

Structures Optimize Engagement

Dr. Spencer Kagan



There are many reasons why **Kagan Structures** consistently produce dramatic academic and social gains. Perhaps the most important reason: When teachers use **Kagan Structures** they dramatically increase both the amount of active engagement and the equality of active engagement among students. To understand why that is so, we can do a PIES analysis. That is, we can ask how structures implement the four basic principles of cooperative learning and how that in turn optimizes active engagement among students.

Core to the Kagan approach to cooperative learning are four basic principles symbolized by the acronym PIES. For each of the four PIES principles there are one or two critical questions. If we get a positive answer, we say the principle is in place. If we fail to get a positive answer, we say the principle is not implemented. Empirical studies, theoretical analysis, and years of observation and experimentation all converge on the same conclusion: If PIES are in place a wide range of positive outcomes result. If not, we cannot be assured of the positive outcomes. Implementing PIES is so important that we say PIES define cooperative learning. In the Kagan model, when PIES are not in place, we are merely doing group work, not cooperative learning. Group work does not consistently produce active engagement by all, so the gains of cooperative learning are not assured.

What, then, are the four PIES principles? They are defined by simple critical questions:

Principle	Critical Questions
P Positive Interdependence	Does the success of one benefit others? Is everyone's contribution necessary?
I Individual Accountability	Is individual, public performance required?
E Equal Participation	How equal is the participation?
S Simultaneous Interaction	What percent are interacting at once?

Let's briefly apply each principle in turn to **Kagan Structures**: first, to understand how the structures implement PIES, and second, to better understand how the structures maximize active engagement. In different ways, each principle ensures there is more active engagement for more students. The PIES principles reveal that students who otherwise might slip through the cracks become engaged when teachers use **Kagan Structures**.

Positive Interdependence

Structures Increase Active Engagement: Peer Support. Positive Interdependence has two components. The first critical question we ask is if the task we have set before our students results in a positive correlation among outcomes. **Does the success of one benefit others?** That is, have we structured the situation so that if one student does well, that will benefit other students? If so, students hope for and work for positive outcomes for each other. For example, if you score well on a test and that boosts our team score, I will be inclined to encourage you, and will be more likely to tutor you if you need help. When there is a positive correlation among outcomes, when your gain helps me, then two powerful forces are released: peer encouragement of achievement and peer tutoring.

In a traditional classroom without Kagan Structures, a teacher may have students work alone on individual worksheets. Working alone, students do not hope their peers do well. In fact they may secretly hope others do poorly so they look good by comparison. In that situation the weak student is struggling alone to learn some information or master a skill. Working in isolation, the student becomes frustrated. The student feels no peer support. No one reaches out to encourage or help. The result: The student may give up. In contrast, let's place that same student in a classroom using a Kagan Structure, say **RallyCoach**. With **RallyCoach**, students complete a worksheet together, taking turns each solving a problem while their partner serves as coach. They have the common goal of obtaining the correct answers; they know the gain of one is a gain for the other. The weak student in that situation has a coach encouraging and tutoring them. In that situation, the weak student is not likely to give up: She/he is pulled into the achievement cycle—rather than dropping out, the student becomes engaged. The structure holds the student on task, and provides support so they do not give up; engagement is increased.



Increased Active Engagement: Everyone Must Contribute. The second critical question we ask to determine if positive

interdependence is in place is whether the learning task is structured so that no one person can do it alone: **Is everyone's contribution necessary?**



It is obvious how this second critical question contributes to increased active engagement. We have all been in a group where one or two students do most or all the work while others take a free ride. To ensure cooperation of all, the task must be structured so that a contribution by each person is required for successful task completion. If a teacher gives each group a worksheet and asks them to complete the worksheet, the likely outcome in many groups is for one or two students to do most or all the worksheet. If in contrast, the teacher uses a Kagan Structure like **Showdown**, the outcome is active engagement for every student. In **Showdown**, each student does each problem on their own before receiving help. When "**Showdown!**" is called, each student shows teammates their work, and they begin the process of checking, coaching, and celebrating. In **Showdown**, no student can slip through the cracks. Similarly, if I tell two students to name as many prime numbers as they can, the likely outcome is that the stronger student will name prime numbers while the other student just listens and nods. If, in contrast, I have the students do a **RallyRobin**, students take turns giving answers. With **RallyRobin** it is almost certain both students will be actively engaged.

Individual Accountability



Increased Active Engagement: No Hiding, No Free-Riders. Individual Accountability has three components. **Is individual, public, performance required?** If we leave out any one of these three components, active engagement becomes less likely.

To see how individual accountability increases active engagement, let's contrast a learning task in which individual accountability is absent versus one in which it is present. The traditional teacher-directed question-answer approach provides an excellent example of a structure that lacks individual accountability. First the teacher asks a question of the class. Next, the hands of the high achieving students shoot up, waving. They hope to be called upon, to win teacher and peer approval, to validate their thinking, to be active. The teacher calls on one student to respond. Although an individual, public performance is required of the student who is called on, not every student had to respond. In fact, the weak students are relieved to have someone else answer, as they do not have to risk the public embarrassment of possibly failing in front of the whole class. They can hide by simply not raising their hands. In contrast, let's say the teacher chooses **Numbered Heads Together**. In **Numbered Heads Together**, after the teacher asks a question, each student writes her/his best answer and then the students compare answers and put their heads together to improve their answers. Finally the teacher calls a number and students with that number share their best answer with the class. **Numbered Heads Together** requires every student to make an individual, public performance on every round (write their own answer and show it to their teammates) and on a quarter of the rounds students are also called upon to share with their classmates. Because **Numbered Heads Together** requires an individual public performance of each student, students who otherwise would not be engaged become engaged. Without an individual public performance required, some students seek the safe harbor of not responding and become disengaged.



Equal Participation



Increased Active Engagement: Equalized Participation. The third PIES principle, Equal Participation, has us examine the equality of participation among students: **How equal is the participation?** This principle too results in more active engagement.

Let's contrast two different classroom scenarios: one in which the teacher has structured for equal engagement, and one in which the teacher does not. A teacher has presented two sides of an enduring social issue—let's say the pros and cons of capital punishment. Following the presentation the teacher says, "Discuss the issue in your teams." The result is predictable: the more articulate students, those who feel more deeply about the issue, and the more outgoing students will do most or all the talking. The less articulate, those who do not care much about the issue, and the shy students will contribute little or nothing to the discussion. If, in contrast, the teacher structured for equal participation, perhaps by doing a **Team Interview**, each student would contribute about equally. In a **Team Interview** each student in turn stands for a minute and is interviewed by their teammates, in this case they would be asked about their opinion on the issue. Notice, because **Team Interview** structures for equal participation, students who otherwise would not participate become actively engaged.



Simultaneous Interaction



Increased Active Engagement: Increased Per Student Participation. The last PIES principle focuses not on the equality of active engagement, but rather the absolute amount of engagement per student. We ask: **What percent are engaged at once?** Engagement can take the form of interaction (as when all students



ask: **What percent are engaged at once?** Engagement can take the form of interaction (as when all students are in pairs interacting) or it can take the form of individual action (as when all students are writing at once). To evaluate cooperative learning we focus on simultaneous interaction, but we consider other forms of simultaneous engagement to be important as well. (Note: When assessing percent of engagement we focus on overt actions—forms of engagement we can see or hear. When the teacher is talking, we hope all students are listening and thinking, but we cannot tell from observing them, so we do not count that as overt engagement. If in contrast all students are writing, or talking, we count that because it can be observed).

When the teacher calls on one student in the class to respond, the result is that one of the thirty learners in the room verbalizes their thoughts. This is an unacceptably low percent. All but one student in the class is somewhere between partially to fully disengaged as they look at the back of the head of the student responding to the teacher. Another common situation that lacks simultaneous engagement is the traditional approach to reading—the reading group. The teacher wants students to practice reading so she/he has students in groups. One at a time, each student reads aloud so the teacher can evaluate and coach. In a class of thirty, if the teacher did not say a word and if there were no transitions among reading groups, and no interruptions, the maximum amount of oral reading per hour a student could do is two minutes. But of course students don't get a full two minutes of oral reading because the teacher must take some of the time to give compliments or corrections. There is also time lost for transitions between groups and interruptions because most of the class is unsupervised while the teacher focuses on the one student who is reading. In contrast, let's look at what happens in the classroom of a teacher who maximizes simultaneous engagement by having students read in pairs all at once. The teacher abandons the traditional reading group and instead uses **RallyRead**. With **RallyRead**, students are seated in pairs, taking turns reading sentences or paragraphs to each other. The teacher circulates evaluating and coaching. In that situation each student reads aloud approximately thirty minutes an hour, not just two minutes an hour, and the teacher has just as much opportunity to evaluate and coach. With **RallyRead** compared to the traditional reading group there is fifteen times as much active engagement per student! Whenever we implement the principle of simultaneous interaction we dramatically increase the amount of active engagement.



Structures Increase Active Engagement Through PIES

Imagine a class without the PIES principles in place. It is a class that fails to actively engage all students. Although the teacher may be excellent at presenting the content, students are passive and they do not all interact with each other or with the content. When the teacher seeks active participation, only the volunteers respond. Participation is optional and unequally distributed. The high achievers wave their hands excitedly to get their chance to participate, but many others have tuned out. When it is time for all students to participate, to be engaged, it is during independent tasks. Interaction is discouraged. Students are indifferent about the success of classmates. There is no peer encouragement for success. Do I paint a bleak picture? Perhaps. But bleak are the learning prospects for students, especially the low achieving students, if we do not structure for regular active engagement for all students.

In contrast, imagine a classroom that makes frequent use of **Kagan Structures** and so implements the PIES principles. Students work in teams. They are on the same side. They discuss issues in teams. They solve problems together. They create products and presentations together. They disagree and reach consensus. Teammates tutor and encourage teammates who otherwise might give up, tune out, and get off task. Every student is expected to contribute; they are all regularly held accountable to their teammates, classmates, and teacher for their contributions. This is a class buzzing with active engagement. When we look at the internal dynamics of each team, we find **each student is actively engaged**.

Each of the **Kagan Structures** implements the PIES principles. In turn the PIES principles dramatically increase active engagement:

Principle	Increased Active Engagement
P Positive Interdependence	Students encourage and tutor those who otherwise might give up. Every student's contribution is necessary.
I Individual Accountability	Students who otherwise would not participate are required to respond.
E Equal Participation	Shy and weaker students are given equal time.
S Simultaneous Interaction	Per pupil active engagement is increased dramatically.

With the structures in place, no student can hide, no student can fall between the cracks. Every student is an active participant in the learning process. Structures optimize active engagement. When structures are in place, we can truly say, **"No child is left behind."**

