Game-as-teacher: Using a constraints-led approach to make games fair, fun and for everyone
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Key concepts

Game-as-teacher refers to learning to play the game through progressions of sub-games known as sandboxes (Gee, 2007). This means that the "game" is set as the condition for the emergence of complex learning. So rather than breaking a game into parts (e.g., skills, rules, strategies and tactics) the game is seen as a system of interacting and adapting sub-systems. Understanding the game as a whole system creates the conditions for the complexity of a game to emerge from learner/task/environment inter-action (Hopper & Sanford, 2009).

GAME PERFORMANCE = TACTICAL AWARENESS + (SKILL SELECTION + SKILL EXECUTION)

Game Modification – Constraints based – Space, Task, Equipment (object) & Players.

- Representation (Rep) = Representation refers to mini games developed with the key features and tactical problems of the adult game but played with modifications to suit the learner's size, age and ability, i.e., mini tennis in the service boxes with a sponge ball, or 3 on 3 soccer with two small goals.
- Exaggeration (Exagg) = Exaggeration refers to game structures or rules modified to stress a tactical problem in the game that requires the players to read the situation and apply skills to address the problem, i.e. long narrow court in badminton to stress deep shots and drop-shots.
- Adaptation (Adapt) = Adaptation refers to the game modified to increase the challenge to a successful player based on the outcome of the previous game. Changes can be made in relation to the constraints of the game such as space, scoring, rules conditioning play or number of players, in order to ensure the outcome of the game is close, for the unanticipated to happen through game play.

READY (same as RECOVER)

READ: Deciding what to do based on cues in game situation

RESPOND: Preparatory movements by player as opponent executes on-the-ball skill.

REACT: As object enters player's play area adjustments made to set up execution of on-the-ball skill.

RECOVER: Appropriate preparation movement to begin cycle again.

Base – set-up position to start point and continue in play.

Decision - making appropriate movements based on choices about what to do with the object or when defending space.

Cover - defensive movement in relation to object being played by an opponent based on opponent's target area.

Adjust - movement of player forward, backward or to side, as required by the play of the object in the game.

Skill - efficient performance of selected skills.
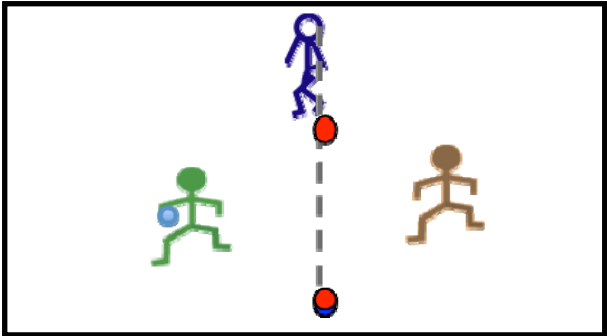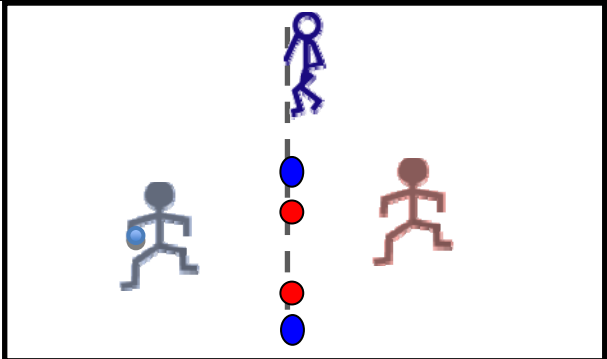
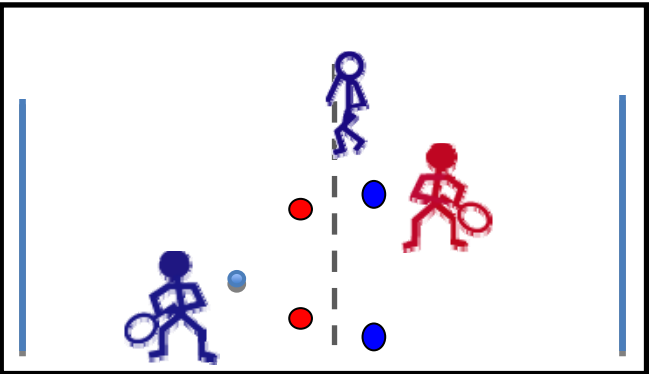Base - recovery position between skill attempts.

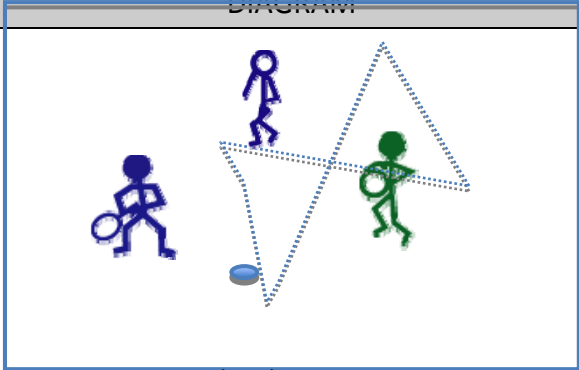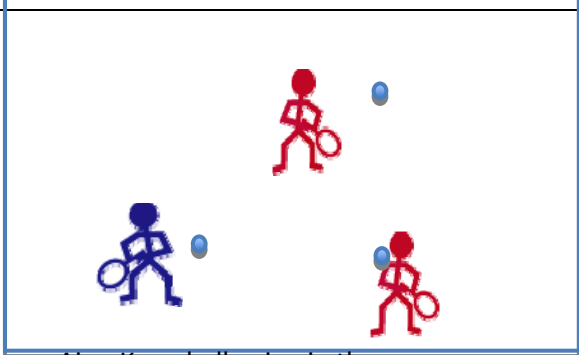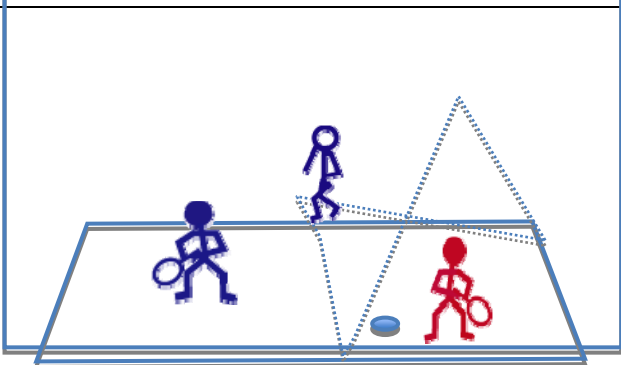**GAME-AS-TEACHER complexity theory and video game concepts**

	Complex system attributes	Learners as agents of system learn best when there is:	Teachers as agents of learning system promote complexity when:
Self-organizing	**Energy exchange** between learners, system they create together and the environment	*Conditions offering affordances to the learner, through multiple feedback loops, that allows them to adapt successfully.*	*Focus on creating the conditions, with feedback loops shifting the system back and forth from in-control (stable) to out-of-control (unstable), necessary for learners to experiment and exceed themselves*
	Complex systems are made up of **nested self-similar simpler systems**	*Anticipation by learners that engagement in simpler self-similar systems, affording and discouraging certain sorts of actions and interactions, will allow them to access more complex systems.*	*Create conditions for learning that reflect an understanding that complex systems are unities with common features that can be represented by nested, self-similar and simpler systems.*
Adaptation	**Skills learned in context** through participating in comingling roles	*Learning in context means the learner is engaged as an agent in the activity of the system with other agents. As agents take on legitimate roles they develop, through adaptation, skills to enable the activity of the system*	*Design lessons that acknowledge skills as an expression of distributed knowledge located in the activity that can only be learned in roles associated (a game identity) with the activity of the system.*
	Agents' adaptive actions **structurally determined**	*Structurally determined activity through adaptation to constraints in a context that is proscriptive*	*Acknowledge in their teaching that complex agents' responses are dependent on, but not determined by, environmental influences*
Emergent	**Neighborly interactions** based on redundancy	*Enabling connections between agents allowing dynamic adjustments to the conditions affecting the system*	*Facilitate neighbourly inter-actions between learners through feedback, demonstration and encouraging purposeful interactions*
	Diversity for **generative possibilities**	*Opportunities to take advantage of randomness in environment, leading to generative possibilities as learning emerges stabilizing the system*	*Focus learners in the system on the emergent moments (occasions) when their actions in the system successfully 'fall together' in ways that cannot be fully anticipated*
	Constraints based on simple rules that proscribe system opportunities	*Emergent decentralized control as they adjust to rules and the conditions of the environment.*	*Design enabling constraints that determine the balance between sources of coherence that allow learners to maintain a focus, and sources of difference that compel the collective of learners to adjust as learning emerges.*

Video games

a. Aspect of play – reading play, able to engage with game equipment, work with others, increasing levels of challenge
b. Taking Risks – playing more than winning, readiness to engage in challenge, safe and comfort in environment
c. Trying again and again – repeat section of game with changes, meaningful, self-selected, self-improve, can manipulate
d. Rules – set play-space, can adapt with mutual consent, confidence in knowing how and why to adapt
e. Feedback – ways to improve, desire to learn, helpful teacher/player, positive and increasing, not suggesting failure but way forward
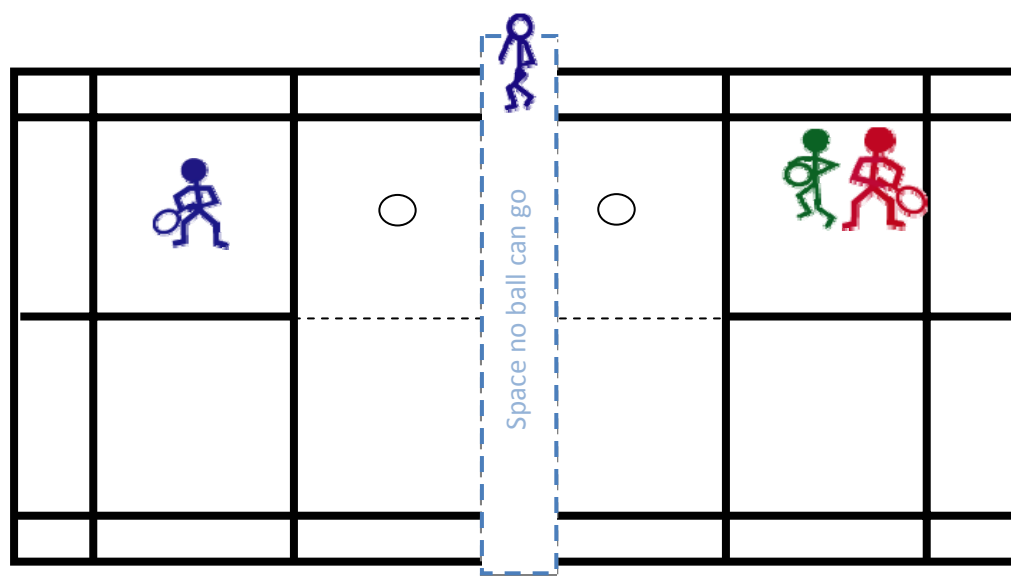
PRACTICAL SESSIONS – Designing enabling constraints

NAME	DIAGRAM	Rules - Constraints	Equipment use & Objects		Game-as-teacher feedback
Line Game Exagg.	Aim: 1. Make partner move. 2. Score 3 points	1. Catch ball then bounce between markers on your side of line. 2. Lose point if drop ball or it bounces on your side of line before you catch it. 3. Ball must be sent from above shoulder height immediately from place ball caught.	*4 markers* *Hand Catch* *One-touch control then hand strike*	Sponge ball Transition ball	1. *Remind to throw between markers* 2. *Make sure throw from should height or above* 3. *Must throw from place catch ball and throw as soon as control ball.* Space: Send to space. Force: Drop short (soft throw) then position close (read) **Base between points.**
Line game Adapt	Aim: Score 3 points then winner adapt game	1. As above, if player gets to 3 then either a. increase line for other opponent to aim at, or b. decrease line winning player to aim at. 2. Players can catch then self-feed to strike back 3. Players can strike ball with hand.	*Catch then one-touch control to strike.* *Use racquet hold from throat, one touch to control.*	Sponge ball Transition ball Tennis ball Add bat or racquet.	1. *Suggest increase space for winner player* 2. *Must bounce ball before line* 3. *Practice one-touch control then hit with partner throw/catch* Space: **Decision movement** to anticipate opponent's target area Force: Use space in front and behind player Time: Send hard for high ball to give time to recover. **Cover** space as ball sent.
Box game Adapt		1. Players can increase space between lines but ball cannot go in dead-zone between lines. 2. Can strike ball with bat or use one-touch control then either, a. strike in air, or b. strike after one bounce. 3. Not bounce beyond line	*Use bat or racquet from throat.* *Use full length racquet.*	Sponge ball Transition ball Racquet	1. *Strike enough force to get over space.* 2. *Set-up base early to receive the ball* 3. *Practice one-touch control then hit with partner throw/catch* **Adjust** as ball arrives to strike ball in the hitting zone in front of the body. Create time to set ball up in hitting zone.

NAME	DIAGRAM	Rules - Constraints	Equipment use & Objects		Game-as-teacher feedback
Castle Game Rep.	Aim: Try to hit the target to score	(1) The ball must bounce once (so it can hit the target). (2) The ball must be sent above head height (height allows time to get to ball). (3) The ball is hit alternately by the players (tennis-like relationship).	Hand, catch & toss Hand, catch, self-feed ten strike One bat self-feed then hit	Sponge ball Transition ball	Start Castle game with no bat then add bat. If player without bat hits the target then they win the bat. Use hands as bat or "catch then self-feed to hit" or "catch and toss". Person with bat decides size of target area.
Keep-up game	Aim: Keep ball going in the open space	(1) After one bounce strike ball above head height. (2) Hit the ball away from other players (3) Stay within half-court area.	Hand Bat Racquet from throat Racquet	Sponge ball Transition ball Tennis ball	**Base** – set-up position to start point and continue in play. **Adjust**: Striking ball in front of the body as it drops into the waist/knee height area. Height for more time.
Castle game in court	Aim: Hit target keeping the ball within the space	Same rules as above. (4) Ball must bounce in the court area (5) Win point if rules 1 to 4 not followed (6) 3 points to win a game (7) 3 points if hit the target	One bat self-feed then hit Bat Racquet from throat Racquet	Transition ball Tennis ball	Cover target positioning opposite opponent's target. **Decision movement** to anticipate opponent's target area **Cover** space as ball sent. **Adjust**: Striking ball in front of the body as it drops into the waist/knee height area. **Base** – set-up position to start point and continue in play.

Win the bat

Initially, rally with partner to find how you can play to keep the ball in the court for 4 shots in a row. Use hands as bat or catch then self-feed to hit or catch and toss. Play over space 1 meter wide or over a 3 to 4 foot high net. Select ball you want to use for the way you want to play.

Space no ball can go

Intent of game: Score points when using the bat by keeping the ball in the court more often than your opponent

1. Ball must be hit up, go over space and bounce once.
2. Lose point if the ball lands in the space, out of court or bounces more than once before being hit.
3. Restart point from behind back line
4. If hit the spot or get to 3 points you win the bat. Rotate bat after if two games in a row won.

What off-the-ball movement skills are needed to address the tactical problems presented by the game?

Off-ball-movements	Action offence	Action defence
Base Decision Cover		▪ Recover to ready position behind back line. ▪ Read and anticipate other player's options ▪ Respond with movements to cover trajectory of ball as struck
Adjust	▪ React with quick changes adjusting to ball as arrives	

What on-the-ball skills are needed to address tactical problems presented by the game?

As above, now aim for spot, or aim for spaces where opponent not covering.

*Follow-through to target with arms and bat and recover to base.*Depending on class work on:
1. *Movement in the court from partner feeding and catching*
2. *Forehand shot against a wall*
3. *Backhand shot using progression*

Backhand progression from Chapter 15.

Partner feed to backhand side aiming between spots.
Stand outside spots

(a)

Work on 'J' action with knee bend and arms extend.
Partner drop feed and catch.

Extend up as brish ball to partner to catch.
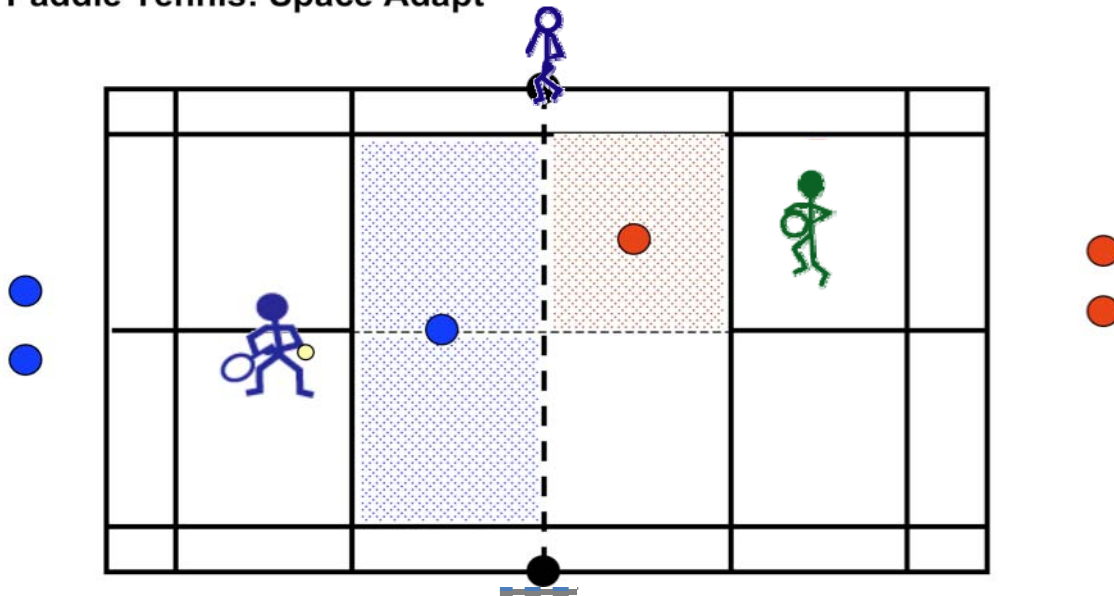*Let arms go "hurrah"*

(b)

Return to game to transfer action of bat on the ball
for a backhand.

(c)

Paddle Tennis: Space Adapt

Intent of game: Score point by trying to keep the ball in the court more often than your opponent

1. Ball is in play if you send the ball over the net and into your opponent's court
2. Lose a point if the ball bounces more than once on your side of the net
3. Start the point by serving into the service box
   a. Decide who serves
   b. Play up to 3 points

Think, pair, share.

Closure.

- What off-the-ball movement skills are needed to address tactical problems presented by the game?
- What on-the-ball skills are needed to address tactical problems presented by the game?
- How did the adaptation affect the game?