Improving the Practices of Cooperative Learning in Mettu University, Institute of Education and Professional Development studies: the Case of Third and Second Years Students

Dr. Tekalign Minalu (Assistant Professor) - Mettu University Institute of Education and Professional Development Studies Department of Educational Leadership and Management,

Tesfaye Kebede (MA) Lecturer Mettu University Institute of Education and Professional Development Studies Department of Adult Education and Community Development

Tewodros Asmare (MA in Curriculum and Instruction) Lecturer - Mettu University Institute of Education and Professional Development Studies Department of Adult Education and Community Development

Abstract : *The purpose of the study was to assess the outcome of the implementation of cooperative learning strategies in Mettu University, Institute of Education and Professional Development studies of two different departments. The research design applied in the study was case study research design. Non probability sampling technique that is, purposive sampling was used in the study. For the structured interview purpose 8 (one head, one vice, two department heads, two mentees, and two subject teachers) participants were selected by purposive sampling method. The sampling size was 50%. Focus groups were also used as a data collection tool and 16 cooperative learning groups comprising 80 members were selected by the purposeful sampling technique from two departments. Consequently, the total participants in the study were 88 and they participated in the study in the structured interviews and focus group discussions respectively. Qualitative data generated from interviews and focus group discussions were transcribed, coded and interpreted thematically. The findings of the study reveled that, cooperative learning methods, with the guidance of an informed teacher, will have a positive impact on student achievement. Thus, it is recommended that re-planning and organizing cooperative learning continuously to include different activities that facilitate the operations of cooperative learning together with the concepts, principles and scientific skills; providing training in the area of cooperative learning to enable learners to improve the standard of students in the achievement of their studies; developing new ways of evaluation to measure the students' achievement in the subjects the learners study; encouraging teachers to practice and use cooperative learning method in teaching of their subjects and conducting continuous studies with regards to the impact of the use of cooperative learning for all teachers on creative thinking in all areas of learners' education.*

Key words *Management, integrated functional adult literacy program, adult learners, teaching and learning processes, and learning environment*

1.1. Background of the study

Learning is generally defined as cognitive change, that is, some addition to a learner's knowledge structures or reorganization and reconstruction of that learner's existing knowledge. This change occurs as connections made between new material and prior knowledge and then integrated into the learner's existing knowledge base (Sisay Awgichew & Olani Wakjira, 2015). The more complex the learning, the more complex those cognitive changes are. According to socio-cognitive learning theory, cognitive change is strongly influenced by interaction and activity with others (Mugny & Doise, 1978, Vygotsky 1978).

Cooperative learning is defined as an instructional method in which small groups are used to maximize student teaching (Simpson, Anise V., 2010). Students work together in groups to accomplish shared goals (D. W. Johnson & R. Johnson, 1999). Many teachers are realizing the gains in student learning by transitioning from centralized discourse, in which the majority of classroom dialogue stems from teacher leadership to decentralized discourse, in which student-led discussions direct learning (Simpson, Anise V. , 2011). This is because, as stated by John O'Flahavan (1995) teachers who transfer social and interpretive autonomy to student groups often enjoy seeing their students experience, higher-order understandings and richer interpersonal relationships. Conversational discussion groups is an example of this approach to learning in which the teacher forms student in groups of four- to- six each for the purpose of allowing students to control their own social and interpretive paths to learning (O'Flahavan, 1995). During these cooperative group structure of

learning, teachers coach students both before and after students meet in groups. Also, teachers scaffold students during their group discussions (O'Flahavan, 1995). As a result, student-driven discussions of the instructional content direct the paths of learning rather than the teacher.

Although the teaching learning process is student-led, teachers must properly monitor and structure the activities for students so that chaos and misdirection does not occur during group work. Often many faculty members who are untrained in cooperative learning - teaching methodology mistakenly think that cooperative learning is achieved by simply breaking the class into small groups to work on some shared task or assignment for which a group grade is collectively earned. However, several components need to be present within the lesson to be functioning as a true cooperative learning lesson.

There is consensus among most experts that there are two components of cooperative learning: positive interdependence and individual accountability (S. Kagan & M. Kagan, 2009). Positive interdependence is the understanding among group members that each group member's efforts are required in order to learn the assigned material (D. W. Johnson & R. Johnson, 1999) whereas individual accountability is the understanding among group members that each group member is personally responsible for his or her own contributions to the group work and no group member can get a free ride on the work of others. While David and Roger Johnson advocate the use of group grades, Spencer and Miguel Kagan see it blatantly unfair for students to receive grades based on the work performance, or

lack thereof, of teammates (2009). Instead, Kagans (2009) support the practice of grading students on individual work not on group work.

The Kagans (2009) also add the components of equal participation and simultaneous interaction to qualify a lesson as cooperative learning. Equal participation occurs when the lesson is structured in a way that student participation within the group is distributed relatively equally. Simultaneous interaction occurs when the lesson is structured in a way that increases the active engagement of as many students within the classroom. Simultaneous interaction increases student engagement and participation and also save classroom time (S. Kagan & M. Kagan, 2009).

Proper formation of cooperative learning teams plays a critical role for the effectiveness of the cooperative learning strategy. Millis and Cottell (1998) report that most university and college instructors prefer heterogeneous groupings of four because students tend to stay attentive and on task and unable to hide within the small groups; and are still able to function smoothly when team members are occasionally absent. Ferguson - Patrick (2010) say that it is ideal for groups to be diverse containing students who are boys and girls, assertive and non-assertive of varying reading levels and personality types, and from different racial and ethnic groups. Ferguson P. (2010) also expresses the importance of proper group formation when quoting a teacher during a study as saying:

When we structure the groups connect to their learning it is like some students scaffold other students' learning that we

1ike if we sort of put same abi1ity groups we don't think they'd get anywhere but we will find that some students can pull other students up and support their learning things and where it gives them a bit more confidence and each other's learning.

Cooperative learning structures are content-free teaching tools with which instructors build learning experiences. Structures are independent of any curriculum and therefore can be used repeatedly with many kinds of different subject matter. Spencer Kagan is the trailblazer of the structures approach. Kagan Structures were developed and are used world-wide by tens of thousands of teachers to meet a variety of different learning objectives (S. Kagan & M. Kagan, 2009). The Kagan Structures (2009) encourage achievement and engagement as well as promote thinking and social skills. For example, the Round Robin all write consensus structure was designed to promote teambuilding, social skills, communication skills, decision-making, knowledge building, procedure learning and thinking skills. Also, the Round Robin All Write Consensus structure helps students to grow skills with presenting and processing information (S. Kagan & M. Kagan, 2009).

Besides, cooperative learning is now considered as the preferred instructional procedure at all levels of education and postsecondary educators all over the world are using it. Cooperative learning is beneficial at all levels of the education system because it maximizes student learning, particularly the learning of difficult material of a higher complexity (D. W. Johnson, R. Johnson, & Smith, 2007). Cooperative learning also prepares college students for interactions within a

professional setting in which individuals must work together as a team to reach shared goals. In a college classroom setting, cooperative learning engages students in Problem-Based Learning (PBL) scenarios in which students must learn to manage emotions such as anger or frustration in order to meet the shared goals of the team (Attie, & Baker, 2007).

Cooperative learning is also a set of methods in which students work together in small groups and help one another to achieve learning objectives (Johnson & Johnson, 2009). It is well recognized as a pedagogical practice that promotes learning, higher level thinking, pro-social behaviour, and a greater understanding of children with diverse learning, social and adjustment needs (Cohen 1994).

Researchers have shown that group learning leads to academic and cognitive benefits. Group learning promotes student learning and achievement, increase the development of critical thinking skills (Cockrell, 2000) and it promotes greater transfer of learning (Brandon and Hollingshead 1999). Group learning also aids in the development of social skills such as communication, presentation, problem solving, leadership, delegation and organization (Cheng and Warren, 2000).

It is important first to establish exactly what we mean by cooperative learning. We could say the essence of cooperative learning requires pupils to work together in small groups to support each other to improve their own learning and that of others. To work effectively certain key elements need to be in place. Five elements are essential and these are known by the acronym 'PIGS F': Positive interdependence, Individual accountability, Group processing, Small

Group and interpersonal Skills, Face-to-face interaction (Spencer K., 2009).

Cooperative learning is also different from group work. In-group work, students are put together and asked to work together to learn, to complete a group project, or to do a group presentation. Like cooperative learning, the social organization of group work is cooperative. Cooperation is the goal. However, as anyone that has worked in an unstructured group can attest, often that is not what happens. Some students may do most or all the work. Some students do little or none. Some students work independently. What is the main difference between group work and cooperative learning? Group work lacks structure. Effective cooperative learning carefully structures the interaction to ensure students work together well (Spencer K.et, al., 2009).

Ethiopian public schools starting from primary to tertiary level implementing cooperative learning in the name locally called 'one-to-five' organization even though the implementation is at its infant stage (MOE, 2010). The method was implemented with the objective of enhancing students' educational achievements in particular and improving quality of education in general. Therefore, it is sensible idea that conducting action researches in the area of cooperative learning in order to facilitate better learning environment for students of second year Early Childhood Care and Education and Adult Education and Community Development who engage in it and to enhance outcomes of the cooperative learning.

Thus, at Mettu University teaching and learning process, the reasons why cooperative learning is needed include an

increasingly diverse student population who need to develop ways of learning together in order to achieve the increased use of teaching and learning that emphasize learner-driven approaches such as peer learning or cooperative learning. Because of this reason, Mettu University, Institute of Education, Departments of Early Childhood Care and Education, and Adult Education and Community Development third and second year students are increasingly being asked by Institute of Education and Professional Development Studies to work co-operatively and learn collaboratively. This will increase emphasis on group learning is partly a reaction to Early Childhood Care and Education and Adult Education and Community Department second year changes including a new emphasis on team work in the university.

1.2. Statement of the Problem

Cooperative learning is an approach to group work that minimizes the occurrence of those unpleasant situations and maximizes the learning and satisfaction that result from working on a high-performance team. A large and rapidly growing body of research confirms the effectiveness of cooperative learning in higher education. Cooperatively taught students tend to exhibit higher academic achievement, greater persistence through graduation, better high-level reasoning and critical thinking skills, deeper understanding of learned material, greater time on task and less disruptive behaviour in class, lower levels of anxiety and stress, greater intrinsic motivation to learn and achieve, greater ability to view situations from others' perspectives, more positive and supportive relationships with peers, more positive attitudes toward subject areas,

and higher self-esteem (P.A. Mabrouk, 2007).

There are several reasons why cooperative learning works as well as it does due to the idea that students learn more by doing something active than by simply watching and listening has long been known to both cognitive psychologists and effective teachers. Cooperative learning is by its nature an active method (Olani Wakjira, 2015). Beyond that, cooperation enhances learning in several ways. Weak students working individually are likely to give up when they get stuck; working cooperatively, they keep going. Strong students faced with the task of explaining and clarifying material to weaker students often find gaps in their own understanding and fill them. Students working alone may tend to delay completing assignments or skip (MOE, 2015). Thus, in this action research, the term cooperative learning refers to students working in teams on an assignment or project under conditions in which certain criteria are satisfied, including that the team members be held individually accountable for the complete content of the assignment or project.

The proven benefits of cooperative learning notwithstanding, instructors who attempt it frequently encounter resistance and sometimes open hostility from the students. Bright students complain about being held back by their slower teammates; weak or unassertive students complain about being discounted or ignored in group sessions; and resentments build when some team members fail to pull their weight. Knowledgeable and patient instructors find ways to deal with these problems, but others become discouraged and revert to the traditional teacher-centered

instructional paradigm, which is a loss both for them and for their students (P.A. Mabrouk, 2007). This action research tries to find criteria for effective implementation of cooperative learning, challenges of cooperative learning, applications and outlines proven methods for implementing cooperative learning and overcoming common obstacles to its success for second year Early Childhood Care and Education students, and of Adult Education and Community Development.

The major purpose of this action research is to improve second year Early Childhood Care and Education and Adult Education and Community Development students' achievement by addressing issues like lack of positive interdependence among the peer groups, absence of individual accountability, and not having appropriate use of collaborative skills among the groups. For this batch there were peer groups which were formed based on the status of their CGPA of 2016 and 2017. From these peer groups the researchers took 16 peer groups; the deviations of grade assessment made for second and third year students from groups 1 up to group 16 (Group one = - 0.008; group 2 = 0.01; group 3 = 0.034; group 4= 0.1; group 5 = 0.03; group 6 = 0.028; group 7= 0.002; etc .... group 16 = - 0.016). From this data, it was understood that there were a deviation among the groups, with regards to their CGPA at peer group levels realized that at the individual level where group 6 and 10 were positive. Groups 2, 7, 9, 11, 14 were negative while 32 students have positive value; 30 students negative and 18 students fixed in their CGPAs. Hence, the researchers designed the following basic questions to investigate the problems and made

proper intervention to improve the aforementioned year level students' achievement. Thus, this action research will attempt to answer the following basic questions:

1. What is the status of the students' participation in cooperative learning?

2. What are the major challenges for low participation of students' in cooperative learning strategy?

3. What are the possible strategies that help to facilitate cooperative learning?

1.3. Objectives of the Study

The general objective of this action research is to improve achievement of second year adult education and community development, and Early Child Care and Education students through cooperative learning. In addition to this, the following specific objectives are treated.

1. To improve the status of the students' participation in cooperative learning.

2. To reduce the major challenges that hinder the implementation of cooperative learning

3. To apply possible strategies that help to facilitate cooperative learning

1.4. Significance of the study

The researchers' interest in studying about the implementation of cooperative learning is informed by the contribution of cooperative learning towards promoting working together in a group and managing the competitive activities in the classroom for second and third year students of the institute of education and professional development studies.

Moreover, its attempt is to improve the practices of cooperative learning and builds social cohesion among the students. The researchers also want to understand and gain insight into how students coming from different cultural background perceive and respect each other's idea in a classroom and what can be done to improve their relationships.

2. Methodology and Design

This study relies up on qualitative method and procedures to collect and analyse data. Case study design was used as a useful tool for investigating the trends and specific outcome of the implementations of cooperative learning strategies in Mettu University, Education Institute and Professional Studies. Thus, in this study case study is a strategy of inquiry in which the researchers explores in depth study, event, activity, process, or one or more cooperative groups. Cases are bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time (Slake, I 995 cited in John W Creswell, 2009:46). In this study, case study research design was used focusing on the implementation of cooperative learning style in the Institute of Education and professional studies related to the two departments (Early Childhood care and Education, and Adult Education and community development studies) to evaluate the outcome implementation of cooperative learning strategies in the instructional processes of the two departments. In this case the data collection techniques used was structured interview and focus group discussion.

2.1. Sampling and Sampling Size

In this study non- probability sampling specifically purposive sampling method was used because of the population elements, that is, third year, and second year (from the departments of (Adult Education and Community Development and Early Childhood Care and Education) students of Institute of Education and Professional Development study were taken on the basis of their availability.

Accordingly, data were collected from fourty second year and fourty third year students using focus group discussion. From each department, one mentor, one department head and two subject teachers, as well as from Institute of education one head and one vice head dean of the institute were purposely selected to participate in the study through structured-interview. Hence 8 respondents were participated in the interview. The data collected through, interviews and focus group discussions were analysed qualitatively. The qualitative data from the interviews and focus group discussions were used to elaborate on the issues under discussion. The procedures followed were: developing data gathering instruments, collecting data using structured interviews, focus group discussion and organization, presentation, analysing, and identifying major findings in the study.

2.2. Structured Interview

An interview is a purposeful interaction in which one person obtains information from another. Interview permit researchers to obtain important data they cannot acquire from observation alone, (Geoffrey E. Mills; & Peter Airasian, 2012:387). In the study, structured interview were used as part of the data collection specified set of questions that elicits the same information from the

respondents 8 (faculty head, vice faculty head, two department heads, two mentee, two subject teachers) given both open-ended and closed questions in a structured interview was used in the study. Closed questions used that allowed the researchers for a brief response such as yes or no, whereas open-ended questions were also used that allowed the researchers for a detailed response and elaboration. The information gathered through open-ended questions allowed the researchers to obtain important information that may otherwise be considered discrepant.

2.3.   Focus Group Discussion

According to Geoffrey E. Mills, Peter Airasian, (2012:388) a focus group is like a group interview where you are trying to collect shared understanding from several individuals as well as to get views from specific people. Focus groups are particularly useful when the interaction between individuals will lead to a shared understanding of the questions posed by a teacher researcher. In the study another valuable interview technique used were focus groups that include 16 cooperative learning groups with 80 members contributed to the research problem. To validate the study the researchers ensured that all participants in the 16 cooperative learning groups have their say and nurtured a group agreement to take turns; and group-sharing activities and not something to be dominated by one or two participants during conducting focus group discussion to encourage all participants to respond. Moreover, in the study the researchers conducted interviews with 16 cooperative learning groups having the member of 80 to capture the responses from the focus group and later themed and transcribed the discussion.

3.   Results and Discussions

In this section since action research is a form of research carried out by practitioners into their own practices and a form of self-reflective enquiry, in this study qualitative research method with case study design was used to conduct the study. Non probability sampling method with purposive sampling approach was used. Data were gathered through interview and focused group discussion. The data and information obtained through interview and focused group discussion were used in the analysis of the study to enrich the action research. The total number populations involved in study were 8 interviewee and 16 peer groups having a total member of 80.

This section answers the question how effective is the peer group learning in improving teaching and learning in 2nd year Early Childhood Care and Education and Adult Education and community Development Department students in the Institute of Education and Professional Development studies. The data collected from interview made with 2 heads; 2 mentees, 2 department head and 2 subject teachers revealed that right from the beginning formation of a group for peer learning has a problem because students who do not know each other and who don't agree to study together are forced to become the member in a group. In this case the focus group discussion results made with 16 groups having a total of 80 members (M =51, F=29) said that "it would have been good if group formation would be based on volunteer. Follow up of the advisor (mentor) was less and resources (stationary, library, internet, etc) which are required by the group are not available in the Institute of Education and Professional Development studies.

This section answers the question: *What is the status of the students' participation in cooperative learning?* The interview results collected from three-mentees revealed that "participation of group member become very low. Doing assignment and other projects rests on the shoulder of the group leaders. There are even group members who don't know the topic of the assignment. So peer group learning strategy bears its own problem. Because the majority of the group member become idle while very few students tolerate the cost of activities. Therefore, the peer group learning approach does have a lot of negative side while if it is handled carefully and supplemented by the necessary input together with timely follow-up of the concerned bodies especially by mentees, can improve the performance of students."

Above and beyond, one of the mentor said "peer learning strategy is being used towards facilitating students learning and improving team spirit among members in their 1-5 setting and in overall classmate. But the main problem in peer learning in the study showed that challenges related to mental setting of the learners." In addition, the vice dean of the Institute of Education also revealed, "Cooperative learning leads active students to carry out many responsibilities and to become over loaded. There is steel the probability to observe behavioural problems with few/some students while working in their team and students' background may come to create some kind of challenges."

This section answers the question: *What are the major challenges to low participation of the students' in cooperative learning?* What opportunities are there for peer group learning? In this case from the 16 focus group discussion (M =51, F =29) results revealed that cooperative learning create opportunities to improve social relationship, be pleased about differences and conflict management skills. However, there is a problem in responsibility sharing and materials needed are not necessarily expected to be available. Developing social skill is not only the ultimate goal of peer learning groups but it is among them. Teaching experience also matter on the use of this strategy. It is difficult to evaluate or assess individual contribution in the group activities. In addition, three mentees disclosed that "students size and physical setting matter. Then, cooperative learning promotes friendship if and only if it is managed wisely."

This section answers the question: What are the main possible *strategies that help to facilitate cooperation in learning?* the results from 16 group discussion M =51, F =29) unveiled that "peer learning to some extent require additional time and other resources which are unavailable. It may also result in negative interdependency among students." Additionally, three mentees made known that "to be fruitful in cooperative learning what matters is its management especially in the process of planning, organizing, monitoring, evaluating and getting feedback from members of the group and group leaders. It works with every student regardless of their background; it may take close supporting and follow-up. Personal commitment is mainly what cooperative learning requires, however, accessibility of classroom environment influences cooperative learning." In the end, interview made with (three mentees and one department head) given away that "assessments can be done in a variety of

ways and include daily competitions, debate, worksheets, quizzes, tests, and other types of assessment. The students must be empowered with the necessary classroom environment and continuous structuring of the 1-5 or peer learning groups have to be update from time to time in order to reach higher levels of achievement and subject content mastery. Then, cooperative learning methods, with the guidance of an informed teacher, will have a positive impact on student achievement."

4. Summary

Cooperative learning methods will most likely be one of the learning techniques teachers explore in an attempt to provide a learning environment conducive to higher student achievement. In the study the results from interview and focus group discussion revealed that in the Institute of Education and Professional Development studies the variety of cooperative learning strategies available to teachers forces each individual teacher strive to structure 1 -5 cooperative learning peer groups. Because, simply putting students in groups is not good enough and does not satisfy the expectations of effective cooperative learning; due to the fact that cooperative learning methods have a track record of positive results in the classroom. Once the proper amount of background information has been attained by the teacher, a teacher choice can be made as to which cooperative learning techniques are best suited for their classroom and students. As a specific cooperative learning method is chosen, teachers should monitor the dynamics of the group setting, place an emphasis on collaboration and motivation, and assess the mastery of learning materials by the students on a group and individual basis.

Assessments can be done in a variety of ways and include daily competitions, debate, worksheets, quizzes, tests, and other types of assessment. The students must be empowered with the necessary environment and structure in order to reach higher levels of achievement and content literacy. Finally, the study reveled that, cooperative learning methods, with the guidance of an informed teacher, will have a positive impact on student achievement.

5. Conclusion

In this study, the learning environment for the implementation of cooperative learning did not promote the active and meaningful student participation. Both students and faculty members want during the instructional process, since cooperative learning activities were not purposefully structured, particularly to help students achieve their goals in Mettu University, Institute of Education and Professional Development Studies in the Departments of Early Childhood Care and Adult Education and Community Development. This indicates that Mettu University, Institute of Education and Professional Development Studies did not adequately train teachers and students on how to properly implement *cooperative* learning methodology in learning environment. The methodology might include strategies for proper group formation, proper instructor monitoring of groups, and proper configuration of structures to ensure the cooperative learning components of positive interdependence and where individual accountability are supported.

6. Recommendations

Referring to the results of the study, the following recommendations could come up as follows:

1.   Re-planning and organizing cooperative learning continuously to include different activities that facilitate the operations of cooperative learning together with the concepts, principles and scientific skills.

2.   Provide training in the area of cooperative learning to enable learners to improve the standard of students in the achievement of their studies.

3.   Developing new ways of evaluation to measure the students' achievement in the subjects the learners study.

4.   Encourage teachers to practice and use cooperative learning method in teaching of their subjects.

5.   Conduct continuous studies with regards to the impact of the use of cooperative learning for all teachers on creative thinking in all areas of learners' education.

Acknowledgements

4.   List of References

Attie, S., & Baker, B. (2007). Cooperative learning in a competitive environment:Classroom applications. international Journal of' Teaching and Learning in Higher Education, 19,, 77-83.

Ferguson- Patrick, K. . (201 0). Cooperative learning and quality teaching: Early career teachers striving for quality. The International Journal ofLearning, 16, 385 - 400.

Geoffrey E. Mills, Peter Airasian. (2012). *Educational research : competencies for analysis.* Boston Columbus Indianapolis New York San Francisco: Pearson Education, Inc, .

Johnson, D. W., Johnson, R., & Smith, K. (2007). The state of cooperative learning in postsecondary and professional settings. Educational Psychology Review, 19, 15-19.

Kagan, S., & Kagan, M. (2009). Kagan cooperative learning. San Clemente: Author.Lawrie, S. (2008). Graphic design: Can it be something more? Report in progress. . Art Design & Communication in Higher Education, 6, 201-207.

Millis, B. J., & Cottell, P. G. (1998). Cooperative learning for higher education faculty. Westport: The Oryx Press.

Mugny, G. &. (1978). Socio-cognitive conflict and the structure of individual and collective performances. European Journal of Social Psychology, 8, 181–192.

O'Flahavan, J. F. (1995). (1995). Teacher role options in peer discussions about literature (National Reading Research Center). The Reading Teacher, 48, , 354-365.

Simpson, Anise V. (2011). An Action Research Study on Using Cooperative Learning During Graphic Design Classroom Crits. Cedarville University-Master of Education Theses & Projects School of Education, 19.

Sisay Awgichew and Olani Wakjira (2015). Action Research: Improving Students' Achievement Through Cooperative Learning. Middle Eastern & African Journal of Educational Research, Issue 18, 1-12.

Vygotsky, L. S. . (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

P.A., M. (2007). Active Learning: Models from the Analytical Sciences. Washington, DC:American Chemical Society.

Spencer Kagan Miguel Kagan. (2009). Kagan cooperative learning. Kagan Publishing.