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APPENDICES

Appendix A: Semi-structured interview questions for learners

Interview guide: the use of Art Integrated Learning in a mathematics AIL classroom
The following are interview questions that learners will be asked

Name: .....

Interview questions to learners:

1. What is your understanding of Art Integrated Learning in an AIL classroom?
2. How can you describe the best way of learning mathematics in a mathematical AIL classroom?
3. What is your understanding of the topic of mathematics? Do you find it hard? If yes, what do you think makes mathematics difficult to understand?
4. Do you think using art integrated learning can improve your understanding of mathematics than when a teaching method is used? Please elaborate.
5. What are the benefits of using Art Integrated Learning in a mathematical classroom? Please name at least two.

6. What mathematical resources do you use except the textbook for learning mathematics?

7. How did Art Integrated Learning enhance your conceptual understanding of mathematics?

Appendix B: Semi-structured interview questions for the teacher

Interview questions to a teacher:

1. What is your preferred method of teaching and why?
2. Do you regard mathematics as a difficult subject?
3. What do you think makes the performance of learners in mathematics poor?
4. What are the benefits of learning mathematics art integrated learning to you as an educator?
5. If Art Integrated Learning is used effectively, do you think it can enhance learners' conceptual understanding of mathematics?

Appendix C: Permission letter to the principal

Title: A Study of Effect of Art-integrated Learning on Academic Achievement in Mathematics of 10th Grade Students of Government Secondary School Students of Laxmipur

Date .....

The Principal
Government High School, Laxmipur

Dear _____

I, Jagmohan Bagh am researching supervision Dr. Sourabh Kumara Professor in the Department of Mathematics Education towards the degree Three Year Integrated B.Ed.-M.Ed. at the Regional Institute of Education, Bhopal. We are inviting you to participate in a study entitled **"A Study of Effect of Art Integrated Learning on Academic Achievement in Mathematics of 10th Grade Students of Government Secondary School Students of**

Laxmipur." The study aims to find the effect of Art Integrated Learning on academic achievement in mathematics of 10^{th}-grade students.

Your school has been selected because it has the sufficient number of learners doing mathematics and your school environment is conducive for learning.
The benefits of this study are helps teachers use Art Integrated Learning effectively to enhance conceptual understanding of mathematics in Grade 10mathematics AIL classroom.

There are no potential risks to participants. There will be no reimbursement or any incentives for participation in the research.
The feedback procedure will be allowing any learner to contact the researcher to access the research results.

Yours sincerely

_____ (insert signature of researcher)

_____ (insert name of the above signatory)

Appendix D Interview guide: the use of Art Integrated Learning a mathematics AIL classroom

The following are interview questions that teachers will be asked

Name: XXX Number of years Teaching grade: 24

Interview question to a teacher:

Researcher: What is your preferred method of teaching and why?

"Teaching methods should be mixed, because learners learn differently, the methods should be mixed during the process of teaching, but I mostly recommend group work, learners should investigate when given activities to do, I shouldn't always spoon feed them."

Researcher: Do you regard mathematics as a difficult subject?

"No, mathematics is the easiest learners view at as a difficult topic because they don't learn the laws and procedures that needs to be followed to understand and solve all given activities with understanding, for example when we work with reduction formula learners should understand how the circle works when learners can understand on the first quadrat all trig ratios are positive and so forth"

Researcher: What do you think makes the performance of learners in mathematics poor?

"Lack of practice, most learners will seem to be understanding during the process of teaching and learning but performing very poorly during the tests and exams. The poor performance in mathematics as a whole is also because these learners don't have study groups (for mathematics practice and other subjects). Some learners bunk AIL classes or are absent most of the time and that result in them missing a lot of important lessons, some learners don't help each other i.e. some learners are just selfish"

Researcher: What are the benefits of learning mathematics in an art integrated learning to you as an educator?

"I believe learners learn best from each other and using group work they can rectify each other, learn from each other, and encourage each other to learn for understanding. Learners can help each other in a sense that the other learner might be good in a certain subject e.g. accounting and the other in mathematics, so these learners can benefit from each other"

Researcher: Do you think using Art Integrated Learning can improve learners' understanding of mathematics than when a traditional textbook method is used? Please elaborate?

"We teachers use a different method of teaching, but as I said earlier I believe in mixing these teaching methods to enhance understanding of learners in mathematics in general. I use all the methods of teaching in my AIL classroom but Art Integrated Learning is better than traditional textbook

method since it is learner-centred, it, makes learners independent of their learning."

Appendix E Table 4.1: A paired-samples dependent pre-test and post-test marks for the control group.

Name of learner	Posttest (%)	Pre-test (%)	Difference
1	22	16	6
2	14	24	-10
3	28	22	6
4	26	16	10
5	54	54	0
6	6	8	-2
7	26	22	4
8	8	12	-4
9	26	14	12
10	24	24	0
11	12	12	0
12	52	38	14
13	46	42	4
14	60	24	36
15	42	36	6
16	28	14	14
17	22	14	8
18	8	8	0
19	32	50	-18
20	46	46	0
21	16	26	-10
22	40	32	8
23	16	10	6
24	20	16	4
25	40	56	-16

26	68	70	-2
27	48	38	10
28	5	18	-13
29	18	18	0
30	50	46	4

Appendix F Table 4.2: a paired samples dependent pre and post-tests marks for the experimental group.

Names of learners	Post-test (%)	Pre-test (%)	Difference
1	34	18	16
2	72	52	20
3	30	38	-8
4	48	20	28
5	64	54	10
6	50	8	42
7	22	8	15
8	74	60	14
9	24	4	20
10	60	42	18
11	96	72	24
12	68	28	40
13	42	24	18
14	34	20	14
15	74	15	59
16	70	32	38
17	38	18	20
18	22	16	6
19	30	12	18
20	26	16	10
21	10	14	-4
22	56	48	8

23	66	44	22
24	24	30	-6
25	60	22	38
26	40	18	22
27	68	50	18
28	54	34	20
29	32	16	16
30	80	30	50