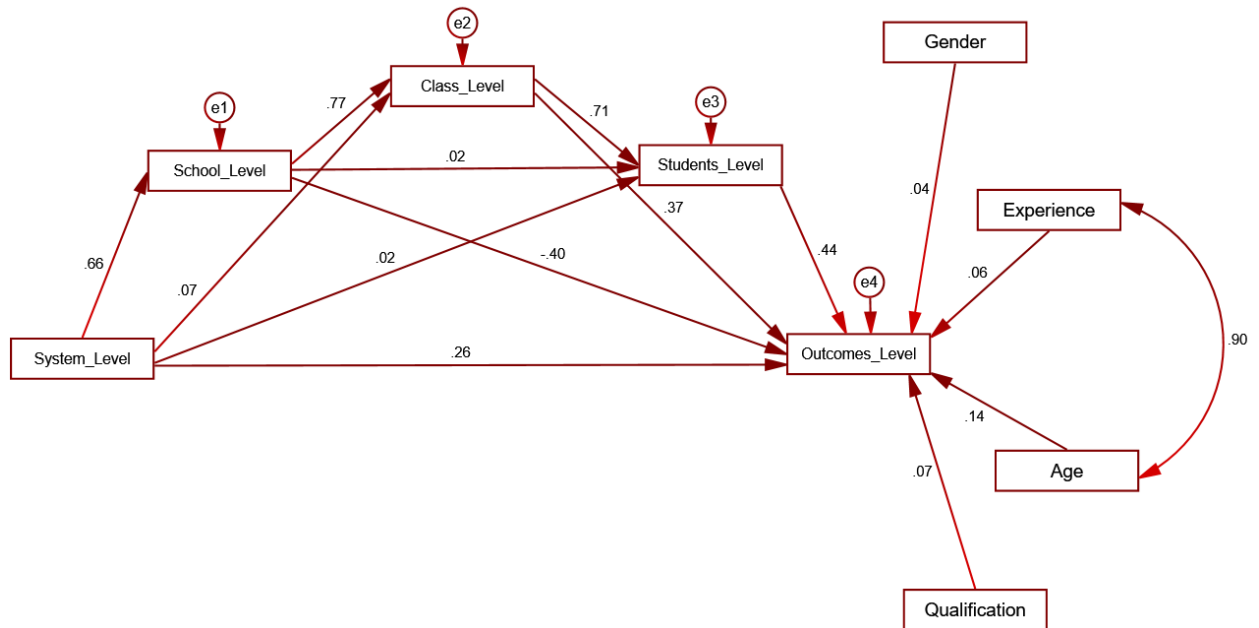


Figure 2 Model

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 the heads of institutes for the 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 the Heads of Institutes for the Students with Hearing Impairment (N = 55).

Variables	School		Classroom		Students		Outcomes	
	β	SE	β	SE	β	SE	β	SE
Predictors	-	-	-	-	-	-	-	-
System	.71***	0.08	.08	0.20	-.01	0.13	.26	0.11
School			.78***	0.29	.06	0.27	-.40	0.21
Classroom					.70***	0.10	.37	0.09
Students							.45*	0.11
Covariates							-	-
Age							.14	0.54
Gender							.04	0.92

Qualification			.07	0.73
Experience			.07	0.57
<i>Total R²</i>	.515***	.682***	.613***	.453***

* $p < .05$, ** $p < .01$, *** $p < .00$

The results of the perceptions of the *heads* of institutes for the students with hearing impairment about the education effectiveness shows that system level is found to be significant positive predictor of school level. Whereas system level is found to be non-significant predictor of classroom level, 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, while non-significant predictor of 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 of the *heads* of institutes for 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 (N = 55).

Mediators	Outcome	
	β	SE
School	-.29	.21
Classroom	.03	.04
Student	-.01	.06

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

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 of the *heads* of institutes for the 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 (N = 55).

Mediators	Outcome	
	β	SE
School → Classroom	.21*	0.14
School → Student	.02	0.07
Classroom → Student	.03	0.04

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

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 the *heads* of institutes for the 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 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 = 55).

Mediators	Outcome	
	β	SE
School → Classroom → Student	.18*	0.12

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

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 depicted that the *heads* of institutes for the 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 heads of institutions 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 heads of institutions 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 heads of institutions of students with hearing impairment.

Implications

This scale can be used with slightly adaptations for knowing the mediating role of school, classroom and students levels between system and outcomes for other disabilities such as visual impairment, and physical handicap. This scale can be used in the other provinces of Pakistan for knowing mediating role of school, classroom and students levels between system and outcomes for heads of institutions of students with hearing impairment. This scale can also be used for private institutes as well as non-governmental institutes with the minor changes for knowing the mediating role of school, classroom and students levels between system and outcomes for heads of institutions of Students with hearing impairment.

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