

Active Learning in Language Study and Science: Transforming Teacher Practice in North Sumatra's Elementary Schools

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Abstract

An action research project to investigate the implementation of active learning strategies to improve the quality of teaching and learning was conducted in three government elementary schools (SDN: *sekolah dasar negeri*) in North Sumatra that had received training in teaching for active learning under the auspices of the USAID-sponsored project, Decentralized Basic Education 2 (DBE2). Three cycles of data collection utilizing classroom observations, focus group discussions, and participant observation were conducted in each school. Data were analyzed both holistically and categorically to develop a better understanding of teachers' successes and challenges in teaching for active learning. Finally, an intervention strategy involving modeling of teaching for active learning strategies was designed and implemented by members of the research team in each school. Our results suggest that language and science teachers developed more confidence in utilizing active learning strategies in their classrooms as a result of the intervention. Students also appeared to respond positively to the new active learning teaching strategies employed by their teachers. We conclude that the DBE2 training provided to these schools can be considered successful; however, more attention needs to be paid to concrete factors that facilitate or impede teaching for active learning in Indonesian elementary schools in order to continue improving the quality of instruction for Indonesian children.

Abstrak

Penelitian tindakan kelas dalam rangka penerapan *active learning*, guna memperbaiki kualitas belajar mengajar, diselenggarakan di tiga Sekolah Dasar Negeri (SDN) di Sumatera Utara, yang mendapat pelatihan *active learning* lewat proyek bantuan USAID, Decentralized Basic Education 2 (DBE2). Tim peneliti menempuh tiga siklus tahapan pengumpulan data—observasi kelas, diskusi kelompok dan observasi partisipan—di masing-masing sekolah. Data dianalisa secara menyeluruh dan tematik untuk memahami keberhasilan dan kendala yang dihadapi guru dalam menerapkan strategi *active learning*. Intervensi kemudian dilakukan dengan mendemonstrasikan pengajaran berbasis *active learning* oleh anggota tim peneliti. Hasil penelitian menyebutkan, guru mata pelajaran bahasa dan sains lebih percaya diri menggunakan strategi *active learning* di kelas mereka setelah mendapat intervensi. Siswa juga menunjukkan respon positif atas strategi pembelajaran baru ini. Tim menyimpulkan, pelatihan DBE2 untuk sekolah-sekolah ini dinilai sukses; namun, perlu diperhatikan beberapa faktor riil yang dapat mempermudah atau menyulitkan pengajaran berbasis *active learning* di sekolah dasar di Indonesia demi perbaikan kualitas pembelajaran anak-anak Indonesia.

Key Words: Islamic Education, Active Learning, Religious Studies, Indonesia

Introduction

Teaching for active learning is an instructional strategy with a long history and an extensive body of literature which provides strong evidence of its usefulness in enhancing student learning

(Simons 1997; Prince 2004). While research and writing on the importance of active student engagement in their own learning dates back at least as far as John Dewey (1900) in the United States, teaching for active learning has become a topic of growing international interest in recent years with studies examining active learning in contexts as diverse as Guatemala (de Baissa, Chesterfield, and Ramos 2002), Finland (Niemi 2002), Macedonia (Sturtevant and Linch 2007), and Egypt (Herrera 2008). Teaching

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for active learning has been of interest in Indonesia as well, figuring in educational reforms since at least the 1980s. However, research on teaching for active learning in Indonesian elementary schools, particularly from the province of North Sumatra, is almost nonexistent in the international literature. This article aims to help fill in that gap and contribute to our comparative understanding of teaching for active learning in diverse international contexts.

Review of Literature

According to Michael Prince (2004, 223), active learning is defined as

Any instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing. While this definition could include traditional activities such as homework, in practice active learning refers to activities that are conducted in the classroom. The core elements of active learning are students' activity and engagement in the learning process. Active learning is often contrasted to the traditional lecture where students passively receive information from the instructor.

Active learning is an umbrella term that refers to several models of instruction that focus the responsibility of learning on learners. The social constructivist learning theory of Lev Vygotsky (1978), which stresses the importance of social interaction in learning, is an important theoretical underpinning of active learning. It conceives of learning as a social activity—interpersonal behaviors are the basis for new conceptual understandings—and learning requires student interaction and engagement in classroom activities—engaged students are motivated to learn and have the best chance of achieving full communicative competence across the broad spectrum of language and literacy skills (Wilkinson and Silliman 2001). Vygotsky (1978) saw children as constructing their knowledge from the social interaction of their learning contexts with all its possibilities and limitations. In the learning environment, therefore, it is essential that the learning atmosphere must “student-centred” so that students in this atmosphere engage in learning activities themselves and thus take on responsibility for their own learning (Abbott and Ryan 1999; Brooks and Brooks 1999; Yurdakul 2004; Bas 2008, 2009).

For more than a century, educators such as Dewey (1916) have reported on the benefits of experiential, hands-on, student-directed learning. In highly developed educational systems most teachers

know the value of engaging, challenging projects for students and plan field trips, laboratory investigations, and interdisciplinary activities that enrich and extend the curriculum. “Doing projects” is a long-standing tradition in education in such contexts (Markham, Mergendooler, Learmer, and Ravitz 2003). Highly trained teachers recognize active learning not only transfers material to students for learning, but also encourages greater mental engagement and more extensive student-student and student-instructor interaction than does a typical lecture class.

This faith in teaching for active learning as an effective pedagogical strategy is borne out by research showing, for instance, that teaching for active learning contributes to increased student enjoyment of learning science (House 2008) as well as significant learning gains (Yuretich, Khan, Leckie, and Clement 2001). During an environmental science project for rural high school students, the use of active learning curriculum materials resulted in significant improvements in both science knowledge and study skills (McGehee 2001). Further, middle school students who participated in an inquiry-based summer science program expressed more positive beliefs about science (Gibson and Chase 2002).

Teaching for Active Learning in Indonesia

Teaching for active learning strategies have been a component of Indonesian education reforms since the 1980s when *The Way of Active Learning (Cara Belajar Siswa Aktif)* was implemented in the elementary schools of several provinces. This was followed by the Learning by Inquiry initiative, which was piloted in Java between 2000 and 2005 before being replicated in other provinces as Lesson Study. Both initiatives were based on a constructivist philosophy of learning that seeks to enable students to construct knowledge from their own individual and social experience by actively engaging in and critically reflecting on their environment. More recently, active learning strategies have been advocated in the Educational Unit Level Curriculum¹ (KTSP: *Kurikulum Tingkat Satuan Pendidikan*), a curriculum reform that has been disseminated to both elementary and middle schools throughout Indonesia. In practice, however, the KTSP curriculum reform has not been clearly understood by many rank and file Indonesian educators.

Beginning in 2006, the USAID-funded project Decentralized Basic Education 2 (DBE2) was implemented in seven Indonesian provinces, including North Sumatra. Its aim has been to provide support for the Indonesian government's efforts to improve the quality of education by enhancing the quality of teaching and learning in government and private elementary schools and primary-level madrasahs. Since its inception, DBE2 has developed

and implemented six training packages for teachers and principals in 174 schools serving approximately 40,000 students across nine districts of North Sumatra. Program evaluations conducted in 2007 and 2008 have shown significant improvements in the areas of teacher planning, classroom management, instructional strategies and assessment in DBE2 schools. Student achievement and parental satisfaction have also been found to be strong in schools receiving DBE2 assistance.

For instance, assessment results in both DBE2 and control schools revealed general trends in student achievement: Grade 6 Science achievement, for example, was consistently high, with 92 percent of students at or above expected competency levels. However, persistently low outcomes achieved in both Grades 3 and 6 Math were striking, particularly in comparison to the percentages of DBE2 and control students that met or exceeded competency expectations in Language and Science. Student achievement in Language for both Grade 3 and Grade 6 is much higher than in Math with more than three-quarters of students at or above competency levels. Despite relatively high achievements in Language, however, there remains a marked downward trend in Language achievement from Grade 3 to Grade 6 in both DBE2 and control schools. Ninety percent of Grade 3 students meet or exceed Language competency. This figure reduces to 80 percent in Grade 6. The percentage of children that exceed competency in Language fall even more steeply from Grade 3 (60 percent) to Grade 6 (7 percent). These two trends suggested the need to examine not only curricular expectations but instructional practices and materials as well to help ensure children meet basic levels of language competency before exiting primary school (Education Development Center [EDC] 2010).

These assessments of DBE2 results suggested that teachers are unclear about the relationship between KTSP curriculum reforms introduced by the Indonesian government and the efforts to improve teaching and learning implemented by DBE2. Many assume that KTSP is one thing and the DBE2 program something entirely different. When they look at the active learning promoted by DBE2 they see an entirely different approach to teaching than that promoted in the KTSP curriculum reform even though active learning is an integral component of the KTSP initiative. This suggests a possible lack of understanding of active learning among teachers in DBE2 schools that may affect the dissemination of this instructional strategy in North Sumatra. In order to investigate this possible misunderstanding and, if necessary, develop interventions designed to correct it, a team of lecturers from the State University of Medan (*Universitas Negeri Medan*), several of whom were directly involved in the DBE2 project, planned and carried out an action research project in two government primary schools and

one primary school that had received DBE2 assistance in North Sumatra.

Research Sites and Cultural Context

The research team selected three primary schools (two government and one private) for its inquiry into teachers' understanding and implementation of active learning strategies in North Sumatra, a province located on the north-east coast of Sumatra which is distinguished by its religious and cultural diversity. The schools were located in the sub-district of Lubukpakam, an agricultural area approximately twenty kilometers from the provincial capital of Medan, the third largest city in Indonesia. Each school enrolls approximately 300 students whose families are primarily laborers, farmers, and low level government officials. The schools selected had received training in a joint UNESCO-Ministry of National Education initiative entitled Active, Creative, Effective and Joyful Learning (PAKEM: *Pembelajaran Aktif, Kreatif, Efektif dan Menyenangkan*). They had also participated in DBE2 training in a "foundation" training package introducing effective subject matter instruction between July and December 2007. The training was delivered in a series of four workshops: the School Team Workshop, School Headmaster Group Workshop, Teacher Group Workshop, and the School Professional Counseling Workshop.

Research Design and Methods

Our inquiry into the implementation of active learning strategies in these schools was designed as an action research project. As such, it involved multiple cycles of data gathering and analysis in order to fully understand teachers' difficulties in teaching for active learning as well as collaborative interventions designed to help teachers overcome those difficulties (Stringer 2007). Data was collected through classroom observations, interviews with teachers, and focus group discussions involving teachers and members of the school committees. Classroom observations were structured by an evaluation protocol developed by the DBE2 training module implementation team, which consisted of master teacher trainers, the district learning coordinator, the module development team, and the university advisor. The observation protocol was designed to gather information on classroom administration, classroom management, teaching strategies, use of media and learning resources, evaluation techniques, and school environment. Classroom observations were recorded for subsequent analysis. Interviews and focus group discussions were recorded, transcribed and analyzed for emergent themes that might shed light on the

challenges teachers were facing in their efforts to teach for active learning in these schools.

The first round of data collection involved classroom observations of ten teachers utilizing the observation protocol described above. Teachers were scored on five elements: classroom administration, classroom management, classroom strategies, use of learning resources, and evaluation. The school was evaluated on the basis of the overall environment. Each of the five elements was broken down into five sub-components. Teachers' performance on each sub-component was evaluated on five-point Likert scale. Observational results were as follows:

Table 1. Observation of PAKEM Progress at SDN Lubuk, Pakam, North Sumatra

No.	Teacher	PAKEM Components								
		CA	CM	CS	LR	EVA	SE	SCORE	CHATE	CHATE
1	TP	20	16	17	21	16	25	73.4	Blue	Develop
2	MP	24	15	13	14	15	25	67.0	Blue	Develop
3	KS	22	14	20	22	14	25	79.8	Green	Success
4	ER	24	15	18	21	15	25	79.6	Green	Success
5	LT	21	16	18	21	16	25	78.4	Green	Success
6	DH	16	15	14	17	15	25	65.6	Blue	Develop
7	RMR	22	14	15	17	14	25	72.8	Blue	Develop
8	MS	18	10	13	14	10	25	56.4	Blue	Develop
9	RW	18	15	17	22	15	25	76.6	Green	Success
10	AS	19	15	17	22	15	23	72.2	Blue	Develop

Notes: CA: Classroom Administration
SE: School Environment
CS: Classroom Strategy
EVA: Evaluation
CM: Classroom Management
LR: Learning Resources

As Table 1 shows, classroom observations revealed that teachers were having the most difficulty with teaching strategies and evaluation of learning, perhaps the two most important elements of teaching for active learning. To investigate this further, the research team organized focus group discussions with teachers at each school. In these focus group discussions teachers reported that evaluation processes had not been developed because they did not understand how to construct and analyze assessments appropriate for active learning strategies. The training on assessment strategies they attended was too short, in their view, to gain practice in developing appropriate evaluation tools. Moreover, the training occurred as teachers were being trained to prepare new lesson plans as part of a recently mandated transition from the Competence Based Curriculum to the KTSP, a task teachers were required to take on as an overload beyond their normal duties. As a result, teachers were still largely assessing

students' cognitive gains via pen and paper tests more suited to traditional transmission models of teaching. They had not developed more authentic assessments of other aspects of student learning such as student engagement, verbal expression, social development, et cetera. In addition, a formative test which teachers had managed to develop and utilize yielded disappointing results, further undermining teachers' confidence in their ability to teach for active learning and appropriately assess the results.

Based on our analysis of the observational and focus group data we collected, the research team identified the need for assistance in developing appropriate assessment strategies as well as the strong desire of teachers to observe active learning demonstrations by the members of the research team as potentially useful interventions. The research team therefore planned and carried out active learning teaching demonstrations in Grades 1 and 2 (thematic curriculum), Grade 3 (Bahasa Indonesia), Grade 4 (English and science), Grade 5 (science), and Grade 6 (Bahasa Indonesia and English) at two schools. Members of the research team taught the demonstration classes while teachers utilized an observation sheet drawing their attention to four elements of active learning: classroom management, learning strategies, the use of learning media, and the evaluation process. Post-demonstration reflection sessions were held in which some teachers noted differences between the research team's demonstrations and their own efforts to teach for active learning. This enabled them to reflect on their own teaching and consider alternative strategies. Other teachers felt that the demonstration confirmed their approaches to teaching for active learning, thus reinforcing their confidence that they were on the right track.

Teachers' Understanding and Use of Active Learning in Language and Science Instruction

Observations conducted in both English and Bahasa Indonesia language classes suggest that the teachers observed have learned to use active learning strategies with the thematically organized curriculum taught in Grades 1, 2 and 3. In the English class we observed the teacher provided two envelopes containing ten pictures and twelve symbols and asked students to match the symbols with the pictures as a vocabulary enrichment exercise. Students used dictionaries to find the names of animals. In a Grade 2 Bahasa Indonesia class the teacher combined Bahasa Indonesia and science instruction by engaging small groups of students in an exercise in which they were asked to use numbers and write a poem about an animal. The exercise engaged children in the creative use of language, elementary learning about common animals, and review of numbers:

Buffalo has two horns
 Buffalo has two feet
 Buffalo has two eyes
 Buffalo eats grass
 Buffalo lives on the land
 A kid is tending three buffalos
 A kid is tending buffalos in the rice field
 His sound is very loud
 Panggi's buffalos are many
 Panggi's buffalos are fat because they are eating grass.

My fat and big cow
 You eat grass so that you cannot be ill
 My cow, I promise to you
 I will feed you
 So that you are healthy and strong

My cow, every day I ride you
 But you are never angry
 You make my heart happy
 Thank you, my cow.

Though a few children seemed somewhat passive and were slow to become engaged, most were generally actively involved in the exercise.

Classroom observations and interviews with science teachers revealed that some had mixed opinions about active learning and the training they had received. Some perceived their training in active learning strategies as redundant or unrealistic in their circumstances. While some welcomed what they learned in their training as a new way to improve student learning, others saw the active learning strategies as games that simply repeated training they had received before and which did not help them teach new concepts.

In my experience teaching math it is good to repeat. It is usually difficult when you first learn a concept. Students don't understand every time they get a new concept, such as magnetism. That is what we want DBE2 to do. Don't teach us what we already know. We want to know by first watching directly how you teach a new concept. We observe. What DBE2 . . . that's a games system I think. We have never seen them teach a new concept. (Silitonga, Science Teacher, 16 June 2008)

The same teacher interpreted advice to use the environment of the school as a context for active learning activities in a fashion that made it seem unrealistic in her particular context: "Contextual

learning as I understand it means using the environment outside the school as a learning resource. This is still an obstacle. If we try to bring students to . . . for instance, a factory near here, the factory won't welcome us. So what should we do?" (Silitonga, Science Teacher, 16 June 2008). A social studies teacher who considered using the school environment to teach students how to use a map echoed her colleague's complaint about the impossibility of visiting places on the map and settled for showing children pictures of locations on the map: "Giving pictures is enough, I think. There is a picture of the local government office. Don't ask me to use the environment anymore" (Lina, Social Studies Teacher, 16 June 2008). Both teachers seem to have a narrow understanding of what constitutes the schools' environment, apparently believing that it refers to something outside of or far from the school.

Other teachers also expressed concerns about classroom management, particularly the noise resulting from group activities. One teacher complained "in my second grade class there are six students who have poor reading abilities. When we give them a task . . . in that situation . . . they work, but they are noisy. I cannot tell them to shut up, so I just let them work and make noise" (Panggabean, Thematic Teacher, 16 June 2008). It is unclear from this teacher's comment whether her concern stems from a discomfort with the inevitable noise of an active classroom when contrasted with the silence of a traditional classroom or whether it reflects a lack of classroom management skills in an active learning environment. However, it is interesting to note that she is also, perhaps unintentionally, expressing difficulty in appropriately integrating children of differing ability levels in learning activities.

Interestingly, the same science teacher quoted above who described active learning as a game and complained that the training she received did not teach her to apply the strategy in teaching new concepts reported quite happily on her use of active learning strategies to teach children about electricity. "Electricity is quite easy to teach. The tools are cheap. To find positive and negative poles there are batteries, and students can do that. Electricity is easier to teach because the tools are easy to have and they often see it" (Silitonga, Science Teacher, 16 June 2008). She also reported on her use of role playing to teach children about eclipses: "The moon is in between the earth and the sun. This can be shown using a lamp. One student stands up, another student turns around him. That's it" (Silitonga, Science Teacher, 16 June 2008). Both of these science lessons were introduced as examples of active learning in science in the DBE2 training.

Other science teachers were found to be using active learning strategies in their classrooms as well. One teacher used pieces of metal and magnets to teach the concept of magnetism. Another

teacher brought five different kinds of leaves to her class to teach fourth graders about plant structure. The students were asked to draw the leaves and note the differences in structures. This prompted them to reflect on the reasons why different leaves have different structures. A Grade 2 teacher used flowers to spark a discussion about plant diversity. Students were asked to note the parts and the colors of the various flowers and then used the flowers to practice counting from one to fifty. In one Grade 5 class the teacher asked students to bring stones from various parts of their immediate environment. Students practiced careful observation of natural objects by touching the stones, comparing their weight and texture to other stones and then drawing them and noting where they came from. When one of the researchers introduced a stone she had picked up on a recent trip to Irian Jaya, an Indonesian province at the opposite end of the country from North Sumatra on the island of New Guinea, it sparked an animated discussion on the stone and where it came from.

In each of these instances of active learning in science classes the students appeared to be actively engaged in the classroom activities. In some classes students sat in circles or worked, a little noisily, in groups with concrete objects such as plants, stones, batteries or magnets as instructional media. They kept notes in their notebooks or on colorful worksheets created by their teachers in the form of leaves, shirts, circles or rectangles. In the beginning some students asked questions in a very timid voice, as if they were ashamed to be asking question. Others, however, finished their work quickly and recorded it on their worksheets or in their portfolios. Then each group presented their reports in front of the class like junior scientists reporting their research. The teacher circulated among the groups, listening in on student conversations and examining worksheets and portfolios to assess students' progress. In this particular case, this teacher's assessment practices had moved beyond paper and pencil tests. In another Grade 5 science class the teacher used cards and collaborative group work to teach concepts such as earth, water, light, etc. Students talked with one another, consulted their books or looked back at their portfolios to develop concept maps. Once their concept maps were complete, a representative of each group presented the group's work to the rest of the class.

Conclusions and Recommendations

Many of these teachers needed to be convinced that teaching for active learning could be easily employed in their classrooms. Modelling helped to convince them, reinforcing and supporting teachers' implementation of active learning strategies to teach the concepts modelled in the training. Teachers needed to share experiences with the researchers concerning the advantages and

disadvantages of teaching for active learning. Teacher needed to observe the benefit of implementing active learning in their own classrooms. Thus opportunities to practice active learning under supervision in their own classroom, as well as the opportunity to observe others teachers, increased teachers' confidence to teach for active learning.

Our observations of teacher planning, classroom management, classroom strategies, and evaluation of learning support previous studies (e.g., Prince 2004) that have shown active learning to be an effective strategy for promoting student engagement in meaningful learning. While some obstacles remain in these three schools—teachers' misperceptions, lack of facilities, and limited experience, for instance—our study suggests that the DBE2 program's efforts to improve teaching and learning through the training of teachers in active learning strategies has made a significant contribution to the improvement of teaching and learning in Lubukpakam.

Note

1. Educational Unit Level Curriculum (KTSP: *Kurikulum Tingkat Satuan Pendidikan*) is a basic curriculum framework derived from the national curriculum for K-12 for the purpose of providing guidance in the formulation of educational unit level curriculum and syllabus to each educational unit.

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