Families in flocks: Intergenerational sharing in a tabletop game illustrating Tragedy of the Commons

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Walk-up tabletop technologies are becoming common in public settings, and are immediately engaging, but can they stimulate informal learning in family groups, and how might the vagaries of intergenerational communication support or constrain learning?

Tabletop technologies

Tabletops provide shared interfaces that support casual, intuitive interaction. Few studies have been done in 'wild' settings. This study looks at a tabletop in an informal country park setting, with casual visitors, using a game illustrating a conflict between self-interest and social good.
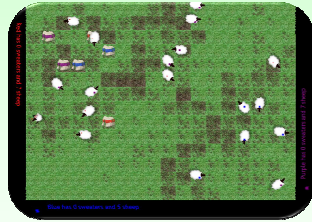
Sheep: The Tragedy of the Commons (ToC)

The Sheep tabletop game (Pukinskis & Rogers, 2006) has 3 players: each can create sheep (red, blue or purple) with a touch on the surface. Sheep graze autonomously, are sheared and produce jumpers for their owners. Over-grazing kills the grass and eventually the sheep.

This illustrates the ToC (e.g. Hardin, 1986): finding the equilibrium of individual profit and social gain. Players can be competitive, maximising personal gain and sabotaging or stealing others' gains, or cooperative, agreeing a strategy with other players and limiting flock size to a sustainable level.

The game was installed on a Mitsubishi DiamondTouch tabletop in a redundant church, which had an exhibition of rural crafts. We observed different family groups playing the game, to assess how reflection on sustainability is supported by adult mediation. 22 groups visited in a 2-hour period. 15 of these consisted of only older adults who did not approach the game. 7 groups approached the game when invited:
4 were studied in detail on video and characterised as follows:

A	*adult participant-guide*	father and sons (8 & 10) on a cycling trip,
B	*adult as arms-length facilitator*	sisters (5 & 7), parents, 2 grandparents, at a family barbecue
C	*adult as distanced commentator*	teenage girl & parents, visiting for a country walk
D	*adult as close guide*	parents and daughter (4) visiting the village

Reflections on sustainability only occurred with adult scaffolding…

Group A: participant guide
Son 1: I'm champion at this! (quickly gathering sweaters)
Father: But y' see all your sheep have eaten all the grass so you see… (sons continue collecting)
Father: Oh dear, look ,look ,look, ah, what's happening here then?
Son 2: I dunno
Son 1: They're dying… (sons continue collecting)
Father: But look what's happening –they're dying, they've run out of grass! (Father helps sons put sweaters in their spaces, sons continue overgrazing)………

Father: The moral here is you see you may have lots of sheep but they're not very good living conditions, they're dying off….whereas my sheep over here…on the other hand you've got 21 sweaters to sell and I've only got 2.

How do players mediate and support
--reflection on sustainability?
-- use of technology?

Supporting use of technology came primarily from children
Girl: You need to press the grass and then sheep will come up and jumpers and a jumper will come up and you put it over there and you see how many jumpers you got, you see like I am (points to her own side and demonstrates clearly).
These adults tended not to engage with the technology, observing and giving general encouragement rather than playing.
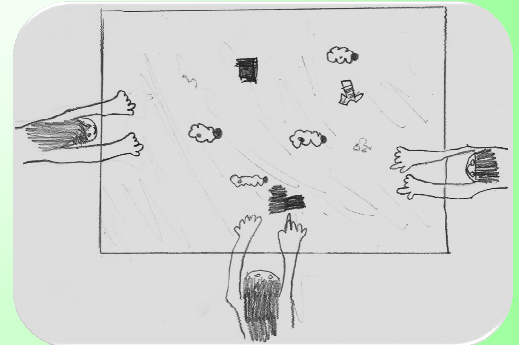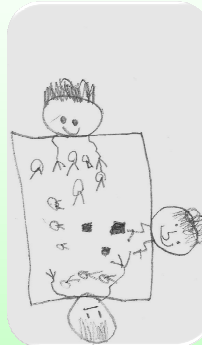
Results

Adult mediation, as long as it was not too hands-on or too hands-off, encouraged child engagement with the game. Deeper reflection on the issues, though, only happened when an adult explicitly raised questions of sustainability. Eliciting cross-generational discussion of the Tragedy of the Commons requires explicit guidance. The technology tended to be seen as the province of children and young people. Children sometimes interpreted the technology for their parents.

Discussion

Encouraging reflection about cooperation and sustainability in children required careful scaffolding and explicit support. The success of the sheep game can be judged in terms of 3 dimensions of constraint proposed for supporting groupwork with large surfaces (Yuill & Rogers, 2010)
Awareness: The tabletop allows all players to see easily what others are doing, keeping an eye on their plans
Control: Users have too broad control in being able to create as many sheep as they wanted, thus damaging others' interests. In a game-like context, people seem unlikely to moderate their actions and cooperate.
Information transparency: The bad consequences of greed only become apparent as the game unfolds. Repeated games and explicit encouragement seem to be required to support reflection on the Tragedy of the Commons. Further work is investigating children's abilities to plan cooperative working in the sheep game.

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