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Working Together: How Teachers Teach and Students Learn in Collaborative Learning Environments

Mary Burns
Senior Technology Specialist, Education Development Centre, Waltham, MA, USA, *mburns@edc.org*

Elizabeth Pierson
Researcher, Education Development Centre, New York, USA, *epierson@edc.org*

Shylaja Reddy
Programme Officer, Sarva Shikshana Abhiyan, India, *shyla.reddy1@gmail.com*

Active Learning in Maths and Science (ALMS) was a six-month face-to-face professional development program for middle school maths and science teachers carried out between June and November, 2010 in two Indian states. ALMS's theory of action is grounded in the belief that collaborative learning serves as a "gateway" to learner-centered instruction. Designers theorized that this shift from individual to collaborative learning would redefine the teacher's role; alter the teacher and student relationship; change teachers' organizational, instructional and assessment practices; and begin to lay the groundwork for an eventual shift toward full learner-centered instruction. As this paper will discuss, this proposed theory of action was largely confirmed. Over 80 percent of teachers across the two states regularly implemented collaborative learning techniques and began the larger journey toward learner-centered instruction. This implementation also resulted in a number of benefits for students, including greater levels of engagement, increased confidence, and improved behavior. The research also suggests that when teachers see positive changes as a result of their actions, their deeply-held beliefs about traditional instruction may conflict with what they in fact witnessed in their classrooms. This is the beginning of the evolution of change.

Keywords: Collaborative Learning, Learner-Centered Instruction, Professional Development, Learning, Instruction.

INTRODUCTION

Active Learning in Maths and Science (ALMS) is a six-month professional development program for middle school maths and science teachers created by Education Development Centre (EDC). As its name suggests, ALMS focuses on helping teachers integrate learner-centered (or "active learning") instructional methods into their maths and science classrooms. Thus far, the program has operated in two Indian states—one located in the wealthier, south-eastern part of India, the other in the poorer, north-eastern section of the country.

ALMS's theory of action is grounded in the belief that collaborative learning serves as a "gateway" to learner-centered instruction. By "loosening" the dominant "teacher-centered" instructional paradigm so common in Indian classrooms to allow students to communicate and collaborate around a learning task, ALMS designers theorized that this shift from individual to collaborative learning would redefine the teacher's role; alter the teacher and student relationship; change teachers' organizational, instructional and assessment practices; and begin to lay the groundwork for an eventual shift toward full learner centered instruction.

This paper presents findings from the six-month pilot program that took place between June and November, 2010. A variety of methods was used to gauge project effectiveness, including teacher surveys, interviews with program support staff, teacher and student focus groups, and classroom observations. Taken together, this mixed-methods approach provides a more "robust" understanding of project implementation and outcomes than any single approach, thus capturing the depth and breadth of the intervention.

As this paper will discuss, this proposed theory of action was largely confirmed. Over 80 percent of teachers across two the states regularly implemented collaborative learning techniques and began the larger journey toward learner-centered instruction. This implementation also resulted in a number of benefits for students, including greater levels of engagement, increased confidence, and improved behavior. Implications for future professional development in India are also described.

CONTEXT

Professional Development: The Active Learning in Maths and Science Model

Active Learning in Maths and Science (ALMS) consists of a series of three five-day workshops supported by monthly classroom follow-up visits to teachers' classrooms. Session 1 focuses on collaborative learning, session 2 on project-based learning, and session 3 on strategies to promote higher-order thinking (such as open-ended questioning techniques and concept mapping). All three face-to-face sessions included a focus on instructional design. Each series of workshops—120 hours in total—largely adheres to the professional development model advanced by Joyce & Showers (1980), though with some modifications. Thus, these professional development sessions:

• Modeled the practices and behaviors teachers were supposed to adopt;

• Created learning situations through which teachers' experienced the intended practice as learners;

• Promoted teacher reflection on the learning from the point of view of learners and teachers.

In these sessions, with support from their facilitator, teachers:

• Collaboratively planned a learner-centered activity based on this practice;

• Practiced the activity with their peers and received feedback from their peers;

• Revised the learner-centered activity based on peer and facilitator feedback;

• Micro-taught the activity with peers in the role of students.

Once this sequence was completed, teachers carried out the activity in their classrooms with students, often with observation and feedback by an ALMS support person.

REVIEW OF THE LITERATURE

Defining Learner-Centered Instruction in *Active Learning in Maths and Science*

Active Learning in Maths and Science is grounded in learner-centered instruction, a pedagogical approach that has emerged primarily from constructivist learning theory and neuroscience. Heavily influenced by theorists such as Dewey (1915), Vygotsky (1978), Piaget (1958), and Gardner (1983), learner-centered instruction is essentially rooted in the notion of individual differences—awareness that learners are unique individuals who have particular and distinct ways of receiving and assimilating information, processing information, interacting with resources, and constructing knowledge. This broad concept of individual differences states that individual learners:

- *Have different learning styles*: Learners have different aptitudes and intelligences. The process of inputting, processing and outputting knowledge is unique to each learner (Gardner, 1983).
- *Possess different working styles*: Some students learn better working alone, some work better collaborating, some work better in pairs. However, embedded in this framework is the notion of learning as a socially mediated construct (Vygotsky, 1978; Bell & Kozlowski, 2008) developed through shared meaning, discussion, collaboration and negotiation.
- *Learn in different ways depending on learning resource/tools*: For example, individuals prefer some tools over others or learn optimally via a combination of tools—for example, computer, multimedia, a person, a book, etc.
- *Construct knowledge in different ways*: This may occur via inductive thinking; higher-order thinking skills—problem-solving, analysis, identifying pattern, application of learning to new situations, etc. (Barak, Ben-Chaim & Zoller, 2007).

Given such diversity among learners, no one instructional style can "reach" all students. Rather, instruction must be differentiated as much as possible to address these individual differences in working and learning. ALMS attempted to help teachers address all four of these characteristics of learner-centered instruction during the six-month professional development program.

Defining Collaborative Learning in ALMS

Within this broader conceptual framework of learner-centered instruction, ALMS professional development was also grounded in a collaborative learning approach. Indeed, as mentioned previously, this collaborative approach served as the foundation for learner-centered instruction.

Collaborative learning (Johnson & Johnson, 1988) is an instructional method characterized by the following traits:

- **Positive interdependence:** Team members need one another to complete their task. They cannot complete the activity alone.
- **Individual accountability:** Each team member is responsible for a certain part of the task or fulfills a certain role. If someone is not doing his/her job, true collaboration is absent.
- **Social skills:** Team members must learn to handle conflict, argue constructively, and disagree without being disagreeable, etc.
- **Face-to-face interaction:** Team members physically work together, in a common space, to complete their task. [1]
- **Group processing:** Team members help one another understand how learning occurred and how each team member contributed to completion of the overall product. Reflecting on learning is critical to real learning.

METHODS

Research Question

The field research was guided by the following question: *What instructional changes have occurred in teachers' classrooms as a result of the professional development they received?*

Research Design

Because it is so information rich, researchers utilized an explanatory case study to examine the research question. Explanatory cases studies use multiple sources of data as part of their construct, seeking to explain what occurred, and why and how it occurred. In so doing, explanatory case studies— via logical reasoning, explanation building, and reference to larger bodies of research—attempt to establish a clear chain of evidence, leading in theory to some degree of causal explanation of findings.

Sampling Frame

For the case study, researchers purposively selected six "key informants"—three teachers each from the two Indian states in which ALMS was implemented—to help them understand the contextual differences between teachers across educational levels, states, location, content area and populations. The demographic characteristics of the six teachers are included in Table 1.

Table 1: Sampling frame for case study teachers

	Name	*Teaching Experience (yrs.)*	*School Location*	*Students*
SE State	Teacher A	5	Rural	46
	Teacher B	10	Urban	120
	Teacher C	7	Rural	47
NE State	Teacher D	16	Rural	43

[1] Clearly, this precept is changing as the Internet facilitates collaboration across time and distance.

Teacher E	20	Rural	103
Teacher F	5	Tribal	91

Instruments

All research instruments were designed to allow researchers to examine implementation of the professional development from multiple perspectives. To do so, as much as possible, researchers utilized multiple measures, multiple indicators within measures and, where needed, multiple administrations of measures in order to fully document the outcomes of this professional development.

- *Case study teacher interviews:* Structured interviews and focus groups conducted with case study teachers upon conclusion of ALMS. Additional data were collected and interviews undertaken with case study teachers (n=6);
- *Teacher focus group protocol:* A structured focus group discussion protocol conducted with case study teachers and additional upon conclusion of ALMS. The protocol involves free response, selection of responses, rankings, nominal ranking techniques and open-ended discussion prompts (n=22);
- *Student focus groups protocols:* A set of visual and kinesthetic prompts that encouraged students to re-enact, visually identify, role play, and list the instructional practices embodied in their classrooms. Because focus groups were so novel for students and because of concerns that they might have been coached by teachers, the student focus group protocol focused on triangulating data among student groups and included some redundant activities that measured the same teacher behaviour. These focus group students were evenly divided along gender, geographic and types (rural and urban) schools (n=90).

To supplement and contextualize the above case study information, researchers also utilized two additional instruments (administered to all teachers):

- *Measures of learner-centeredness survey:* A self-reporting tool in which teachers assessed their ability to implement learner-centered methods at the beginning of the ALMS program and upon its conclusion (n=81)[2];
- *Classroom observations:* A low-inference classroom observation tool in which observers record the number of incidences of behaviours in five-minute intervals. This was carried out during baseline, mid-point and post-professional development. (n=81);

Qualitative Data Analysis Strategy

Within this case study design, researchers utilized a retroductive data analysis approach that allowed a retrospective piecing together of the factors influencing teacher change (Danermark, et al. 1997). For such an analysis, in reviewing teacher focus group and interview transcripts, researchers utilized inductive codes, generating codes to encapsulate emerging concepts, as well as deductive, theoretical codes based on a set of

[2] Because of some teacher attrition, this number is higher than number of teachers who completed the ALMS program.

prior constructs grounded in the professional development. This blending of types of codes is common practice in qualitative research and allowed researchers to find more ample information— finding material that did not fit into the existing coding frame while also finding material that supported pre-existing codes and constructs.

From coding, researchers moved to amalgamating codes based on similarities in order to create a set of categories or concepts which fed into the generation of themes. Before generating any propositions or assertions from themes, researchers triangulated themes against quantitative data; against well-established research on professional development, instruction and teacher change; and against researchers' own experiences and fieldwork in the area of teacher professional development.[3]

FINDINGS

As theorized, collaborative learning did in fact "loosen" the tight, traditional model of classroom instruction that prevailed before ALMS, distributing the locus of control and learning from the teacher to students. The specific instructional changes are discussed in this section.

Decline in Traditional Instructional Practices

Initial baseline observations revealed a predominantly, indeed exclusively, traditional approach—teacher lecture; teacher demonstration; the teacher questioning students who respond chorally with short answers; an A (teacher)-B (student) communication pattern; students working individually; and predominant, if not absolute, use of the chalkboard, notebook and teacher as the primary teaching and learning materials. For instance, among the six case study teachers, initial baseline classroom observations showed no instances of student collaboration while six months later, final classroom observations revealed 78 instances as teachers exhibited greater increase in the use of collaborative strategies, such as jigsaw approaches, learning stations, pair work and students working together in groups of three and four.

Greater Use of Teaching and Learning Materials (TLMs)

Baseline observations of all six case study teachers (and indeed of all 81 teachers) revealed essentially three types of teaching and learning materials (TLMs): the chalkboard; the teacher; and the students' notebook.[4] Yet, over the course of six months, two patterns of change emerged for teachers in terms of teaching and learning materials. First, as Figure 1 will demonstrate, teachers realized that in order to facilitate collaborative learning, they needed to carefully plan instruction, including creating multiple learning materials. Because students would now be working in collaborative

[3] Drawing on one's own expertise and insight is completely acceptable within a case study design (Stake, 1995; Simons, 2009).
[4] Baseline observations made no explicit mention of textbooks.

teams, teachers could not simply rely on traditional learning materials such as the chalkboard—rather they had to create materials that could be used and shared in a jigsaw or learner-centered activity.

In addition to the traditional TLMs used during baseline observations, teachers created or found readings, concept maps, models, and real world materials with which students could interact as part of either learning stations or jigsaw activities. For instance, one teacher made charts and "models" that students could use. To help students understand the composition of matter, this teacher also procured a number of "found" materials—rocks, sand, and wood—so students could learn about the composition of matter via a hands-on, exploratory process. Additionally, all six case study teachers to one degree or another had students create their own learning materials.

Increased Formative Assessment

The increase in collaborative learning techniques and the commensurate decline in traditional instruction, coupled with greater use of a variety of teaching and learning materials (TLMs), resulted in the rise of formative (ongoing) assessment practices, several of which are noted here in italics. For example, as students began to work in groups and interacted with TLMs, they questioned one another's beliefs and ideas (*peer assessment).* As teachers circulated among small groups of students, they observed and listened to students (*assessment by walking around*). And they did so, teachers began to observe that within these small-group formations, certain students "stood out" as knowledgeable, in ways they did not in a whole-class setting. As a result, teachers began instituting of *peer instruction* (explicitly tasking students to teach one another) and *peer assessment* (explicitly tasking students to question one another's assumptions and beliefs). Additionally, because groups were responsible for developing some sort of product, teachers also asked their students to demonstrate their group work to the whole class assessment (*performance-based assessment*). Finally the collaborative activity itself also served as an embedded form of assessment.

Increased Use of Collaborative Learning Techniques

To promote collaborative learning in their classrooms, teachers had to change classroom *inputs* (carefully plan instruction and creating learning materials that could engage students over a sustained period of time); change classroom *processes* (instructional and assessment methods and communication patterns); and change the classroom *structure* (the role of the teacher and students and interactions between both). With students increasingly working in groups and interacting with multiple—versus single—learning materials, teachers could not continue with their traditional role of standing in front of the classroom and dispensing information. Logistically it would just be impossible.

The shift toward collaborative learning arrangements meant that teachers had to also change their role. Over the course of six months, classroom observations point to teachers as facilitators of student learning. Teachers planned instructional experiences for students; circulated among groups and assisted students as needed; interacted with students on a more intimate, small-group level; and prompted students to learn from and help one another. As will be discussed in the next section, this shift toward a more

facilitative instructional role was viewed positively by case study teachers, and more importantly by students themselves, who stated that this new teacher role made the teacher more accessible and less remote and as such students felt greater comfort and less "shyness" and "fear" seeking help from their teacher. This shift in the teacher's role, also resulted in changes in teachers' communication patterns, as noted in classroom observations. Because students would be working in groups, teachers had to facilitate *group* learning and this is in turn reflected in an increase in teacher facilitation techniques.

It was noticeable to researchers that within student focus groups, students had already internalized a number of collaborative routines. They clearly knew how to form collaborative groups; distributed group roles without being told to do so; fulfilled their roles; could discuss "jigsaws" and "learning stations" (though a few groups did not know the terms but understood the concepts) and worked together to achieve consensus. This could not have occurred unless teachers were in fact utilizing collaborative techniques with some regularity.

DISCUSSION

While all teachers demonstrated changes in a number of instructional domains, it was collaboration that had the biggest impact on student engagement, student confidence, and teacher/student relationships. Additionally, of the new "suite" of teaching techniques introduced by ALMS, collaborative approaches proved to be the most accessible to and feasible for teachers. Analysis and discussion of the previous section's findings are perhaps best framed by the schema in Figure 1—a visual explanatory model constructed through information gleaned from classroom observations and focus-group discussions with case study teachers and students. As Figure 1 shows, collaboration served as the catalyst for instructional change, primarily in two highly interconnected and mutually reinforcing ways (as shown by larger orange arrows).

Changes in Teacher Behaviours and Beliefs

Teachers easily and immediately grasped the learning benefits of collaborative learning and wanted to use it. This, in turn resulted in the first real shift in teacher practice—organization and planning of lessons. As one EDC support person noted, if teachers wanted to use collaborative approaches, they could no longer, "walk in, lecture, and leave." They had to carefully plan for collaboration, develop teaching and learning materials with which students could engage in their groups, organize and sequence the lesson, and then—since students were interacting collaboratively with these TLMs—deliberately shift their role from a transmitting information to facilitating, guiding and monitoring student learning. This organization and planning resulted in greater decentralization of the teacher's role (as seen on the left-hand side of Figure 1). These three dominant teacher behaviours (Numbers 1-3: organization, creation of TLMs, and a shift toward greater facilitation), detailed in the left-hand side of Figure 1, resulted in a number of discrete practices associated with improved instruction (such as more

differentiated instruction, formative assessment, greater time on task, and peer instruction).

These changes appear to be the result of many (though not all) teachers' shifting notions of their own role and changes in their embedded beliefs. Teachers possess two sets of beliefs— "espoused" or articulated beliefs—what they say they believe or value—and deep or "embedded" beliefs— the drivers of action. It is these beliefs and values that govern teachers' classroom practices. When teachers see positive changes as a result of their actions, their deeply-held beliefs about traditional instruction may conflict with what they in fact witness in their classrooms. This is the beginning of the evolution of change.

Case study teachers spoke to researchers about their changing beliefs regarding themselves and their students. Prior to ALMS, they saw themselves as the centre of the classroom, the authority, and the only one in the room with any knowledge. They did not consider their students as capable or independent learners, and in some cases where students were of a different village, tribe, caste or class, they did not even see them as distinct individuals capable of learning. They did not understand how children learn. Since ALMS had helped teachers begin to understand the developmental nature of learning and the notion of individual differences, individual working and learning styles, and differences in intelligences and cognitive processing, understandings of their students—as individuals and learners—had shifted for many teachers:

Before this year, my students were afraid to interact with me because I stood only at the blackboard. Now, the children have become very close to me. This year I sit among the children or move around…I'm a better teacher. (Case Study Teacher B)

Thus, via professional development, by witnessing students "in action" in collaborative activities, and through greater interaction with students—individually and in small-group settings—teachers began thinking more about what was most optimal for the student as a learner. Like Teacher B, many teachers spoke of seeing students in more human terms—as unique individuals with their own personalities and preferences and as unique learners as this case study teacher noted:

The kids are lively and interested and are always motivated. In the new method I see more energy and participation too. (Case Study Teacher C)

These changes in instructional behaviours along with shifts in beliefs eventually lead to improvements in students' affective, cognitive and even conative abilities.

Explanation of Figure 1: Nodes 1-3 are dominant *teacher actions* resulting from implementation of collaborative approaches in the classroom gathered from case-study teachers. Nodes 4-6 are dominant student outcomes as a result of the teacher's implementation of collaborative practices, as revealed through focus-group discussions with students and case-study teachers. The "sub-nodes" (in yellow) emanating from nodes 1-6 are indicators that explain the larger behaviour or outcomes listed in numbers 1-6. These indicators were also gathered from discussions with case-study teachers and student focus-groups. Taken together, these form a "logic model" explaining how collaborative approaches changed teacher and student behaviour. As Figure 1 further displays, these behaviours were self-reinforcing. For example, as students showed greater engagement, taught one another and exhibited greater confidence in learning, teachers were more

likely to organize more collaborative activities, diversify the use of TLMs, and "loosen" the classroom by assuming more of a facilitative role.

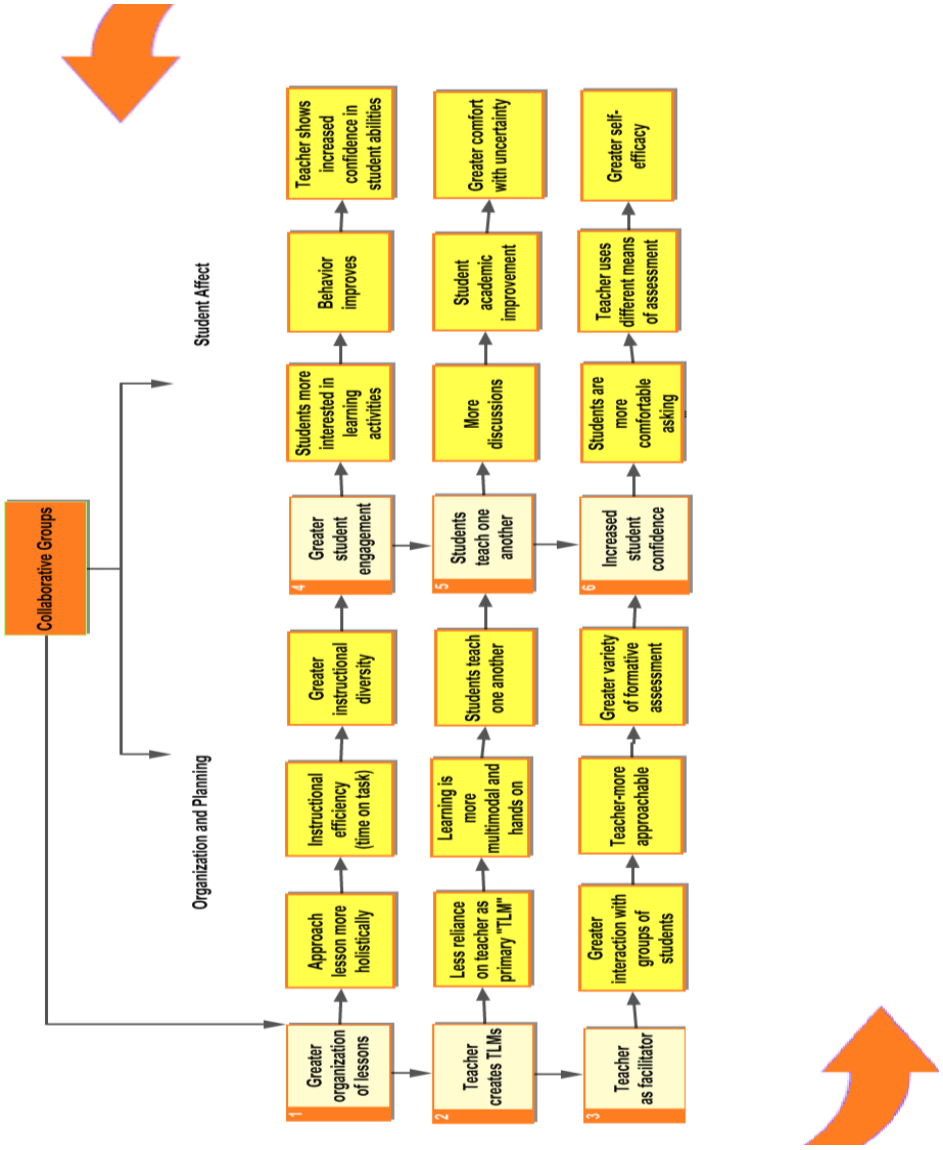

Figure 1: Logic Model—Collaboration and Changes in Teacher Behaviour and Student Affect

Changes in Student Affect

More important, perhaps, changes in teacher practice spawned the second large shift in the classroom dynamic—changes in student affect (See numbers 4-6 on the right-hand side of Figure 1). In interviews and focus-group discussions, teachers reported that students were more engaged, better behaved, and performing better academically than in traditional or non-collaborative settings. Focus-group students asserted that classes were more interesting and engaging, that they were "less fearful" of their teachers, that teachers were more approachable (since they were not standing lecturing in front of the class) and that school was less "boring." Since the interaction of students and teachers in relation to the learning process is the foundation of instruction (City, et al. 2010), we analyse the causes of this shifting teacher-student relationship in greater detail.

Just as teachers began to shift their attitudes towards their students, students began to see their teachers in a different and improved light. With students now organized in groups and more reliant upon one another, versus the teacher, for learning, the teacher became a less formidable figure for students, particularly as he/she interacted with small groups. For instance, one student shared what several had stated—that in the traditional whole-group classroom system, students were typically afraid to ask questions of the teacher:

Now) the teacher sits with our groups and it is easy to ask help from the teacher when he is in groups. We feel comfortable working in groups…Before, when we worked alone, we did not ask questions.

Students spoke of the difficulty of learning in a traditional (i.e., non-collaborative) setting. They reported that, though they tried, sitting alone and listening to the teacher was "boring" and un-engaging and their minds wandered and their bodies fidgeted. Several groups mentioned the "fear" associated with working alone—the fear of making a mistake; of being solely responsible for learning; of not having someone to help them if they didn't understand; fear of being scolded for not paying attention or getting sleepy as the teacher lectured at length; and general fear of their teacher. Said one group: "When we work individually there is fear and we are less confident." Another group of students said they wouldn't ask the teacher a question if they were working alone. But when working in a group, they felt more confident asking questions and did in fact ask more questions of the teacher. Teacher E's students may have best summarized the affective differences between working alone and individually:

With group work, we discuss with each other and when one of us does not know, then we ask one another and learn. We ask the teacher only when all of us in the group do not know. When we work individually there is fear and we are less confident. But when we work in groups we do not have fear.

Both teachers and students reported that since student behaviour was much improved in a collaborative learning environment, teachers resorted far less to physical punishment or threats of physical punishment, which in turn made students less fearful of their teachers.

Finally, this improved mutual regard resulted in greater efficacy among teachers and students. For instance, as students engaged in group-based peer instruction, they recognized that they could often explain concepts or procedures more successfully than their teachers:

Group work is more helpful for learning maths. We share with each other, we discuss, and we do not have fear. We can teach other and understand better. (Case Study Teacher D's students)

This in turn, increased their own self-efficacy—a belief in one's ability to successfully complete an endeavour and one of the keys to successful learning (Schunk & Ertmer, 2000). Again, students noted:

Last year we used to do only the problems that were easy and the difficult ones we used to omit, but now if one of us in the group knows he/she explains to us and helps us to them. We share. (Group work) is learning while playing….As roles are given work is done, roles also make us responsible and this also shared from one group to the other. (Case Study Teacher A's students)

Similarly, increased student confidence in their own abilities was accompanied by (and reinforced by) teachers' increased confidence and sense of efficacy regarding their students. As one teacher noted,

(The students) can articulate and present their learning at the end of activity. They are more responsible and they know the importance of doing something and can make working models of many things. I taught them very little about soil but they learned a lot about that since I took them outside and showed different samples of soil. (Case Study Teacher E)

Based on examination of all data, teachers' changes in instructional practice and students' responses to this change appeared to create self-generating momentum and a self-reinforcing pattern (visually displayed by the two larger orange arrows in Figure 1) — as students reacted positively to and performed well in collaborative approaches, teachers developed more collaborative activities, which in turn resulted in positive student behaviour and performance.

CONCLUSION

ALMS case study teachers demonstrated positive reactions toward the concepts of learner-centered education. Seeing their students' enthusiastic reactions to collaborative learning helped to initiate the transformation of teachers' "espoused" beliefs into "embedded" ones (Simmons et al. 1999), attitudes toward learning that motivate ongoing action. Case study teachers demonstrated excitement over their newly acquired knowledge and skills and appeared hungry for more instructional techniques, ways of thinking, and support.

Creating a comprehensive professional development system that supports teacher innovation and development is an arduous task. First steps include activities on two fronts: the state or provincial level and the school level. Education policymakers can work to formulate and broadly disseminate position statements, standards, and guidelines to provide a clear vision of classroom instruction as a transformative versus didactic process—intended to open minds, versus fill them. From focus group discussions, researchers can extrapolate certain elements of successful professional development that are confirmed by this study and that could be helpful guideposts when implementing professional development in similar locales. Successful professional development programs:

- Engage school leadership in creating a school environment that promotes instructional innovation and that supports specific professional development goals around such innovation
- Align the professional development focus with broader educational goals focused on student learning outcomes
- Link teacher professional development with student outcomes
- Target a "critical mass of teachers" in the same school
- Address teachers' ideas about learning, their roles in the classroom, the and roles of their students
- Combine various learning experiences that promote observation, direct experience, reflection, and practice
- Integrate modelling, collaboration, and learner-centered instruction
- Provide a multi-layered array of different types of support, including administrative, instructional, school community-based, family-based, teaching and learning materials, and sufficient preparation time, and vigorous follow-up that guides teachers in their approach toward change in teaching and learning

Despite the brief duration of the program, our research suggests that the professional development and support embodied in *ALMS* can serve as one model of teacher education for nations seeking to shift instruction from traditional, teacher-centered instruction to the kind of collaborative and connected instruction that prepares learners to take their place in an increasingly collaborative world of work.

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Turkish Abstract

Matematikte ve Fen Birlikte Çalışmak: Katılımcı Öğrenme Ortamlarında Öğretmen Nasıl Öğretir ve Öğrenci Nasıl Öğrenir?

Bilgisinde Aktif Öğrenme (ALMS) Haziran ve Kasım 2010 arasında iki Hint bölgesinde ortaokul matematik ve fen bilgisi öğretmenleri için düzenlenen altı aylık yüz-yüze bir profesyonel gelişim programıdır. ALMS'nin yapılmasındaki teori katılımcı öğrenmenin öğrenci merkezli öğretime hizmet edeceği inancına dayanmaktadır. Tasarımcılar bireyselden katılımcı öğrenmeye doğru bu değişimin öğretmenin rolünü tekrar tanımlayacağını; öğretmen ve öğrenci ilişkisini değiştireceğini; öğretmenin örgütsel, öğretimsel ve değerlendirme uygulamalarını değiştireceğini ve tam bir öğrenci merkezli öğretime doğru nihai bir değişim için altyapıyı oluşturmaya başlayacağını teorik olarak belirtmişlerdir. Bu çalışmanın tartıştığı gibi bu hareketin teorisi doğrulanmıştır. İki bölgedeki öğretmenlerin %80'den fazlası katılımcı öğrenme tekniklerini düzenli olarak uygulamışlar ve öğrenci merkezli bir öğretime doğru bir geçiş yapmışlardır. Bu uygulama öğrenciler için daha yüksek katılım oranları, güvenin artışı ve geliştirilen davranışların yanı sıra bir takım faydalar sağlamıştır. Bu çalışma ayrıca öğretmenlerin yaptıkları sonucu olumlu değişiklikler gördüklerinde, öğretmenlerin geleneksel öğretim hakkındaki derin bağlı oldukları görüşlerin sınıfta şahit olduklarıyla çatışabileceğini göstermektedir. Bu değişim evrimin başlangıcıdır.
Anahtar Kelimeler: Katılımcı Öğrenme, Öğrenci Merkezli Öğretim, Profesyonel Gelişim, Öğrenme, Öğretim

French Abstract

Travailler Ensemble: Comment les Étudiants Apprennent et les Enseignants Enseignent dans les Environnements d'Apprentissage Collaboratifs

L'Apprentissage actif en mathématiques et en sciences (ALMS) était un programme de développement professionel de six mois face-à-face pour les enseignants de mathématiques et de sciences de collège effectués entre juin et novembre 2010 dans deux états Indiens. La théorie de l'ALMS d'action est fondée sur la croyance que l'apprentissage collaboratif sert "d'une passerelle" à l'instruction centrée sur l'apprenant. Les concepteurs ont théorisé que ce changement de l'individu à l'apprentissage collaboratif redéfinirait le rôle du professeur; change la relation d'étudiant et le professeur; change les pratiques organisationnelles, les pratiques d'instruction et d'évaluation des enseignants, et commence à jeter les bases pour un changement final vers l'instruction centrée sur l'apprenant complète. Comme ce document discutera, cette théorie proposée d'action a été en grande partie confirmée. Plus de 80 pour cent de professeurs à travers les deux états ont régulièrement mis en œuvre des techniques d'apprentissage collaboratives et ont commencé le plus grand voyage vers l'instruction centrée sur l'apprenant. Cette mise en œuvre a aussi abouti à un certain nombre d'avantages pour des étudiants, y compris les niveaux plus grands d'engagement, la confiance accrue et a amélioré le comportement. La recherhe aussi suggère que quand les professeurs voient des changements positifs en conséquence de leurs actions, leurs croyances profondément ancrées de l'instruction traditionnelle peuvent être en conflit avec ce qu'ils ont en fait témoigné dans leurs salles de classe. Ceci est le début de l'évolution de changement.
Mots Clés: Apprentissage Collaboratif; Instruction Centrée Sur l'apprenant; Développement Professionnel; Apprentissage; Instruction

Arabic Abstract

العمل الجماعي: كيف يعلم المعلمون و كيف يتعلم الطلاب ضمن بيئة تعليمية تعاونية

كان التعلم النشط في العلوم والرياضيات برنامجا إحترافيا للتطوير لمدة ستة اشهر يقام لمعلمين المرحلة المتوسطة في العلوم و الرياضيات في المدة ما بين حزيران و تشرين الثاني, 2010 في ولايتين هنديتين. هذه النظرية تقوم على اساس الاعتقاد ان التعلم التعاوني يعتبر كبوابة لتعليمات التعلم المركزي.أصدر المصممون احكاما ان هذا الانتقال من الفردية الى التعاون في التعلم سيقوم بإعادة تعريف دور المعلم, يغير العلاقة بين الطالب و المعلم, يغير التنظيمات, التعليمات و التمارين التقييمية للمعلم, ويبدأ بتمهيد الطريق الى تغيير نهائي نحو تدريس مركزي كامل للتعلم.كما ستناقش هذا البحث, هذه النظرية المقترحة تم الموافقة عليها بشكل كبير. أكثر من 80% من المعلمين في الولايتين قامو بتطبيق اساليب التعلم التعاوني و بدأو الرحلة الاكبر نحو التدريس المركزي للتعلم. هاذا التطبيق ادى ايضا الى عدد من الفوائد للطلاب, من ضمنها مستويات اكبر من الاندماج, زيادة في الثقة بالنفس و تحسن في السلوك.يقترح البحث ايضا انه عندما يلاحظ المعلمون تغييرا ايجابيا كنتيجة لجهدهم, هذا يؤدي الى صراع بين ما يعتقدونه حول التعليم التقليدي و بين ما شهدوه حقيقة في الغرف الصفية.هذه هي بداية التطور نحو التغيير.