

in elementary physical education classes. *Journal of Teaching in Physical Education*, 29, 113–130.

Goodyear, V. & Casey, A. (2015). Innovation with change: Developing a community of practice to help teachers move beyond the 'honeymoon' of pedagogical renovation. *Physical Education & Sport Pedagogy*, 20(2), 186–203.

Slavin, R. E. (1996). Research for the future on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology*, 69(1), 43–69. <http://doi.org/http://dx.doi.org/10.1006/ceps.1996.0004>

Dyson B. and Casey A. (2016)
Cooperative Learning in Physical
Education: A Practical Introduction.
Oxon. Routledge



THE JIGSAW CLASSROOM – PUTTING THE PIECES OF COOPERATIVE LEARNING TOGETHER

Chapter overview

This chapter explores the Cooperative Learning Structure 'Jigsaw' and demonstrates the Jigsaw classroom. Included in this chapter are a number of examples and classroom resources to aid you to be a competent user of this approach inside one lesson. Specifically, this chapter gives numerous examples of how the Cooperative Learning Structure 'Jigsaw' works and how it is able to use the five elements of Cooperative Learning. In a step-by-step approach it shows how practitioners can implement and understand the five elements. For example, in using groups of students as the pieces of a puzzle in learning, this chapter shows how a lesson can be taken apart and then put together in numerous ways to aid the students in learning about and through physical activity. It shows how the students become Individually Accountable for their piece of the jigsaw and how they are also responsible to one another (or Positively Interdependent) for their piece – for without it, the picture (or in this case the learning) is incomplete. The chapter shows how students can use Jigsaw to develop their Face-to-Face Interactions and learn about working cooperatively in small groups. Finally, it demonstrates the importance of Group Processing in the co-construction of knowledge.

We believe that

1. Classrooms can be structured to position the students as key knowledge brokers.
2. Children are great judges of how to explain things that they (and therefore their peers) will understand.
3. If you trust students they will pay you back many times over.

4. Trust has to be gained by the teacher or coach as much as it needs to be earned by the students.
5. Mistrust shouldn't be the default position that it has become.
6. Kids trust the systems they know and, as pedagogues, we need to help them embrace the changes that we want and help them to understand why such changes will be better for them in the long run.

Imagine the scene

The class is noisy. They always are. But this is not the noise of inane chatter, but of children working together. Your role has been to watch Mrs. Scott teach and if you didn't know better you'd think that the children were the teachers. In fact they are, but only because they have been empowered to be so.

Walking around the gym, you find children engaged in informed discussions. Their small group and interpersonal skills are excellent; and not just those you'd expect. You taught this class a year ago and you know that they were never this cooperative or supportive when you had them. Yet, here's Jasmine working with her group and she is the one with the knowledge. No one else is interjecting and stating their opinion. They don't know what she knows and they want to. Moving on, you find three other students working in their own way with the same knowledge. It is clear that they (the student teachers) have gained something or learned something that only they know.

Mrs. Scott isn't idle either. Relieved of the need to tell the students what they are learning today (she helped the students understand that knowledge in the weeks that preceded this lesson), she is able to talk to her students and help them on an individual basis. Her interactions are facilitatory and she watches and asks questions of those in her charge. There are 'incidents' but the children play as much of role in moving beyond these as Mrs. Scott. Her role is to ask questions and she is always on hand to help the student expert, but she doesn't override them or question their judgment. She asks them questions and helps them to see the next step(s) but never in a way that undermines them. They are the experts and her role is to help and not hinder them in the new role/responsibility.

Introduction

Google defines the word jigsaw as 'a puzzle consisting of a picture printed on cardboard or wood and cut into various pieces of different shapes that have to be fitted together'. Using this idea as an analogy, and positioning the various pieces of different shapes as students and/or tasks and the learning outcome for the lesson or unit of work as the picture to be fitted together, we begin to see what a Jigsaw classroom might look like.

The task – perhaps to create a gymnastics routine or design a new net and wall game – is split into a number of 'pieces', aspects, or tasks and the students are assigned to one of these. We could divide the task into as many pieces as we want – after all, jigsaws come in many different denominations – but the prospect of a gymnastics routine being made up of 30 different movements or a new

game having 30 different facets (all of which are independently designed) is not appealing. Similarly, the prospect of one student teaching the 29 others in their class their particular 'task' is not really changing the classroom structure of one expert and 30 novices (in other words, one teacher and 30 students). Furthermore, if you are going to maintain this structure then surely it is you (as an experienced and qualified adult) who should be the expert and it would make better sense for you to do the teaching in such a classroom structure. The fact is that this is what you/we are trying to move away from when using Cooperative Learning, so we need an alternative.

Experience and research tell us that six groups of five or five groups of six students are better ways of dividing a class and maximizing learning. If we consider FIFA's (2015) research into and justification for small-sided games (as opposed to full-sided 11-a-side games), we learn a number of important things.

- Players touch the ball five times more in 4-a-side football and twice as much in 7-sided games.
- Players are involved in three times as many one-on-one situations in 4-a-side football and twice as many in 7-sided games.
- On average, in 4-a-side football, goals are scored every two minutes, and every four minutes in 7-sided games.
- Goalkeepers make two to four times as many saves in 7-a-side football than they do in 11-a-side.
- The ball is out of play for eight per cent of the playing time in 4-a-side football, 14 per cent of the playing time in 7-sided games and 34 per cent in 11-a-side football.

Expanding these notions beyond football (soccer, for some of you) and into Physical Education and community sports, we quickly see the benefits of having children and young people working in smaller groups for sustained periods of time. Indeed, you could argue that if these ideas are applied to Physical Education and community settings then it is a little ridiculous that we would seek to encourage youngsters to work in larger groups. Happily, Cooperative Learning is not focused on large groups but on small and individual learning and Jigsaw certainly looks to take advantage of these and lots of other social learning theories.

Jigsaw

Jigsaw is not about dividing students randomly (Cooperative Learning never is) but about doing it heterogeneously and for longer periods of time. Cooperative Learning uses enduring groups that can last in the short- (1–2 lessons), medium- (3–15 lessons) and long-term (15+) but even the short groupings are longer than most small-sided teams stick together in traditional teaching and coaching. The difference with Jigsaw, over other Cooperative Learning Structures, however, is that the group/class is divided not once but twice.

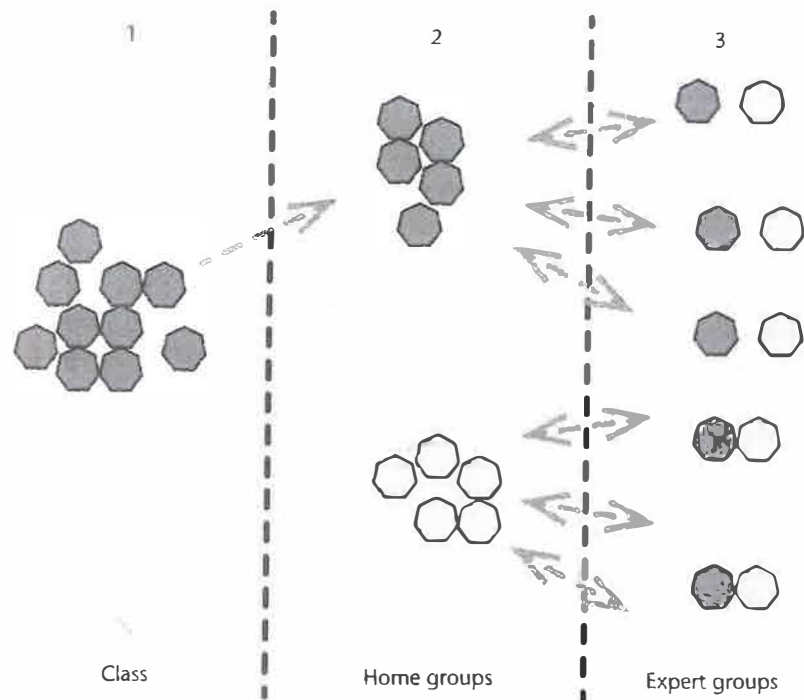


DIAGRAM 9.1 Dividing a class into a Jigsaw classroom

The first division (see Diagram 9.1) is into *home* or *base groups*. These **teams are** the heterogeneous ones and they need to be carefully selected. The rule of thumb that we always use is that every team should feel an equal mix of confidence and uncertainty. Confidence that, with a good performance in which every individual pulls together, they could beat any other team on their day. Equally they should feel that there is the very real potential to lose every game if they don't work together. It is a crude measure but it is surprising how often it is right.

Home groups are where the children will spend most of their time and these are the teams to which they should 'swear their allegiance', so to speak. Regardless of how the 'jigsaw' is divided up the children in each of these groups make up the full picture. The second division occurs when the 'jigsaw' is broken up and the children go to their *expert groups* (see Diagram 9.1). As you can see from the diagram, a class of ten becomes two *home groups* and five *expert groups*. These are ideal figures and more often than not they don't work exactly. You might end up with expert groups of six or indeed two or three groups of six and will have to double up. The important thing is that each *home group* needs to have a 'piece' in the *expert groups*. Without a representative they will have a piece missing from their jigsaw and they won't be able to complete their 'picture'.

Once the *expert groups* are divided up it is then time to give the children their pieces of the jigsaw. You don't give them the full picture but allocate each of them

a unique piece of knowledge or an aspect of the routine that they will be solely responsible for (this is Individual Accountability). If you have two members of the same *home group* in an *expert group* then you will need to manage the situation so that every child has an individual role to play. When Ash teaches Jigsaw he starts with a little word game to show how the classroom works.

A Star Wars example

Dividing the groups as above, Ash will give each *expert group* a set of five cards. On the front of these is their number (and also the position of the word in the phrase or saying he is asking them to remember) and on the back is a word (or two) from the phrase he wants them to piece together in their *home groups*. Asking the children to remain silent at all times, he asks them to distribute the cards and then return with them to their *home groups*. Silence is very important because it is very tempting to shout out, and while this wouldn't spoil the bigger task, it would certainly spoil this one.

Once they are in their *home groups* they should have started to put the phrase together. Imagine that expert group one had the word 'IN', group two had 'A GALAXY', three 'FAR', four 'FAR', and five 'AWAY'. Putting these together in the correct order gives us the expression 'In a galaxy far, far away'. This is a simple, and quick, demonstration of Jigsaw, but what it shows us is how Jigsaw works. Each student is individually accountable for his or her piece of the jigsaw and without his or her word the whole expression is incomplete. The group is positive interdependent and they have to use interpersonal interactions and small group skills to put the jigsaw together – and this is just in a simple word challenge. When the task is made much bigger then the stakes are higher but the process remains fairly much the same.

Gymnastics (or dance) example

Often we ask children to develop their own dance or gymnastic routines and then perform them in front of their peers. For those who can dance this is a great opportunity, but for others, who might lack confidence or feel inexperienced, this can be a daunting task. Making a routine is hard enough when you're proficient and experienced but to do it alone is daunting. We often ask children to learn a dance routine that we have created (or found on the Internet) and then their responsibility is simpler – learn and perform the routine. This, however, robs them of the creative opportunities that come from choreographing a routine of their own and reduces the possibility that they will be asked to perform appropriate movements (i.e. movements that stretch them but which they still feel able to do, albeit with practice). When we (as teachers and coaches) develop routines we tend to try and find the middle ground and second guess what the children can and can't do. So some are doing moves that are too easy and others moves that are too hard.

Imagine instead that we made the class a Jigsaw class. Dividing the students up into six *home groups* (each of which would perform as a group in the final performance), we could then divide the class again into five *expert groups*. Each expert group would then be responsible for creating an element of the routine in their experts groups. As these sub-routines (say, five moments or eight beats' worth of a dance) are developed the individual *experts* are developing a piece of bespoke knowledge that no one else in their *home group* is privy to. Talk about Individual Accountability.

To achieve this division of knowledge we might set up our practical space as in Diagram 9.2. By dividing the space up as shown we create expert subsets within each class and go a long way to ensuring that individuals are positively interdependent and promotive in their interactions. They would need to engage in Promotive Face-to-Face Interactions, have good Small Group Skills and engage in regular reflections through Group Processing.

Once the five *expert group* routines (in this example, gymnastics) have been created and learned, the *experts* go back to their *home groups* and undertake to teach their teammates their section of the routine. To do this we need to reconfigure the practical space (see Diagrams 9.3 and 9.4) to allow every group to practice.

Gym/sport hall set-up

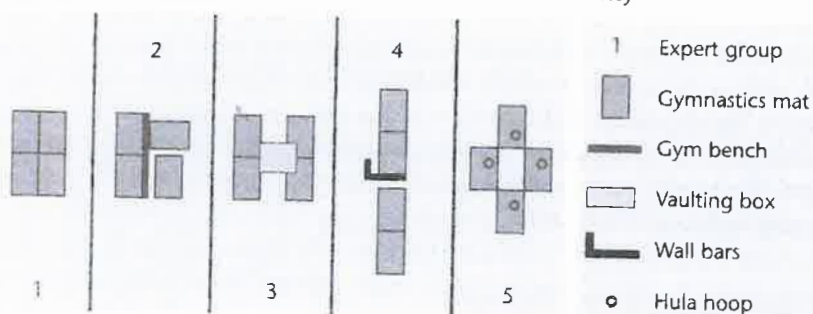


DIAGRAM 9.2 Set-up for *expert group* routine development and practice

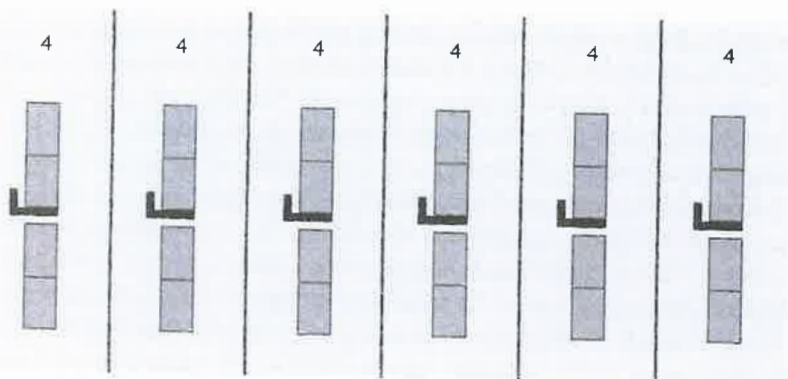


DIAGRAM 9.3 Set-up for *home group* practice (week four)

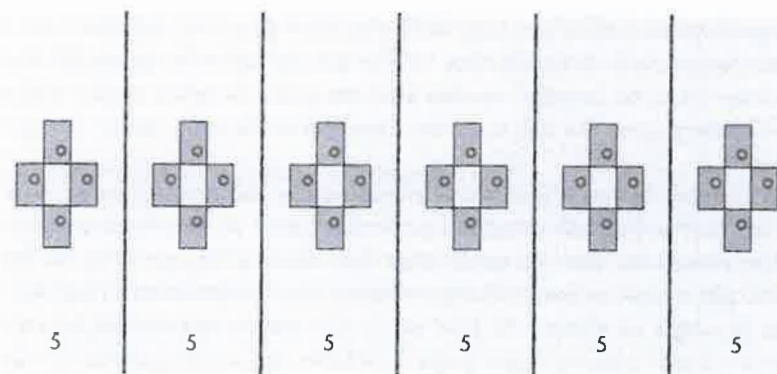


DIAGRAM 9.4 Set-up for *home group* practice (week five)

Using the space in such a way allows each *expert* to take a role in the learning of their peers. They hold a unique piece of knowledge and if they can't let their group mates in on the 'secret' then they can't succeed as a group. To put it bluntly, they sink or swim together. But what is your role? As the teacher or coach we are not suggesting that you take on the role of passive observer (this is certainly not a chance to catch up on your correspondence) but that you be the facilitator. You broker discussions and help solve disputes. You listen and ask relevant questions and you cut any potentially disruptive or non-cooperative behavior off at the pass. You don't need to know all the routines (although having the children write them down is useful) because there are many other *experts* in the room who can help teach other groups.

Once the five sub-routines are learned, then the *home groups* need to put them together and practice for their group performance. The practical space will need to be set up again as per Diagram 9.2 and the groups will need to be helped to manage the space (as there are five spaces and six groups), but experience tells us that by this stage of this cooperative process the groups are willing to work together.

Come the final performance there are *experts* around you who can help you mark the performances. They know what each section should look like and, in theory at least, every routine should be identical. The *experts* can provide feedback on accuracy, etc., leaving you to assess the key criteria you laid out at the start of the unit of work.

Games-making example

One of the things Ash likes to use *Jigsaw* for is making games, and he often does this with his students (be they elementary, high school or university students) as a simple way of introducing Jigsaw (once he's played the Star Wars word game with them). Using a similar set-up (see Diagram 9.5), he divides his classes first into

home groups (these will be the teams they play their games in) and then into *expert groups*. He then tells them that they will be playing tag or 'it' games but that the games are yet to be invented because they are going to invent them. The *expert groups* are then given the task to invent a portion of the rules (in the example, 25 per cent).

As a teacher or coach your role is to ensure that the rules are appropriate and safe and pick appropriate boundaries for the games to be played in, etc. The children should feel that the game helps them develop because they are focused on fair play, participation, self-improvement, and cooperation. That said, the games shouldn't be perfect. At least not in the first or second (maybe even the sixth or seventh) instance. Rules made in isolation are not designed to fit together seamlessly, and one of the purposes of Jigsaw games making is to find the rough edges and the sticking points where the different rules simply don't align. Then, when they return to their *expert groups*, the children can keep negotiating the rules until they find something that works. This certainly helps with Promotive Face-to-Face Interaction and Small Group Skills.

But how does it work in reality?

The expert groups start with some basic rules (and experience tells us they tend to be quite basic, although they can also be overly complicated). For example, we have seen pitches as squares with hoops as safe zones, and children running to be tagged with a single touch anywhere on the body. The 'tagged' then stand still until they are untagged by a teammate (again with a single touch). Alternatively we have seen doughnut-shaped pitches with safe zones in the center. The children are on all fours like a crab, tagging with one appendage and doing a plank when waiting



DIAGRAM 9.5 Roles for tag/tig/it games

to be freed. Neither works particularly well (as the children quickly work out) but that is why Jigsaw works so well. It is easy to go back to the *expert groups* with the *home group's* ideas and re-conceptualize the games.

The five elements in a jigsaw classroom

In the previous sections we have shown how the Jigsaw classroom works and have alluded to the ways in which the five elements might be implemented/used to help enhance the student experience. In the next section it is our aim to make this explicit, one element at a time.

Individual Accountability – Being a piece in the jigsaw puzzle that is your *home group's* final task means that, as a student, you have a responsibility to the whole group. In other words, you are accountable. There is no safety net. When the teacher provides all the instruction in a class then you can always ask someone else nearby for some help. If you daydream or 'switch off' then someone can help you. In a Jigsaw classroom this is not so easy. To ask for help you have to do it a little more overtly and this means acknowledging that you don't know. Put simply, if you don't know and can't help your group then your group will sink rather than swim through their task.

Positive Interdependence – Dividing up knowledge into bespoke and yet isolated pieces means that not only do you hold your students Individually Accountable, you also make them Positively Interdependent. Jigsaw moves the classroom away from a dependence on one expert (i.e. the teacher or coach) and creates multiple experts instead. Each group has their own expert; four or five of them in fact. This means that to swim they need to rely on one another. This means facilitating interactions and working together to achieve a group goal.

Promotive Face-to-Face Interaction – Promotive follows on and complements positive. In their interactions in their *expert* and *home groups* students need to negotiate ideas and understanding. They are in close proximity to one another – toe-to-toe and face-to-face in fact – and it would be easy to resort to telling each other what to do and being 'bossy'. Instead they need to help each other to understand their new *expertise* and then they need to help their peers. When they are learning they need to be able to ask questions and challenge one another, but in a way that enhances their understanding. When they are teaching they need to be patient and help their group mates to understand. Above everything they need to promote each other's successes, support, encourage, and praise each other.

Small Group and Interpersonal Skills – It would be easy to assume that 'Small Group and Interpersonal Skills' is just another way of saying Promotive Face-to-Face Interaction. But it isn't. Working 'cooperatively is inherently more complex than competitive or individualistic learning' (Johnson et al., 1994, p. 10) because students must also understand how to provide leadership and manage

conflict. They need to make decisions, build trust, and communicate their ideas.

Group Processing – In trying to achieve all of the other elements the students need time to reflect on their achievements and discuss how they can move forward together. In our previous book we argued that Group Processing provided the foundation that underpinned the model in Physical Education (Casey & Dyson, 2012). Indeed, in the same book, Lafont (2012) found that those who engaged in frequent social interactions between sequences of play turned out to be more effective than those who just performed. Giving children a chance to talk through their learning is often seen as being contrary to the movement-rich Physical Education we desire. Yet it has been shown that Group Processing helps them to continuously improve their learning and helps them to work together.

It is important to remember that using Cooperative Learning requires deliberate action on your behalf. These five elements don't just help the students to work cooperatively, they help you deliberately create Cooperative Learning between and amongst your students.

Self-processing / A time to reflect

Self-processing questions

1. Jigsaw is about dividing up the learning you want the students to do into equal and well-considered parts. We have used examples from gymnastics and games making but anything should work. Different shots in badminton or defensive formations in basketball would work equally well. How would you do this?
2. When placing the students into Jigsaw groups and asking them to develop a new expertise it is important that you don't undermine them. If you need to talk to them then do so in a way that helps them to maintain their expertise. How can you ensure that they take ownership and develop their expertise?

Our reflections

Ben

I have found that when you mention Cooperative Learning to folks they often think of cooperative games or group work. But when you say, 'Have you heard of Jigsaw?' they often say, 'Yeah we've done that before.' When you ask the details their answers vary a great deal. Now that might make you think 'Great! You know different kinds of jigsaw.' But unfortunately most of the time people have a poor understanding of Jigsaw and they certainly don't have the ability to adapt and modify it as Ash has in this chapter. Jigsaw is a great example of a Cooperative Learning Structure and perhaps the most recognizable, so enjoy playing with it.

Ash

I love using Jigsaw and from the very first time I used it it has remained a personal favorite. I think it's a great springboard into using Cooperative Learning and into more extravagant and risky uses of the model. It really helps you to get your head around the five elements (at least it did with me) and the different groups and roles help the students to understand what it means to learn Cooperatively.

References

- Casey, A. & Dyson, B. (2012). Putting cooperative learning and physical activity into practice with primary students. In B. Dyson & A. Casey (Eds.). *Cooperative learning in physical education: A research-based approach* (pp. 59–74). London: Routledge.
- FIFA. (2015). Small sided matches. Retrieved from <http://www.fifa.com/aboutfifa/footballdevelopment/technicalsupport/grassroots/smallsidedmatches.html>
- Johnson, D. W., Johnson, R. T., & Holubec, E. (1994). *Cooperative learning in the classroom*. Alexandria, VA: ASCD.
- Lafont, L. (2012). Cooperative learning and tutoring in sports and physical activities. In B. Dyson & A. Casey (Eds.). *Cooperative learning in physical education: A research-based approach* (pp. 136–149). London: Routledge.

