

Use of audio-visual aids for the effective teaching of biology at secondary school level in public and private sectors of Peshawar district of Khyber Pakhtunkhwa



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Abstract: *This study has been undertaken to understand the use of instructional material or AV aids in understanding the concepts of biology subject. Its aim was to analyze the academic performance of both public and private sectors in terms of their resources and capabilities in handling of instructional materials. Descriptive research survey was conducted to collect data from 40 respondents (male and female) learners from the selected government and private secondary schools and 40 (male and female) instructors from selected government and private Secondary Schools. The collected data was analyzed by a software SPSS 20.0. Mean score of each item was calculated in Microsoft excel to analyze the empirical reactions of students and teachers regarding instructional materials. The result showed that audio-visual aids have positive impact on the academic performance of both instructors and learners of both sectors. Public-private partnership design and single national curriculum is taught in both sectors and same audio-visual aids can be used for them. Flow of funds, ideas, creativity, knowledge and audio-visual aids between these sectors can benefit both learners and pupils.*

Keywords: Av aids, Audio-visual aids biology, academic performance, instructional material, secondary school, public-private partnership, single national curriculum

1. Introduction

Instructional materials are helping technology tools which are used by teachers in the class room. They are of various forms such as films, multimedia, videos and other resources. The pictures and sounds create virtual situations in a class to enhance learning process by seeing and hearing [11]. Anzaku Francis (2011) believed that audio-visual aids are helpful material which make learning process easy without using any oral communication. Instructional tools are helpful in making studies interesting for both instructor and learner. It comprises of radios, film strips, maps, televisions, models, diagram and projectors [19]. Cuban, L (2001) evaluated

the psychology of instructional material. He believed that 1% learning is done through sense of taste, 1.5% learning is done through sense of touch, 3.5% learning is done through sense of smell, 11% learning is done through sense of hearing and 83% learning is done through sense of insight [9]. Availability and accurate use of instructional materials sharpen pupil senses in a learning environment. Audio-visual aids can be effective if are planned before class and related to curriculum topic [16].

2. Literature Review

When Pakistan came into being, she was divided into two categories of schools which were run by government and other agencies. Both sectors

were different in their nature and curriculum [12]. Education sector can be categorized into two broad categories; Public schools and colleges which are run by provincial governments/ local bodies. and Private schools which are run by charities/missionaries [8]. Pakistan Education sector can be categorized into three types; public sector schools, private sector schools and Deeni Madaris. Pakistan has total 318,932 institutions having 53,827,206 students and 2,100,299 teachers. Public sector schools are about 199,233 (62%) while private sector schools are 119,699 (38%), it also includes 34,010 Deeni Madaris. Public sector schools accommodate 29.27 million (54%) students while private sector schools accommodate 24.56 million (46%) students. [17].

Audio-visual aids are learning resources which can be prepared for learners around the world [1].

Instructional materials are of different kinds such as pictures, diagrams, models and charts. Some are moveable resources such as projector and tv. They create realistic effects within a classroom during learning process [10]. Instructional materials are divided into two categories such as Projected A-V aids and non-projected A-V aids. Projected Av-aids includes Filmstrips, Slide projector, Overhead projector and Opaque projector. Non –projected A-V aids includes Graphic aids, Display boards, 3-D aids, Activity aids and Audio and visual aids. Graphic aids include Photographs and pictures, Flash cards, Charts, Diagrams, Globes and maps, Graphs, Cartoons and comics, Posters and Symbols. Display boards include Black or chalk board, White or marker board, Flannel or felt board, Bulletin board, Magnet board and Peg board. 3-D aids include Models, Objects, Specimens, Mock-ups, Dioramas and Puppets. Activity aids includes Field trips or study tours, Exhibition, Demonstration and Dramatization. Audio and visual aids include Radio and TV, Cassette or record player or tape recorder, Video and Multimedia [2]. A.V aids are those devices which provides the best dissemination of knowledge. It provides the effective and dynamic learning method. It not only sharpens

the learner memorization power but also uplifts the teacher pedagogical skills in his relevant field. Audio- visual aids contributes 85% in Teaching-learning process [13].

Multimedia is a technology which uses diagrams, video, sounds and animated effects to make learning process easy and interesting for learners [3]. Learners are more enthusiastic to learn through multimedia [15]. Multimedia gives a complete review of a topic in both verbal and pictorial forms. This technology creates a virtual environment in a learning place. Presentations, games, and e-learning enhances a learner memory [4]. Educational learning can be achieved in a better way through multimedia. This technology has a positive effect on learning process [14]. Multimedia is no doubt an excellent source of educational learning but it has some limitations such as unskilled people, costly budget, limited time frame, outdated apps, lack of maintenance etc. [5].

A study was conducted to show effect of instructional materials on learners. Students who learnt with the help of them shown good learning development but those who did not has shown less. Progress. Another research concluded that students who learnt with the help of audio-visual aids has shown less learning development but those who did not has shown positive learning development. Educators are still searching the effect of instructional materials on pupils. Some believe that instructional materials such verbal and pictorial forms enhance learning progress. Some believe that they divert pupils' attention from curriculum and learning process. Textbooks is a cornerstone of learning process. Instructional materials and their accurate use make learning process interesting for both learner and pupil. Lack of audio-visual aids and unskilled staff effects learning process. It is also examined that qualified staff cannot make learning process interesting for learners if are not facilitated with instructional materials [6].

AV aids boost up the learning process. Course books and related modules are important for learners to build concepts in a learning process. Technology with standard text books make learning easy. Education is becoming digital and virtual with time [7]. Learning process connects

instructor and pupil to exchange their ideas, knowledge and skills [16]. Public sector has less institutes and teachers' percentage but high enrollment number while private sector has high institutes and teachers' percentage but low enrollment numbers [19]. Public-private partnership (PPPs) in education should be creative and schools should be liable to facilitate pupil and instructor to get access to different educational institutes [20].

Objectives of the research

This research intends to investigate:

1. The comparison between public and private sectors in terms of availabilities of instructional resources and their improvisation and utilization in a biology class.
2. To examine the credibility, motivational and gross performance level of both learners and instructors.

3. Research Methodology

Descriptive research design was chosen to collect data through random sampling technique.

Sample and Sampling Technique

Two public and two private higher secondary schools were selected among 144 schools (77 boys and 67 girls) of Peshawar. Respondents were randomly selected from the selected schools. It was a pre-planned research instrument which was carried out within a stipulated time frame.

Research Instrument

Research instrument was close ended questionnaire.

Rationale for the Questionnaire

The data-gathering instruments consisted of two set of questionnaires such as:

- Questionnaire for learners.
- Questionnaire for instructors.

Each questionnaire was design using Likert Format. The five-point rating scale against each statement.

Administration of the Questionnaire

Researcher paid special visits to four public and private schools for data collection. Learners and instructors were randomly selected from 9th and 10th standard. Questionnaires were personally distributed and were briefed with proper guide lines. All questionnaires were filled by them in a stipulated time period.

Results

Results Information about Teachers number and frequency

The gathered information of public and private secondary schools was systematic organized, analyzed and interpreted. The survey questionnaire has multiple items and a five-point Likert scale was used. Statement has options from strongly agree (SA) =5, agree (A) =4, neutral (N) = 3, disagree (DA) = 2, strongly disagree (SDA) = 1.

Table 1. Results Information of total respondents

District Peshawar	Respondents		Frequency	Percentage
	Instructors	Learners		
Male Secondary Schools (Public and private)	20	20	20	100.0
Female Secondary Schools (Public and private)	20	20	20	100.0

Table 2: Responses of public and private sector instructors

Items	Nature of school	N	Frequency and Percentage				
			1	2	3	4	5
Questionnaires							
1.Are you satisfied with the idea of use of audio-visual aids during a biology science lesson plan?	Public	20	9(45.0%)	8(40.0%)	0(0.0%)	1(5.0%)	2(10.0%)
	Private	20	12(60.0%)	8(40.0%)	0(0.0%)	0(0.0%)	0(0.0%)
2. A.V aids are interesting for learners?	Public	20	10(50.0%)	8(40.0%)	0(0.0%)	0(0.0%)	2(10.0%)
	Private	20	15(75.0%)	5(25.0%)	0(0.0%)	0(0.0%)	0(0.0%)
3. A.V aids preparation is a hectic work load for instructors?	Public	20	1(5.0%)	2(10.0%)	8(40.0%)	4(20.0%)	5(25.0%)
	Private	20	6(30.0%)	4(20.0%)	4(20.0%)	5(25.0%)	1(5.0%)
4. A.V aids can easily be shown to each and every learner during a lesson plan?	Public	20	7(35.0%)	7(35.5%)	1(5.0%)	4(20.0%)	1(5.0%)
	Private	20	9(45.0%)	5(25.0%)	6(30.0%)	0(0.0%)	0(0.0%)
5. Learners must participate during audio-visual aids demonstration?	Public	20	10(50.0%)	4(20.0%)	3(15.0%)	1(5.0%)	2(10.0%)
	Private	20	10(50.0%)	9(45.0%)	1(5.0%)	0(0.0%)	0(0.0%)
6. Public and private instructors must exchange their ideas for the preparation of audio-visual aids for a lesson plan?	Public	20	6(30.0%)	7(35.0%)	1(5.0%)	4(20.0%)	2(10.0%)
	Private	20	5(25.0%)	8(40.0%)	7(35.0%)	0(0.0%)	0(0.0%)
7. Administration is giving its full fledge support for its preparation?	Public	20	5(25.0%)	7(35.0%)	4(20.0%)	1(5.0%)	3(15.0%)
	Private	20	12(60.0%)	2(10.0%)	5(25.0%)	0(0.0%)	1(5.0%)
8. Science lab and library is enough for its preparation?	Public	20	2(10.0%)	6(30.0%)	6(30.0%)	4(20.0%)	2(10.0%)
	Private	20	10(50.0%)	5(25.0%)	1(5.0%)	3(15.0%)	1(5.0%)
9. Class strength must not exceed than average strength?	Public	20	7(35.0%)	7(35.0%)	1(5.0%)	1(5.0%)	4(20.0%)
	Private	20	12(60.0%)	4(20.0%)	1(5.0%)	3(15.0%)	0(0.0%)
10. Do you enjoy teaching to learners with the help of audio-visual aids?	Public	20	11(55.0%)	5(25.0%)	0(0.0%)	2(10.0%)	2(10.0%)
	Private	20	14(70.0%)	3(15.0%)	1(5.0%)	0(0.0%)	2(10.0%)

Table3: Responses (1-10) of public and private sector learners

Items	Nature of school	N	Frequency and Percentage				
			1	2	3	4	5
Questionnaires							
1.A.V aids must be related to a lesson plan?	Public	20	17(85%)	2(10.0%)	0(0.0%)	1(5.0%)	0(0.0%)
	Private	20	9(45.0%)	7(35.0%)	0(0.0%)	1(10.0%)	2(10.0%)
2. A.V aids must be efficiently used within a given time-frame of a lesson?	Public	20	16(80.0%)	1(5.0%)	1(5.0%)	1(5.0%)	1(5.0%)
	Private	20	7(35.0%)	8(40.0%)	1(5.0%)	1(5.0%)	3(15.0%)
3. A.V aids must be shown in a sequence during a lesson plan	Public	20	17(85.0%)	1(5.0%)	1(5.0%)	1(5.0%)	0(0.0%)
	Private	20	8(40.0%)	7(35.0%)	1(5.0%)	3(15.0%)	1(5.0%)
4. A.V aids must be helpful for making notes during a lesson plan?	Public	20	13(65.0%)	4(20.0%)	1(5.0%)	2(10.0%)	0(0.0%)
	Private	20	6(30.0%)	8(40.0%)	1(5.0%)	5(25.0%)	0(0.0%)
5. A.V aids must be helpful for making assignments or home tasks?	Public	20	10(50.0%)	7(35.0%)	3(15.0%)	0(0.0%)	0(0.0%)
	Private	20	4(20.0%)	7(35.0%)	4(20.0%)	3(15.0%)	2(10.0%)
6. A.V aids shown to students must be according to age level or age group of learners?	Public	20	10(50.0%)	9(45.0%)	0(0.0%)	0(0.0%)	1(5.0%)
	Private	20	9(45.0%)	7(35.0%)	1(5.0%)	2(10.0%)	1(5.0%)
7. A.V aids must be interesting and creative for learners?	Public	20	14(70.0%)	6(30.0%)	0(0.0%)	0(0.0%)	0(0.0%)
	Private	20	10(50.0%)	4(20.0%)	2(10.0%)	2(10.0%)	2(10.0%)
8. A.V aids must be a source to sharpen the knowledge of learners?	Public	20	13(65.0%)	7(35.0%)	0(0.0%)	0(0.0%)	0(0.0%)
	Private	20	7(35.0%)	9(45.0%)	1(5.0%)	1(5.0%)	2(10.0%)
9. A.V aids must be shown to each and every learner of a class during a lesson plan?	Public	20	16(80.0%)	3(15.0%)	1(5.0%)	0(0.0%)	0(0.0%)
	Private	20	6(30.0%)	9(45.0%)	1(5.0%)	2(10.0%)	2(10.0%)
10. Instructors must be expert in handling audio-visual aids?	Public	20	17(85.0%)	2(10.0%)	1(5.0%)	0(0.0%)	0(0.0%)
	Private	20	7(35.0%)	6(30.0%)	2(10.0%)	2(10.0%)	3(15.0%)

Mean score was calculated by using following formula:

$$\text{Mean score} = \frac{(\text{FSA} \times 5 + \text{FA} \times 4 + \text{FN} \times 3 + \text{FDA} \times 2 + \text{FSDA} \times 1)}{N}$$

Table 5: Mean scores of instructors' and learners' responses

Instructors'			Learners'			
Nature of school	Items	Mean score	Items	Mean score	Items	Mean score
Public	Q1.	4.05	Q1.	4.75	Q11.	4
Private		4.6				3.95
Public	Q2.	4.2	Q2.	3.85	Q12.	4.45
Private		4.75		4.5		2.6
Public	Q3.	2.5	Q3.	3.75	Q13.	4.55
Private		3.45		4.7		3.85
Public	Q4.	3.75	Q4.	3.9	Q14.	4.45
Private		4.15		4.4		3.9
Public	Q5.	3.95		3.75		4.35

Private		4.45	Q5.	4.35	Q15.	4.5
Public	Q6.	3.55	Q6.	3.4	Q16.	4.45
Private		3.9		4.35		3.6
Public	Q7.	3.5	Q7.	4.05	Q17.	4.55
Private		4.2		4.7		3.85
Public	Q8.	3.1	Q8.	3.9	Q18.	3.05
Private		4		4.65		3.2
Public	Q9	3.6	Q9	3.9	Q19	3
Private		4.25		4.75		2.9
Public	Q10.	4.05	Q10.	3.75	Q20.	2.85
Private		4.35		4.8		2.25
				3.6		

Figure 1: Responses 1-10 of public and private sector learners

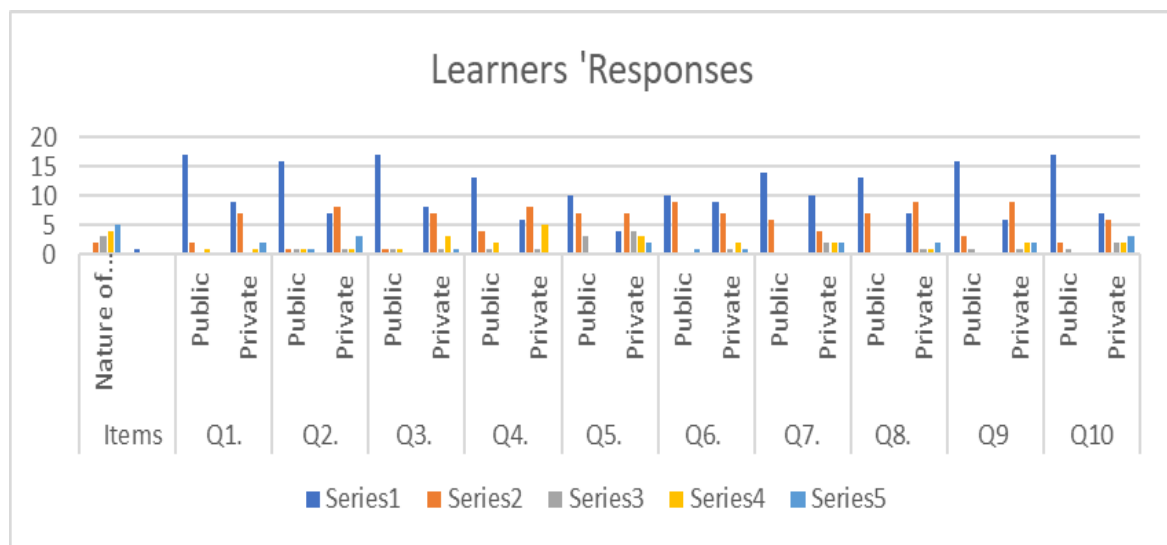


Figure 2: Responses 11-20 of public and private sector learners

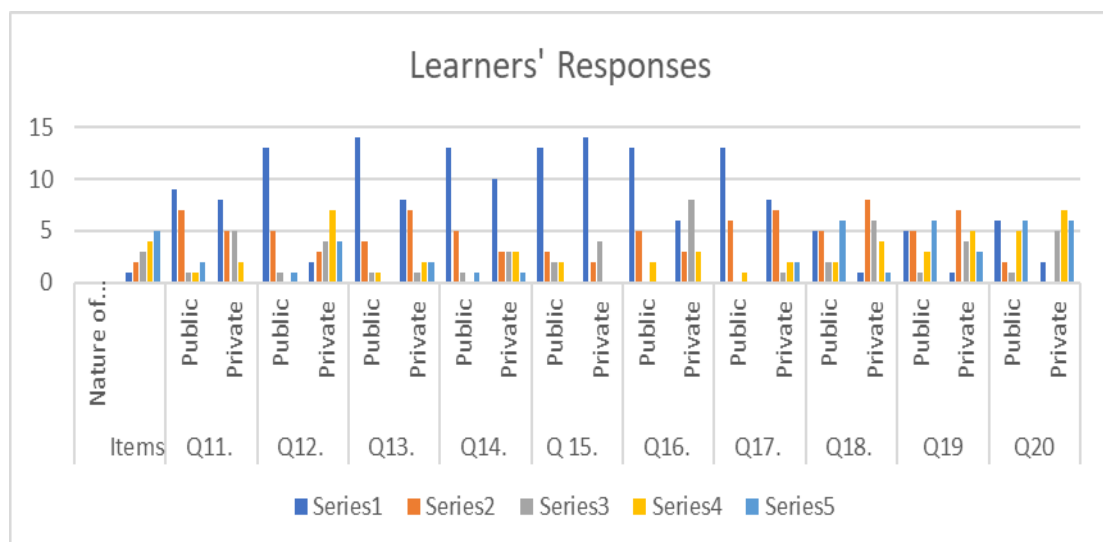
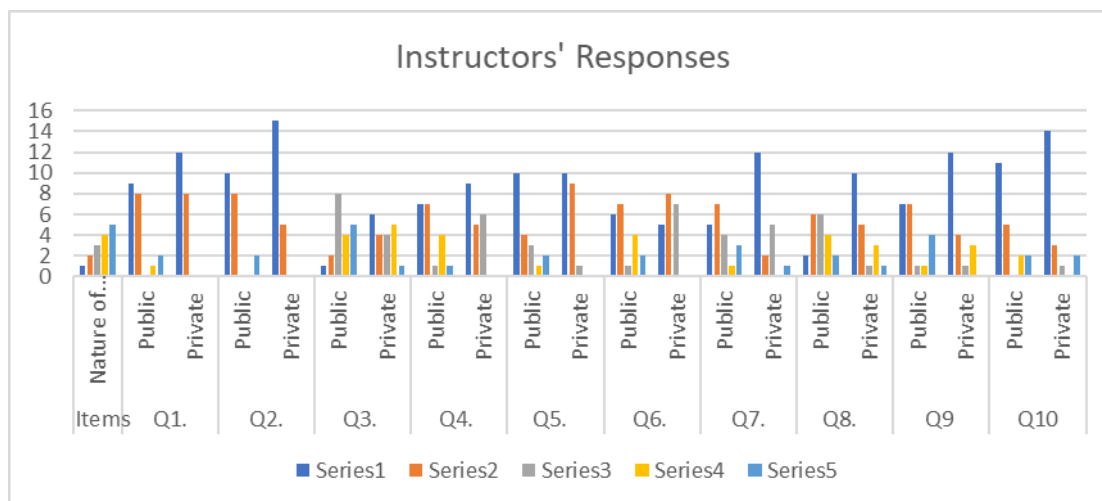


Figure 3: Responses 1-10 of public and private sector instructors



4. Discussion

Findings of the study on the basis of data analysis are given as under:

Data analysis of instructors' responses of public and private sector teachers:

Table 5 shows that that mean score of more than 3.00 (norm) instructors' responses means that instructional materials have a significant impact on learning process at secondary school level.

Data analysis of learners' responses of public and private sector instructors:

Table 6 and 7 shows that mean score of more than 3.00 (norm) learners' responses means that instructional materials are helpful in learning process at secondary school level.

Pakistan has three types of education models of public-private partnership. Private funded schools or government funded students enrolled in private sector schools, public sector schools run by education management organizations privately and public schools where the government pay salaries and utility bills while adopter pay all other expenses such as hiring additional contract staff [18]. Both these sectors can get benefit through PPPs mutual funds which can provide audio-visual aids to pupils and learners to uplift the education quality and standard. `Public-private partnership design is an ideal model to bring close both sectors. Single national curriculum is taught in both sectors and same audio-visual aids can be used for them. Flow of funds, ideas, creativity, knowledge and

audio-visual aids between these sectors can benefit both learners and pupils.

5. Conclusions and recommendations

It was examined from the study that adequate instructional materials have a significant impact on learning biology subject at secondary school level. Availability, utilization and improvisation of instructional resources make learning process more effective. Respondents from both sectors shown keen interests in a resourceful and healthy learning environment. The majority believed that management and instructor should sensitize the accurate use of resources in a class within a given time frame. It was suggested that public-private sector should work together to enhance learning development. According to world bank report (2023), Liberia followed the PPPs model and as a result the instructor got quality training and students got good academic achievement. Pupil and parents were satisfied. But government should be clear regarding policies, legal contracts and execution of the programme. National choice program of Netherland had a significant role on uplifting the standard of quality education. In this program, pupils and instructor were allowed to chose the school of their choice of any zone or district. Pakistan PPPs model initiated many programmes such as Punjab Education Foundation's Assisted Schools (FAS), Education Voucher Scheme (EVS), New School Program (NPS), and Punjab School Support Program (PSSP). It helped in the enrollment of more than two million. It also helped in

providing quality education and physical resources to students [18].

Ideas, skills, creativity and attitude can be exchanged between both sectors by arranging educational seminars and science exhibitions. The designed resources should be related to curriculum. There must be a scheduled class in school time table once in a week or month where instructor and learner can sit together to put their ideas in practical. It was recommended that learning gap between both sectors can be minimized through exchange of their ideas and creativity by implementing the effective public-private partnership program at large extent in Khyber Pakhtunkhwa.

References

1. Andrew.K., Nicholas.K & Ruth.N. (2023). Instructional materials for effective teaching and learning of geography in senior secondary schools. A case study of Bukandula Secondary school-gomba. *Metropolitan Journal of Social and Educational Research*. 2 (6): 529-539.
2. Akram.S., Sufiana & Malik.K. (2012). Use of audio-visual aids for effective teaching of biology at secondary schools level. *Leadership Management*. 50: 10597-10605.
3. [Abdulrahman](#).M.D., [Faruk](#).N, [Oloyede](#).A.A., [Surajudeen-Bakinde](#).N.T., [L.A.](#) [Olawoyin](#).L.A., [Mejabi](#).O.V., [Imam-Fulani](#).Y.O., [Fahm](#).A.O, & [Azeez](#).A.L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*. 6(11).
4. Alemdag E., Cagiltay K. (2018). A systematic review of eye tracking research on multimedia learning. *Computers and Education*. 125 (2):413–428.
5. Al-Ajmi N.A.H., Aljazzaf Z.M. (2020). Factors influencing the use of multimedia technologies in teaching English language in Kuwait. *International Journal of Emerging Technologies in Learning*.15(5):212–234.
6. Alciso, R. M., Boo, A. A., Julongbayan, P. E., Ramos, Q. G., Aclan, B. L., & Porley, R. N. (2023). Development of outcomes based instructional materials in professional teacher education courses for a flexible set-up. *Journal of Education and E-Learning Research*, 10(1), 61–67
7. Al-Hussaini. M. H. (2023). Impact of audio visual aids on youngster and their adjustment at elementary school level. *International Journal Of Elementary Education*. 12 (3): 90-94.
8. Burki, S. J. (1986). Pakistan: A Nation in the Making. Karachi: Oxford University Press.
9. Cuban, L. (2001). Oversold and underused: Computers in the classroom. Cambridge. Harvard University Press.
10. Emmanuel, E., Rebecca, N., Kazaara, A. G., & Nicholas, K. (2023). The Effects of Job Training on Performance of Local Government Employees in Uganda: A Case Study of Molo Sub- County, Tororo District. *International Journal of Academic and Applied Research*. 7(2): 65–73.
11. Indrayanti1.I., Kuntoro.A., & Romadhon.S.A. (2023). Audio-Visual Aids Media, Language Acquisition And Attitude: An Initial Investigation In The Efl Classrooms. *LLT Journal: A Journal on Language and Language Learning*. 26 (1): 314-323.
12. Iqbal, M. (June,2012). Private versus Public Secondary Schools: A Qualitative Comparison. *Journal of Research and Reflections in Education*. 6 (1) : 40-49.
13. Jadal. M. M. (2011). A study of effectiveness of the audio-visual aids in teaching and learning of English at primary level in Z.P. Primary schools of Solapur District. *Indian Streams Research Journal*.1 (7).
14. Milovanovic M., Obradovic J., Milajic A. (2013) Application of interactive multimedia tools in teaching

mathematics--examples of lessons from geometry. *Turkish Online Journal of Education Technology*. 12(1):19–31.

15. Moses, T. (2023). On Job Training and Its Implication on Staff Performance in Uganda: A Case Study of Kasanda District Local Government. *International Journal of Academic Multidisciplinary*. 7(4): 155–163.
16. Odinakachi, E. O., Mbalisi, O. M., Ukhurebor, K. E., Opatye, J., & Leonard, E (2023). Accessibility of instructional materials for effective teaching: outlook from high schools in Eleme, River State, Nigeria. *Cypriot Journal of Educational Sciences*. 18(2):456-469.
17. Pakistan Education Statistics 2020-21.
18. Razwan, M., Hiraoka, R & Taniguchi, K (2022). The role of the private sector in Pakistan's school education. ADB Briefs NO.208.
19. Regina. D & Rajasekaran.W.C. (2023). A Study on Understanding the Effectiveness of Audiovisual Aids in Improving English Vocabulary in ESL Classrooms. *World Journal of English Language*.13 (8).
20. World bank (2023). Designing effective public-private partnerships in education.