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Effect of active learning teaching methodology on learner participation

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Abstract
The participation of learners in class activities is considered as a prerequisite for better academic achievement (Murray, 1997). This study investigated class participation of learners taught by teachers that had highly adopted active learning teaching methodology (high uptake) compared to those (teachers) that had not i.e. the effect of active learning teaching methodology on learner participation. A purposive sampling technique was used to select 42 teachers to participate in the study (21 of these, after earlier routine class observation had been categorized by school inspectors as high uptake teachers in active learning while the other 21 were low uptake). The study confirmed that on a continuum between expository and heuristic instruction approaches, teachers that had highly embraced active learning methodology adopted instruction methodologies that leaned towards the latter compared to teachers that had not fully embraced it (54.5% against 25%). The study rated pupil participation in classes taught by high uptake teachers at 90.1% while their counterparts were rated at 75%. Pupils taught by high uptake teachers were better in recalling lesson content than those taught by low uptake teachers. Furthermore, pupils taught by high uptake teachers had superior pass-rates compared to those taught by low uptake teachers. Overall, 82.7% of pupils taught by high uptake teachers compared with 68.8% had positive attitudes about the subject, lesson, class environment and the teacher.
Key words: Active learning, high/low uptake, learner participation

1.0 Background

Active learning is a method of educating students that allows them to participate effectively in class. It takes them beyond the role of passive listener and note taker and allows the student to take some direction and initiative during the class. The role of the teacher is to facilitate and guide the students in directions that will allow them to "discover" the material as they work with other students to understand the curriculum. Active learning can encompass a variety of techniques that include small group discussion, role playing, hands-on projects, and teacher driven questioning. The goal is to bring students into the process of their own education (Lorenzen, 2001).

According to Bonwell and Eison (1991) strategies that promote active learning have five common characteristics: Students are involved in class beyond listening, less emphasis is placed on transmitting information and more emphasis is placed on developing the skills of the students. The students are involved in higher order thinking such as analyzing, synthesizing, and evaluation. The students are also involved in activities like reading, discussion, and writing. Finally, greater emphasis is placed on the exploration of student values and attitudes

Several studies have shown that students prefer strategies promoting active learning to traditional lectures (Bonwell et. al, 2000). Abhiyan (2006) also indicates that by re-organizing or adapting the ways they present material to students, instructors can create an environment in which knowledge retention is significantly increased. Learners retain information better when the density of new material was low (ibid)

1.1. Statement of the problem

Studies on Active Learning show that students in an experimental group instructed using active learning methodology perform significantly better, on an average, than if placed in the control group taught through lectures (Abhiyan, 2006). In another study, Pratton et.al (1986) investigated the effects of active participation on student learning using 20 fifth-grade classes which were randomly assigned treatment levels. Results suggested that active student participation exerted a positive influence on fifth grade student achievement of relatively unique instructional material. Akınoğlu and Tandoğan (2007) conducted almost a similar study where subject matter was taught on the basis of problem-based active learning on the treatment group, while traditional teaching methods were employed in the control group. Results showed that the implementation of problem-

based active learning model had positively affected students' academic achievement and their attitudes towards the science course. It was also found that the application of problem-based active learning model affects students' conceptual development positively and keeps their misconceptions at the lowest level.

A teacher observation exercise conducted by School Inspectors jointly from the Ministry of Education (MoE) and Aga Khan Foundation[1] (AKF) for 160 teachers in Coast and North Eastern Provinces of Kenya in 2009 established that 64% of the trained teachers were high uptake teachers in active learning methodology. It is from this data that the random sample is drawn to investigate the effect of active learning teaching methodology on learner participation.

1.2. Objectives

The specific objectives of the study were to:

1. Analyze the effect of active learning teaching methodology on learner participation in class activities
2. Identify contextual factors supporting or hindering the practice of active learning
3. Draw recommendations on the efficacy of the active learning methodology

2.0 Methods

A triangulation approach was adopted in this study; class observations, key informant interviews and document/record review were adopted as methods of data collection. The former were used to assess learner participation in class activities and sitting arrangement that favours active learning while the latter were used to collect information factors that support/hinder active learning.

A sample of 176 learners and 44 teachers participated in the study. The former provided information on attitude about the lesson and were also subjected to a quiz to assess comprehension of content, while the latter on factors supporting or hindering active learning methodology and how to overcome them. The researcher also reviewed school records to analyze the academic performance (trend analysis) of pupils taught by high uptake teachers in active learning compared with the low uptakers.

The instruments of data collection included questionnaires and observation schedules. Additionally, a simple test was administered to a sample of learners (i.e. assessment tool) to test their comprehension of the just concluded lesson (as an immediate proxy indicator of active class participation)

This was a comparative study to analyze learner participation in classes taught by teachers that had quickly adopted active learning against those that had not. As earlier mentioned, Aga Khan Foundation has a database as a result of regular follow-up of teachers (teachers classified either as high or low uptake)
A purposive sampling technique was therefore used to select 42 teachers to participate in the study. The table below shows how these schools were distributed:

Table 1: Sample

Location		**Coast Province**	**North Eastern Province**	**TOTAL**
Urban	High uptake	8	3	**11**
	Low uptake teachers	8	3	**11**
Rural	High uptake	7	3	**10**
	Low uptake teachers	7	3	**10**
TOTAL		**30**	**12**	**42**

[1] I am greatly indebted to Aga Khan Foundation for opportunity to use the data archive for the sake of this study

3.1 Respondents' Profile

The table below shows the gender distribution of respondents.

Table 2: Distribution of respondents by gender

Sub-region	Teachers		Pupils	
	Male	Female	Boys	Girls
Coast Province	9 (28.1%)	23 (71.9%)	62 (48.4%)	66 (51.6%)
North Eastern	5 (41.7%)	7 (58.3%)	21 (43.8%)	27(56.2%)
TOTAL	**14 (31.8%)**	**30 (58.2%)**	**83 (47.2%)**	**93 (52.8%)**

Majority of teachers (58.2%) participating in the study were female. Similarly, most of the pupils were girls (52.8%). Within regions, Coast Province (CP) had 71.9% female teachers participating, while North Eastern Province (NEP) had 58.3% female. More girls than boys participated in the study i.e. 51.6% in CP and in 56.2% NEP.

3.2. Components of active Learning

Figure 2 below shows the subjects that were being taught at the time of the class observations.

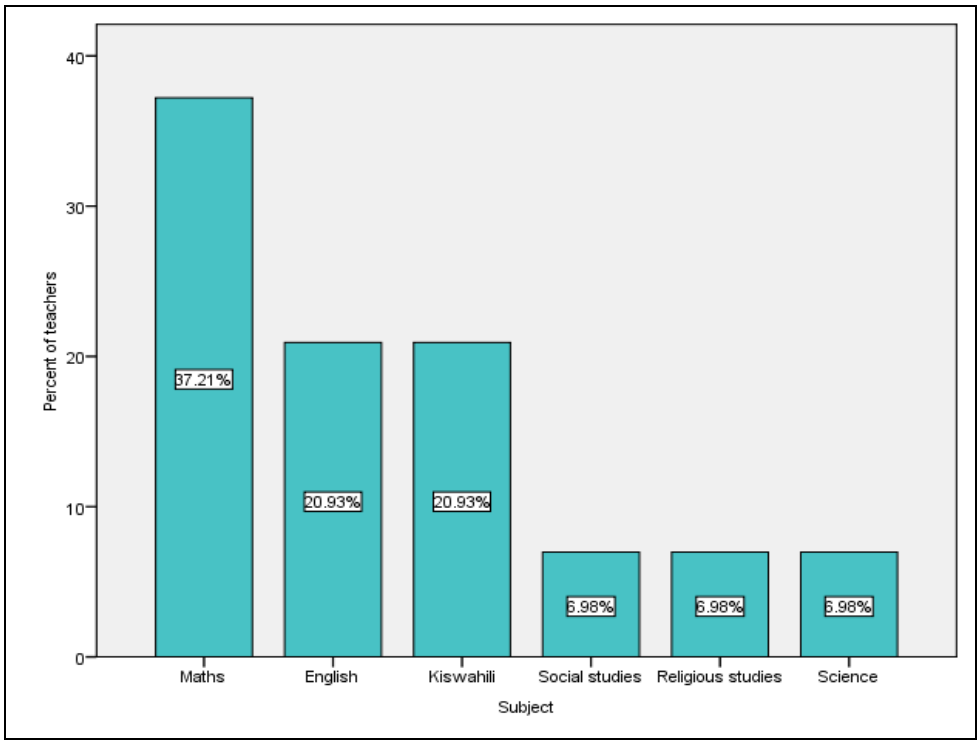

Figure 2: Subjects observed

Most of the teachers (37.2%) under observation were teaching Mathematics, followed by those teaching English (20.9%) and Kiswahili (20.9%) languages. Others were social studies, religious studies and science.

3.2.1. Lesson Planning

This section sought to asses in comparative terms, lesson preparation as evidenced by availability of lesson planning documents between high and low uptake teachers

Table 3: Availability of lesson planning documents

Planning documents	Availability	
	Active learning high uptake teachers	Low uptake teachers
1. Schemes of work	90%	86.4%
2. Lesson plan	70%	59.1%
4. Pupils achievement/progress records	85%	54.5%
5. Child file with individual child's details	15%	9.1%

The results shown in the table above reveal that high uptake teachers had better lesson preparation compared with low uptake teachers i.e. they had most of the lesson planning documents: lesson plan, schemes of work and child progress records

3.2.2 Pedagogy

Table 4 below shows the items that relate to teacher's competency in content delivery and how the two categories (high uptake/low uptake teachers) of teachers faired (rated on a Likert scale).

Table 4: Pedagogical skills

#	Item	Rating (Satisfaction)	
		Active learning high uptake teachers	Low uptake teachers
1.	Good lesson introduction	2.91 *(72.8%)*	2.62 *(65.5%)*
2.	Teacher presents lesson in a logical manner	2.9 *(72.5%)*	2.82 *(70.5%)*
3.	Teacher monitors the learning process	3.0 *(75%)*	2.76 *(69%)*
4.	Teacher has good questioning techniques	3.09 *(77.3%)*	2.82 *(70.5%)*
5.	Teacher gives individual attention to learners	2.82 *(70.5%)*	2.52 *(63%)*
6.	Teacher supports learners who cannot cope with learning tasks	2.54 *(63.5%)*	2.57 *(64.3%)*
7.	Teacher uses a variety of **relevant** teaching materials	2.38 *(59.5%)*	1.95 *(48.8%)*
	Total (Theme)	**2.8 (70%)**	**2.58 (64.5%)**

Overall, high uptake teachers exhibited superior pedagogical skills compared with the slow uptakers i.e. their instruction approaches were rated 70% satisfactory compared with 64.5% of their counterparts (low uptake teachers).

Similarly, in terms of individual items, except in the way they supported slow learners, teachers that had adopted active learning were rated favorably. These teachers were particularly good in their questioning techniques (77.3% satisfactory), were excellent in the way they monitored the learning process (75%), had superior lesson introduction (72.8%) and in logical presentation of content (72.5%).

The slow uptake teachers were however more proactive in supporting slow learners compared with the high uptake teachers (64.3% against 63.5%). This is one area that future training and teacher mentorship should emphasize.

The study also compared time utilization between the two categories of teachers. The figure below shows the findings

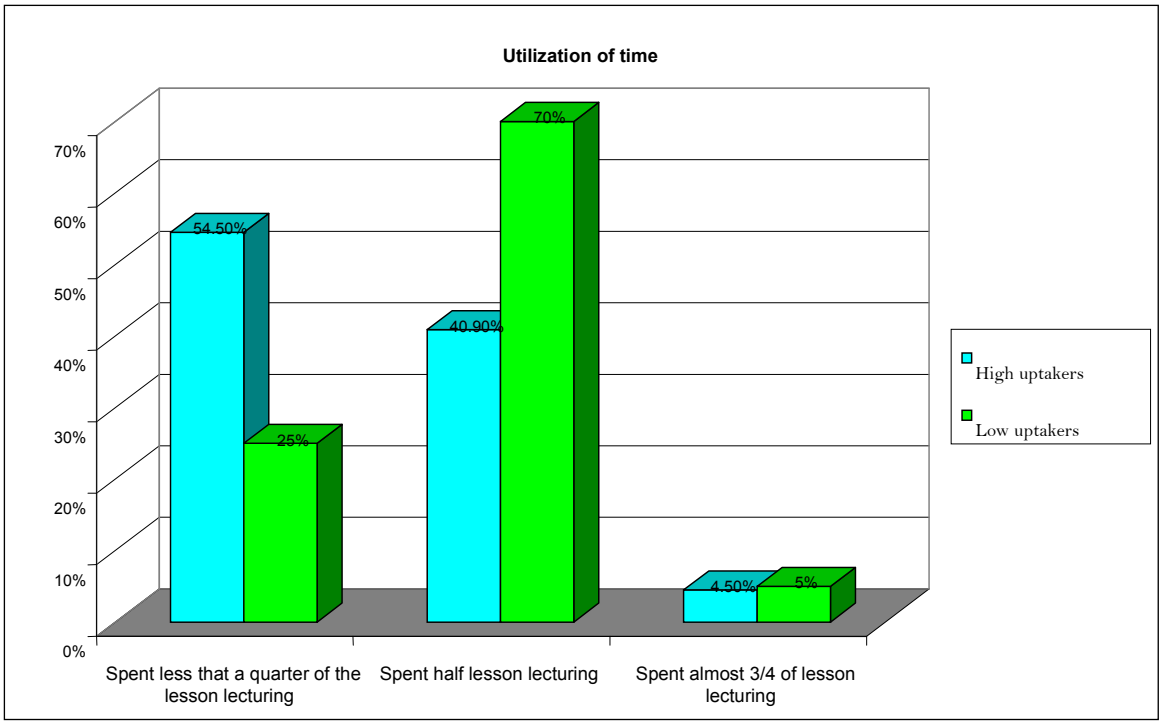

Figure 3: Time utilization

The results presented in figure 3 above show that 54.5% of the high uptake teachers spent less that quarter of the lesson lecturing, 40.9% spent half the lesson lecturing while 4.5% spent three quarters. On the other hand, 25% of low uptake teachers spent less that quarter of the lesson lecturing while a majority (70%) spent half of their lessons lecturing.

On a continuum between expository and heuristic instruction approaches, the results above indicate that teachers that had fully embraced active learning adopted instruction methodologies that leaned towards the latter as compared to low uptake teachers. However, the difference was quite marginal and was not significant[2]

3.2.3 Learner participation

In addition to pedagogy, the study also sought to analyze the effect of active learning methodology on learner participation in class activities. Table 6 below shows the items related to learner participation and how the two categories (high uptake/low uptake teachers) of teachers were rated (on a Likert scale).

[2] Chi-value of 3.88 df of 2. (<0.05).

Table 2: Learner participation

Table 3

#	Item	Rating (Satisfaction)	
		High uptake teachers	**Low uptake teachers**
1.	Children were attentive[3] to the teacher (actively listening)	3.20 *(80%)*	2.77 *(63.3%)*
2.	Children were captivated/excited[4] with the lesson	2.76 *(69%)*	2.73 *(68.3%)*
3.	Most children attempted[5] to answer questions	2.9 *(72.5%)*	2.76 *(69%)*
4.	Most children gave correct answers[6]	3.16 *(79%)*	2.76 *(69%)*
5.	Children asked questions	1.50 *(37.5%)*	1.47 *(36.8%)*
6.	There was spontaneous[7] learner contribution	2.68 *(67%)*	2.14 *(53.5%)*
7.	Children were had great rapport with the teacher	3.09 *(77.3%)*	2.86 *(71.5%)*
8.	Children interacted[8] with learning materials	2.36 *(59%)*	1.95 *(48.8%)*
9.	Children participated in role play	1.76 *(44%)*	1.48 *(37%)*
10.	Learners supported each other[9]	2.10 *(52.5%)*	2.10 *(52.5%)*
	Total (Theme)	**3.64 *(90.1%)***	**3.0 *(75%)***

The results shown in the table above reveal that children taught by high uptake teachers participated more actively in the learning process compared with their counterparts in classes taught by low uptake teachers (90.1% against 75%).

The individual items that were highly rated in the classes taught by high uptake teachers were the way the teacher sustained the attention of learners (active listening)-80%, the number of questions that learners answered correctly (79%) and the rapport that children enjoyed with their teachers (77.3%). In classes taught by low uptake teachers, the impressive items were rapport between learners and teachers (71.5%), correct answers given by learners (69%) and the way pupils were captivated by the lesson. Overall however, high uptake teachers engaged pupils more actively in the learning process compared with those that had not adopted.

3.3. Immediate outcomes of active learning

This study also set out to establish the immediate learner related outcomes of active learning i.e. comprehension of content, change in attitude towards the lesson and the teacher and other proxy indicators such as means-scores in examinations.

3.3.1 Comprehension[10] of content

Four pupils (2 girls, 2 boys) were randomly selected in each class/lesson taught by the teachers under observation. They were independently subjected to a quiz[11] relating to the content that had just been delivered by the teacher. The findings are shown in the table below.

[3] Though extensive use of lecture is strongly discouraged in active learning and a teacher good in active learning methodology uses different skills to ensure that learners actively listen and are not unnecessarily distracted

[4] Enthusiastic pupils (about the content) is a good indicator of active learning

[5] Proportion of children that volunteered to raise hands and actually gave answers was considered as another indicator of active learning. Getting the right answer was not necessarily important at this stage.

[6] An indicator that pupils are following class content keenly

[7] Children volunteered answers, opinions and ideas. This means that pupils are not passive recipients but active participants in the creation of knowledge

[8] Children learn better when allowed to exploit the potential inherent in all senses. Teachers that allow pupils to manipulate (smell, touch, test, see, create etc) learning materials make classes more exciting

[9] This implies that pupils had developed skills in constructing and using knowledge with the educator's guidance, are were not egocentric evidenced by the readiness to assist each other in small groups

[10] Ability of learners to recall/remember/understand content taught during the class session.

[11] Note that the quiz was not standard across the 48 schools but specific to the different class contexts (applicable to 4 pupils from each class); it was not possible to set a standardized test given that this was an impromptu class observation exercise ('quick and dirty') meant to find the teachers in their usual teaching environment. Also, the teachers observed were teaching different classes and subjects. A standardized test would have been more ideal.

Table 4: Mastery of content

Category		No. of correct answers given					
		Answered none of the questions Correctly	Answered one question correctly	Answered two questions correctly	Answered three questions correctly	Answered all four questions correctly	Total
Adopter	N	3	5	8	24	46	86
	%	3.5%	5.8%	9.3%	27.9%	53.5%	100%
Non-adopter	N	8	15	17	21	27	88
	%	9.1%	17%	19.3%	23.9%	30.7%	100%
Total	**N**	**11**	**20**	**25**	**45**	**73**	**174**
	%	**6.3%**	**11.5%**	**14.4%**	**25.9%**	**42%**	**100%**

The mean score of pupils taught by high uptake teachers was 3.22 (80.5%) compared with 2.53 (63.3%) of those taught by the low uptake teachers. In other words, Pupils taught by high uptake teachers scored a mean score of 80.5% on a quiz compared with 63.3% of those taught by the low uptake teachers

Further statistical tests were done to establish the validity of these results. The table below shows these findings.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.637	4	.004
Likelihood Ratio	16.084	4	.003
Linear-by-Linear Association	14.304	1	.000
N of Valid Cases	174		

At a Chi-square value of 15.637 and a degrees of freedom (DF) of 4 (9.49), the study found a significant[12] relationship between grasp of content and adoption of active learning methodology i.e. pupils that are taught by high uptake teachers are likely to grasp/recall lesson content better than those taught by low uptake teachers. These findings are consistent with Abhiyan (2006) who asserted that students instructed in an active learning environment remember up to 50% of the content of each class session while others remember only approximately 10%.

3.3.2 Performance in examination[13]

Better academic performance of pupils in class is regarded as a proxy indicator of good instruction methods. This study also sought to establish the academic performance of children taught by the two different categories of teachers, as a proxy indicator of the effectiveness of active learning methodology. The figure 4 below shows the findings:

[12] At <0.05%, double tail

[13] These results were derived from class examination records. However, these mean-scores are not extracted from standardized tests/examination results. More valid inferences can only be deduced if standardized tests/examinations are given to pupils taught by the two different categories of teachers

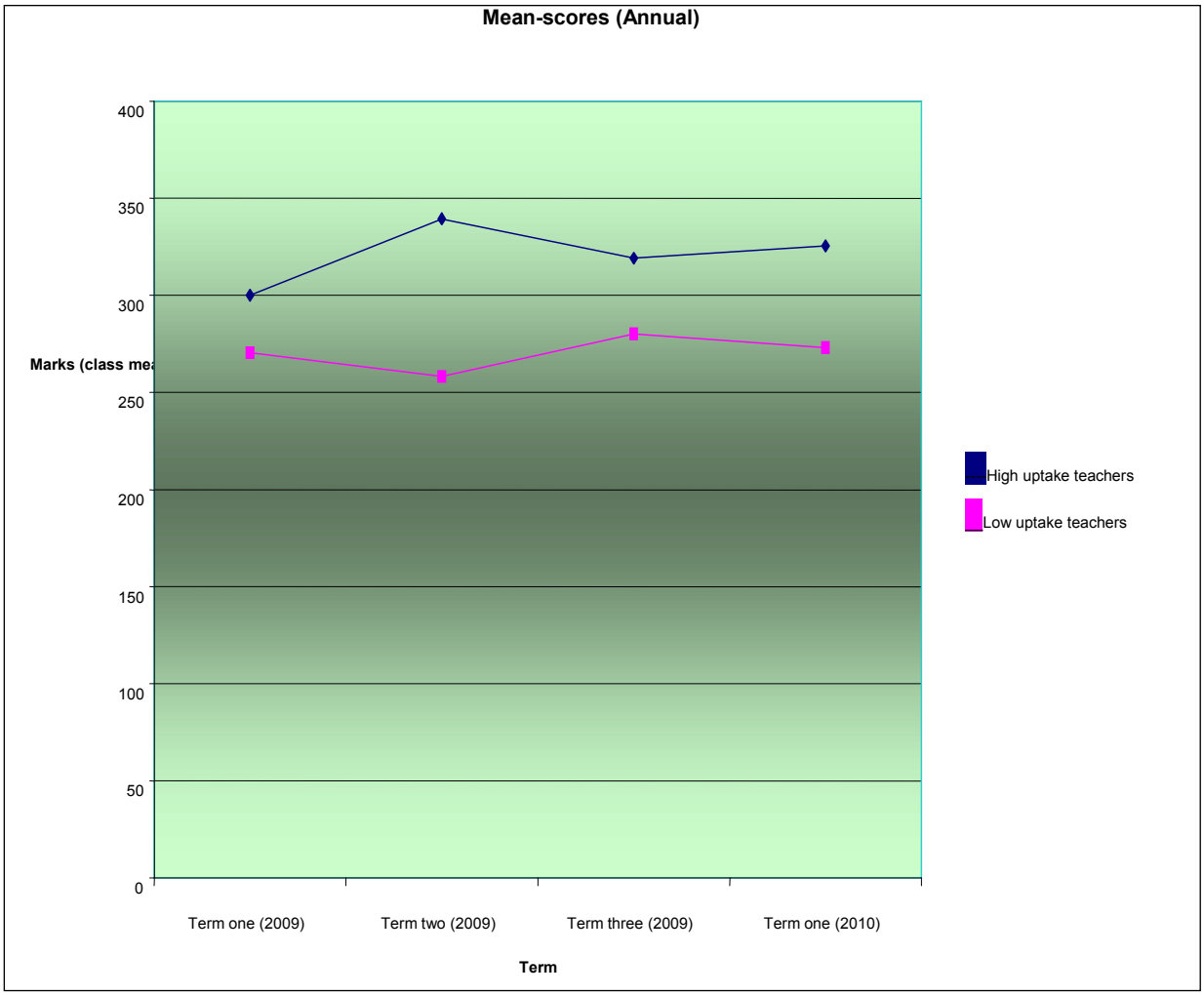

Figure 4: Mean scores

The results shown in figure 4 reveal gradual academic improvement in classes taught by both categories of teachers. However, high uptake teachers had better pass-rates (mean-scores) compared to classes taught by low uptake teachers.

3.3.2 Pupils' attitude/feedback

Table 9 shows items related to pupils' attitudes towards the lesson/teacher.

Table 5: Pupils' attitude towards lesson

#	Item	Active learning high uptake teachers		Low uptake teachers		Chi-Square	DF	Inference
		Not at all	Yes	Not at all	Yes			
1	Day's lesson was enjoyable	3.5%	95.3%	5.7%	83.9%	7.4	2	significant
2	The subject is always enjoyable/ I like the subject	2.3%	86%	9.1%	71.6%	6.27	2	significant
3	The assignments given in the lesson are easy and enjoyable to do	10.6%	80%	10.6%	64.7%	7.2	2	significant
4	Most pupils in the class find learning to be fun during this lesson	23.3%	64%	23%	48.3%	7.18	2	significant
5	Most of the pupils consider the teacher as a good instructor	2.4%	88.2%	7.0%	75.6%	4.84	2	Not significant
	Mean%	**8.42%**	**82.7%**	**11.1%**	**68.8%**			

Comparatively, 95.3% of children taught by high uptake teachers found the lessons "*enjoyable*" compared to 83.9% of their counterparts taught by low uptake teachers. Moreover, 86% of the former "*liked"* the subjects taught by active learning high uptake teachers compared with 71.6% of the latter. Also, 80% of children taught by high uptake teachers found assignments given during lessons *"easy*", 64% had "*fun"* during the lessons and 88.2% considered their teacher a good instructor/teacher. Comparatively, those taught by low uptake teachers had poor attitude in all of these items i.e. only 64.7% found the assignments given during the lessons "*easy"*, 48.3% had "*fun"* during these lessons and 75.6% considered their teacher a good instructor. Except attitude towards teacher, all the other items were significant at <0.05

Overall, 82.7% of pupils taught by high uptake teachers compared with 68.8% had positive attitudes about the subject, lesson, class environment and the teacher.

3.4 Factors that support or hinder active learning

3.4.1 Factors supporting active learning

The following is a summary of factors that teachers cited as essential in promoting active learning methodology.

Table 6: Factors supporting active learning

Factors supporting active learning	Percent *(multiple response question)*
1. Availability of learning materials	100%
2. Grouping of pupils	31.3%
3. Good approach and preparation by the teacher	56.3%
4. Support from school administration and parents	28.1%

From the table above, we deduce that availability of instructional materials (100%), appropriate teacher preparation prior to the lesson (56.3%), support from school administration and parents (28.1%) are the top-most factors necessary for active learning.

On the other hand, learners feel that the use of more attractive learning materials (16.5% responses), use of more examples (i.e. making lessons less abstract)-7.1%, and encouraging pupils to participate actively in class 7.1% are key factors for effective active learning.

3.4.2 Factors hindering active learning

The following factors were cited by teachers as the major obstacles to effective implementation of active learning

Table 7: Factors hindering active learning

Factors hindering active learning	**Percent** *(multiple response question)*
1. Large class sizes	50%
2. Inadequate learning materials	40.6%
3. Absenteeism	35.5%
4. Unsecured classrooms	25%
5. Poverty and lack of feeding programs	21.9%
6. Lack of preparation by the teacher	40.6%

Large class sizes[14] (50%), inadequate learning materials (40.6%), Lack of preparation by the teacher (40.6%), absenteeism (35.5%), poverty and lack of feeding programs (21.9%) and unsecured classrooms that lead to theft/tampering of teaching aids (25%) are the main impediments to active learning methodology. The former inhibits the group sitting arrangement necessary for active learning and makes individualized attention almost impossible-class observations revealed that some classes had up to 75-90 pupils. Active learning methodology advocates for proactive exploration by learners through interaction with learning materials. Lack of these does not spur active learning. Absenteeism affects cooperative learning and the progress of the entire class thus hindering active learning. On the other hand, unsecured classrooms lead to pilferage and distortion of the few learning materials that teachers/pupils would have produced.

3.4.3 Recommendations

Based of the above factors, respondents suggested the following;

Table 8: Recommendations

Recommendations to enhance active learning	**Percent** *(multiple response question)*
1. More learning materials to be provided	53.1%
2 . Employment[15] of more teachers	40.6%
3. Parents to participate in pupils' learning process	18.75%
4. Teachers to prepare for lessons more adequately	28.1%
5.More in-service/refresher courses	28.1%

Active Learning Methodology: implications for reforms in programs and policy

Teacher effectiveness is closely linked to among other factors, teacher training and preparation at College, follow-on support and mentoring, the quality of school governance and leadership, the availability of quality teaching and learning materials and finally to the structure and density of the school curriculum. The application and effectiveness of the active learning methodology should therefore be located within this wider context.

[14] An earlier follow-up of 34 teachers revealed that teachers effectively implementing active learning had a mean class size of between 37-40 pupils

[15] Though teacher shortage is not unique to CP and NEP, the situation is particularly deplorable in these two regions. Some schools had only 3 trained teachers

Teacher training and preparation has in recent years received considerable attention by the Ministry of Education (MOE) in Kenya in terms of both policy and program design. In order to improve mastery of subject content, the two-year primary teacher training course has been divided into two cohorts. In year one, all students must undertake 13 subjects including Physical Education and Computer literacy. In year two, students must choose one of two streams – Sciences (which include Mathematics, Science, Agriculture and Home Science) and Arts (include Social Studies and Creative Arts). English and Kiswahili languages are compulsory for both cohorts.

In addition to the theoretical input, college students must undertake an eight-week teaching practice program over the two year period after which they are assessed and certified to be teachers.

In recent years, college administrators have evaluated their teacher training programs and concluded that the eight weeks of teaching practice are insufficient in terms of producing teachers with adequate pedagogic skills and competencies. They instead recommend phasing out the current two-year primary teacher certificate course and replacing it with a three-year diploma course that will increase both mastery of content and improve teachers' pedagogic competencies.

From monitoring experience reports, practising teachers are rarely ever visited, supported and mentored by quality assurance officials from the MOE. Typically remote far-flung schools have the least chance of ever being visited. Most of the teachers that struggle with the application of active learning methodologies are consistently those in remote, far-flung locations. Some of these teachers besides having an inadequate mastery of curriculum subject matter, do not even prepare schemes of work and lesson plans. To complicate matters further, teacher absenteeism is rampant in remote rural schools thus undermining teacher-student contact time.

This study has pointed to the centrality of teaching and learning materials in the active learning process. Their availability at the classroom level coupled with their proper insertion in the teaching and learning process significantly increases student outcomes. Kenyan schools have been receiving grants from the MOE to purchase relevant teaching and learning materials since the introduction of the Free Primary Education initiative in 2003. While some schools have allocated these grants for the intended purpose, others have diverted the funds to non-classroom priorities. This situation when taken together with the problem of teachers' absenteeism and indiscipline is closely linked to the quality of school governance and leadership. Similarly, schools that do not prioritize the purchase of teaching and learning materials are typically those that experience poor governance and weak leadership.

For the active learning methodology to be fully internalized and practiced by teachers, school heads must provide leadership in both curriculum delivery and effective school management so that resources are readily available to teachers. Active learning processes involve observing, doing, manipulating, listening, discussing, reflecting and evaluating amongst other things. On the expository – heuristic continuum, teachers must tactfully play the role of facilitators, leading by example, counsellors, evaluators amongst other roles. Active learning cannot be confined to the technical aspects of teaching and learning; teachers' attitudes and motivations about their work is equally essential. They must understand the specific circumstances of their learners, empathize with the learners, guide the learners to understand the purpose of education, stir the imaginations of learners and imbue in learners the need/urge for learning. Hence a teachers value systems are as essential as his technical abilities. Teacher training colleges will need to take these factors into account when developing their teaching programs. On their part, quality assurance officers need to make regular visits support and mentor teachers in the teaching/learning process.

Due to the complex nature of the teaching and learning process, MOE must put a ceiling on the maximum number of children in a class. Experience (also corroborated by this study) is that a classroom should not have more than forty children for the active learning approach to have a significant impact on student outcomes.

MOE must prioritize training of school heads in the essentials of school leadership and management. In tandem with this, the In-Service Teacher Training (INSET) program run by MOE must place school heads at the centre of their programs. The new initiative by the MOE in Kenya to decentralize the management of INSET to district level with DEOs taking the lead on the program is a most welcome development. DEOs will of necessity have to coordinate INSET support to teachers through their quality assurance officers; hopefully this will enable them to identify and address the major constraints to the effective implementation of INSET programs as well as the entrenchment of active learning methods in schools.

In terms of strengthening school governance, MOE needs to enact policies and guidelines that will increase the participation of School Management Committees (SMCs) and parents associations in school programs. Guidelines will include opportunities for parents and SMCs to have face-to-face meetings with teachers to identify problem areas as well as areas needing parents' support.

Finally, the 8-4-4 education system and the curriculum that underpins it (especially at primary school level (first 8 years)), has over time been critized for being overloaded and for not promoting life skills education or education for self reliance. Furthermore, teachers have not been properly inducted in its implementation. The failure rates within the system lend further credence to these criticisms. Two recent studies (Are Our Children Learning by UWEZO, 2010 and The Summative Evaluation of Primary and Secondary Education Syllabuses by KIE, 2010) point to serious defects in the curriculum. This is bound to impact on the performance of teachers as well as student learning outcomes.

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