

Research Article: Teaching Math to Special Children

Title: Use of Audiovisual Aids improves the performance of Special Children in Mathematics.

FATIMA MAHMOOD

"This article is about Teaching Math to Special Children. It based on the hypothesis that " Use of Audiovisual Aids improves the performance of Special Children in Mathematics". The subjects are Class KG 1,KG 2,Form 1 Hearing Impaired Children of Govt Special School Faisalabad ,Pakistan .A.V.AIDS used are flash cards, solid toys with and without battery, Pictures in class while delivering lesson in routine The result showed Significance difference Between achievement level of HI students before and after the use of A.V.AIDS.

Introduction: the Literature review

Audio Visual Aids are also named as instructional material. The word Audio verbally means hearing and the word visual means seeing. So all Aids, which are used to clarified the knowledge provided to us through our all sense are called Audio-Visual Aids. All these are learning materials also consider as learning situations which are as real as possible and provide us first-hand knowledge through the organs of hearing and seeing. Therefore, any device which involve vision or auditory experience and can be used to make the learning experience more concrete and effective and also more realistic and dynamic can be considered audio-visual material.

As all of us know,we learn through our sense organs. "Senses are the ways of knowing". All the sense organs helpful in understanding the environment. So most of the formal and informal learning, which we acquire from the school, comes through our ears and eyes.

Audio Visual Aids Definition

According to Burton," These are sensory perceptions e.g. images which stimulate an emphasis on the learning process. Carter V. Good described it as "It is a trainable (including motivation, classification and stimulation) process of learning."

Objectives of Teaching Aids:

1. To enhance teachers skills to its maximum which in result makes the teaching-learning process effective with maximum output.
2. To motivate learners and make them active in the classroom.
3. To improve Communication according to their capacities.
4. To develop the lesson plan.
5. To develop students observation capacities.

6. To develop comprehensive and easy learning material.
7. To nurture child natural learning process.
8. To use in achieving learning objectives.
9. To create interest in children.
10. To make the teaching more effective.

Types

The A.V.Aids classification may be simply based on “sensory experience” of an individual. This is because human being’s experiences mainly based on direct sensory contact(experience). So, it can be classified into three main groups

1. Audio Aids examples are Radio, Gramo-phone, Tape recorder, Audio cassette player, Lingual phone, Language laboratory
2. Visual Aids examples are Black and white board, Chart, Pictures, Models, Maps, Textbooks, Transparency, Slide projector, Flash cards, Print materials etc.
3. Audiovisual Aids examples are Film projector, TV, LCD project, Computer, VFD player, Virtual Classroom, Multimedia etc.

Advantages

1. It improves the learning process and make it more effective and comprehensive.
2. It helps to develop child’s attention in classroom
3. It builds child’s interest and also motivation students learning
4. The researches show that learning with interest enhances the energy level of teacher and students
5. It help students to study in overburden classrooms
6. It foster realistic approach and experience

Disadvantages

1. There may be technical problems as it is new technology
2. The students may lose attention and become distracted
3. It is expensive
4. It is time-consuming
5. it need more room& Space
6. It is no very convenience (available)

Characteristics

It promotes

1. Relevance
2. Purposeful teaching
3. Accurate learning outcome
4. Develop students interest
5. Improve Comprehension
6. Improve motivation level
7. Promote realism

Who can take benefit from Visual Aids? Every child can take benefit from a. v. aids in regular classrooms. But it is more helpful for special students in special need education classrooms: with students showing Language Disorder, , Down Syndrome Autism Spectrum Disorder and so on. Those who have Learning Dis-

abilities ; Those having Personality Development Delay; Op positional Defiant Disorder; Have the problem of Hearing Impairment; having blindness; Have the symptoms of Attention Deficit Hyperactivity Disorder ADD .

Signs of Math Difficulties

1-Output Difficulties • A student with problems in output may be unable to recall basic math facts,

2-procedures, rules, or formulas • be very slow to retrieve facts or pursue procedures • have difficulties maintaining precision during mathematical work • have difficulties with handwriting that slow down written work or make it

3-hard to read later • have difficulty remembering previously encountered patterns • forget what he or she is doing in the middle of a math problem

4-Organizational Difficulties • A student with problems in an organization may have difficulties sequencing

5-multiple steps • become entangled in multiple steps or elements of a problem •

6-lose appreciation of the final goal and overemphasize individual elements of a problem • not be able to identify salient aspects of a mathematical situation, particularly in word problems or other problem-solving situations where some information is not relevant • be unable to appreciate the appropriateness or reasonableness of solutions generated

7-Language Difficulties • A student with language problems in math may • have difficulty with the vocabulary of math • be confused by the language in word problems • not know when irrelevant information is included or when information is

given out of sequence • have trouble learning or recalling abstract terms • have difficulty understanding directions • have difficulty explaining and communicating about math, including asking and answering questions • have difficulty reading texts to direct their own learning • have difficulty remembering assigned values or definitions in specific problem

8-Attention Difficulties • A student with attention problems in math may • be distracted or fidgety during math tasks • lose his or her place while working on a math problem • appear mentally fatigued or overly tired when doing math

9-Visual-Spatial or Ordering Difficulties • A student with problems in visual, spatial, or sequential aspects of mathematics may • be confused when learning multi-step procedures • have trouble ordering the steps used to solve a problem

• feel overloaded when faced with a worksheet full of math exercises • not be able to copy problems correctly • may have difficulties reading the hands on an analo-

gize clock • may have difficulties interpreting and manipulating geometric configurations • may have difficulties appreciating changes in objects as they are moved in space

10-Difficulties with multiple tasks • A student with problems managing and/or merging different tasks in math may • find it difficult to switch between multiple demands in a complex math problem • find it difficult to tell when tasks can be grouped or merged and when they must be separated in a multi-step math problem • cannot manage all the demands of a complex problem, such as a word the problem, even though he or she may know component facts and procedure.

So what might an educator do?

1. Use brief, short-lessons
2. Provide suitable opportunities i.e.e.g. to work alone or to work together
3. Using various problem-solving techniques e.g. using divergent questions
4. Select concrete materials e.g. solid toys or visit actual situation the researcher pointed out solid object help students to learn fast in math class during primary years (Booker et. al. 2004, Cornell 2004, West wood 2000). It may be because the materials provide tangible ways to explore mathematical ideas and they are a “window into student thinking” and to talk about. For example, resource already available in schools is an overhead projector. With the use of transparencies and pens, educators are able think aloud and tackle problems. other material scan be used with projectors such as photographs etc.
5. The teacher should now the student level of understanding of mathematical language
6. The students need to be given opportunities to write and explain about their tasks and allows them to develop the strategies they are happier using.
7. The teacher should play games (Simple and versatile), games (Booker (2000) can provide important learning opportunities; the student with student or student with the adult. For example card games are especially useful as they are portable,cheap, and socially acceptable for all ages.
8. The use of technology e.g. Computer software can often do better than text-book or worksheet .
9. The good Pedagogical knowledge and positive attitude is required.
10. The published materials should be used carefully.
11. NCTM (2006) reminds us that the assessment tool should support the learning of important mathematics theorem and useful information for teachers and students.

Research review up until date:

Many researchers point out that Audio Visual aids help special children learning better - Maria Jyothi (2012). An opinion expressed y various teachers of special

education point out that audiovisual techniques and material help in teaching retarded children (K.C. Cotton 1963). Research on special children by Shankar Narayan (1980) for UNICEF pointed out that audio-visual aids serve as effective means and tools for learning.

Sade A.S. Alyani, F.S. Al Hammad, S.A Alyan (2013) point out that Audiovisual aids found to be effective equally with handicapped children's performance. Sara Rasul, Q. Buksh, S.B. (2011) also report that subject in their research viewed that A.V. Aids play an important role in the teaching-learning process at University level. Annie Magnum, Jean Ecalle (2004) worked with learning disabled children and reported that computerized reading training program improved children's reading. The audiovisual intervention program has also positively affected the language development of preschool children (S.K. Roul (2014)). The similar result was reported by Catter (1963) while applying audiovisual aids to retarded children. The hypothesis of the present study is " The use of audiovisual aids improves performances of HI".

Method:

Systematic Sampling technique is used to collect relevant data. The sample is collected from G.S.E.C. Iqbal Town Faisalabad which is a primary special school for 4 disabilities (viz. blind, deaf, physically handicapped and mentally handicapped). Only hearing impaired children from classes KG-1, KG-2 and Form -1 are selected.

The audiovisual aids were provided for teaching purpose in December 2012. Before this time, A.V. Aids was not available. The results of midterm(Dec.2012) exams and annual(March 2013) exams were taken into account where mid-term results showed performance BEFORE A.V. Aids (Math class) while Annual results indicated performances AFTER A.V. Aid use. The results of successive years i.e. 2013-2014 and 2011-2012 were considered.

The percentage of successful and unsuccessful students (Math subject) is considered. The total number of sample was (Nt =264). The A.V. Aids used in Math Class are: 1. Flashcards 2. Educational toys (blocks etc.). 3. Solid toys

The A.V. Aids was purchased in December 2012 by School Management Council (SMC) budget (parent-teacher organization).

Arrangement & Analysis of Data and Result:

The statistical procedure adopted to see differences between mean scores of after treatment and before treatment is significant by the use of probability table.; tables of results are prepared as follows:

**Table A: Showing the Mean Scores of the results
 (Dec 2011- Dec 2012 Before A.V.Aid Used)**

Results	KG1 M score	KG2 M score	FORM1 M score	
Dec.2011 Before A.V. Aid usage	30% n1=15	44% n2=20	56% n3=5	Nt=40
March 2012 Before A.V.Aids us- age	27% n1=15	40% n2=20	55% n3=5	Nt=40
Dec. 2012 Before A.V.Aids us- age	20% n1=18	47% n2=15	57% n3=12	Nt=45
Total No Subj	N1= 48	N2= 55	N3=22	Nt=125

**Table B Showing the Mean Scores of the results
 (March .2013 March 2014 After A. V. Aid used)**

Results	KG1 M score	KG2 M score	FORM1 M score	
March2013 After A.V. Aids used	67% n1= 18	52% n2=15	49% n3=12	nt=45
Dec 2013 After A.V.Aids used	39% n1=21	71% n2=12	79% n3=14	nt =47

March 2014 After A.V Aids used	51% n1=21	67% n2=12	65% n3=14	nt=47
Total No. Subj	N1=60	N2=39	N3=40	Nt=139

Statistical Analysis

The Hypothesis of this article is “the use of Audio Visual Aids improves the performance of HI in Math subject “

Null Hypothesis =H₀= “the use of A.V.Aids makes no difference on the performance of HI in Math subject”

Statistical Test Applied= F-test

F-test is used because:

- 1-A Hypothesis is to be tested.
- 2- There are more than 3 variables to tackle.
- 3- Null Hypothesis H₀ = “No relation ” among variables.
- 4- Research Hypothesis stands if H₀ is rejected.
- 5- F-test Assume that Testing population is a normal distribution and the variance among population is also Normally distributed

Formula:

$$F = \frac{S_1^2}{S_2^2}$$

$$S_B = \frac{\sum n_1 (M_x - M_m)^2 + n_2 (M_y - M_m)^2}{n-1}$$

$$S_w = \frac{\sum (M_x - M_1)^2 + \dots + (M_y - M_2)^2 + \dots}{N-k}$$

Assumptions

- 1- F-cannot be” Negative”
- 2-The variance among groups is not large.
- 3- The result is checked in F-table

1- Table-1:Data Analysis Based on Table A &B:

(Dec 2011- Dec 2012 Before A.V. Aid Used)					(March.2013 March 2014 After A. V. Aid used)			
	Per-centage Mean Mx	Mean of x values M1	Mx-M1	(Mx-M1)²	Per-centage Mean My	Mean of y values M2	My-M2	(My-M2)²
KG1	77	125.33	-48.33	2335.79	157	180	-23	529
KG2	131	125.33	5.67	32.15	190	180	10	100
F1	168	125.33	42.67	1820.73	193	180	13	169
Sum Total=	376			4188.67	540			798
Total				nx=125				ny=139

$$\begin{aligned}
 S_w &= \Sigma (M_x - M_1)^2 + \dots + (M_y - M_2)^2 + \dots / N - k \\
 &= 4188.67 + 798 / 264 - 6 = 4986.67 / 258 \\
 &= 19.33
 \end{aligned}$$

Table- 2

No	Mean	M-Mm		(M-Mm)²	n(M-Mm)²	

Mx	125.33	125.33-152.66-	-27.33	747.47	3x747.33	=2241.99
My	180	180-152.66	27.33	747.47	3x747.33	=2241.99
Mm	152.66					

$$\begin{aligned}
 S_{bt} &= \sum n_1 (M_x - M_m)^2 + \sum n_2 (M_y - M_m)^2 / n - 1 \\
 &= 3 (747.47) + 3 (747.47) / 6 - 1 \\
 &= 2241.99 + 2241.99 / 5 \\
 &= 4483.98 / 5 \\
 &= 896.8
 \end{aligned}$$

F-ratio

$$\begin{aligned}
 F &= |S_1|^2 / |S_2|^2 \\
 F &= 896.8 / 19.33 \\
 F \text{ value} &= 4.639
 \end{aligned}$$

Summery Table

Sr No	Degree of Freedom	Variance	F-value	F-Table	Result
1	N-k=164-6=158	Sw=19.33	4.639	H0 is rejected	The significance difference present
2	n-1=6-1=5	Sb=896.8			between the means

Result Summery

Thus, on the basis of above calculations it is find out that there is significance difference present among the means of groups. Or in other words it is find out that before experimental treatment performance was low (means average was low as compared to that after the introduction of audiovisual aid). So use of A.V. Aids increase the performance level of the Hearing impaired children in Math Classroom.

Conclusion:

Null Hypothesis H0 is rejected thus Research Hypothesis “ the use of audio-visual aids improve the performance of hearing-impaired children in Math” find out tobe standwell.

Chart 1

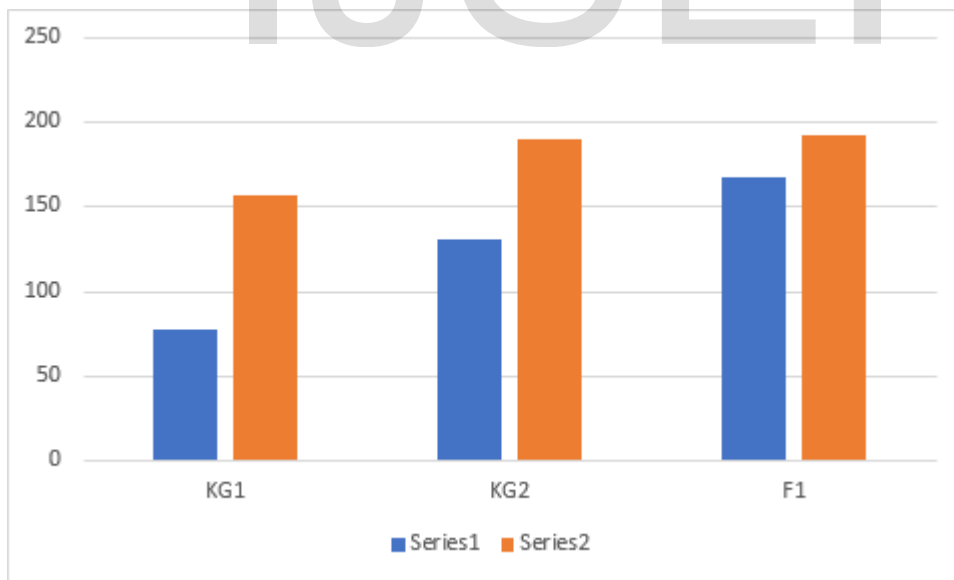


Chart 1 Showing Comparison Between Mean Math Scores
Group 1(Colored Blue)=Before start using A.V.Aids
Group 2(Colored Orange)=After start using A.V.Aids

Discussion:

Learning involves senses especially auditory and visual senses. It is difficult to teach special children because they are disabled. For example, the blind cannot see, similarly hearing impaired cannot hear. Thus they need extra help to learn. Audiovisual aid could provide such help to the special children. As discussed earlier, in order to overcome math difficulties children must be taught to manipulate objects. Audiovisual aids such as solid objects (toys) or flash cards could be very helpful and useful as well.

Present research, therefore, confirms the results of previous researches that A.V. Aids help special children learn better. For example, Maria Jyothi (2012) K.C College 1963, Shanker Narayan 1980; Sade A.S. Alyari Al Jean Ezatte (2004) also pointed out that computers could be useful as A.V. aids. Even language development could be positively affected by the use of A.V. aids as postulated by S.K. Roul (2014).

Many researchers point out that (Booker 2004, Carneros 2004 Westwood 2000) it is materials that provide a tangible way of exploring mathematical ideas, for educators, they are a window into student thinking. Abacus, blocks, educational toys, provide materials to manipulate and talk about. These are all helpful tools in teaching math, especially to HI. Additionally, there is a wide variety of materials (along with books) that can be used e.g. clocks, calculators etc.

The researches also show that games can be used as rewards when the real work has been finished early. Booker (2000) reminds us that games can be powerful teaching and learning tools to develop conceptual understandings. It is engagement with interesting and few activities that can keep a young person practicing a skill well beyond what they tolerate if asked to do another worksheet. It also provides learning opportunity as well. Use of Audiovisual Aids such as educational toys, flash cards should be presented as a game and as a source of enjoyment. Thus it is also helpful in the learning process.

The present research design is experimental in nature. As the performance of children is compared with and without the provision of A.V. Aids. All other external variables are kept constant for example teaching methods, as the same teacher will deliver the lesson to the same children. Classroom environment will remain the same; evaluation will be made by the same teacher to minimize human error. In such a control environment results are expected to be as bare as facts. These results are also compared with the performance of HI of last as well as next year. The results continue the hypothesis that use of A.V. aids will improve the classroom performance of HIC in Math subject.

The performance of children (HI) was evaluated by taking record of their result in midterm and annual exams. Although these are not standardized tests the teachers made sure that the tests are useful for wide age group i.e. very young children to older children. Similarly, concrete material is used as A.V. Aid which helps to reduce attention difficulties, visual-spatial ordering difficulties, organizational difficulties as well as difficulties with multitasking. Solid objects help special children to understand and memorize concepts, as pointed out by many types of research.

The results show the marked difference in performance in KG1 and KG2 classes. As young children respond well to Audiovisual stimulation It may help to improve their sensation, memory span, interest, attention and class work. The form 1 students show slight improvement with the use of A.V. Aid, however, improvement is there. It could also be observed in the form of the graph representing the performance of children for the three-year session. Before the use of A.V. Aids children performance was lower than after the use of A.V. Aid.

Limitation:

- A study is made in only one center, there is a need to widen the scope of the study,
- Study should involve more subjects such as English, Urdu, Science, General Knowledge.

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