Mixing and Fixing Games

Cameron Browne, Queensland University of Technology (QUT)

THIS issue is all about two things: *mixing* and *fixing*. Some articles describe games created by mixing ideas from existing designs, some describe games that came about – or were improved – by fixing particular design problems, and some combine both aspects.

This division between mixing and fixing may seem rather arbitrary, but it has a theoretical basis. It comes from a model of human creativity proposed by mathematician Robert J. Weber in 1992 [1], who observed that the primary mechanisms for invention include:

1. *Joining* existing features in new ways.
2. *Adding* new features to existing ones.
3. *Refining* features through fine-tuning.
4. *Transforming* the feature space through abstraction.

In the context of game and puzzle design, 'mixing' refers to mechanism 1, i.e. the joining of existing features or ideas in new ways, while 'fixing' refers to mechanism 3, i.e. the refinement of features (and the solution of problems) through fine-tuning.

This division of papers was quite unintentional. However, writing on the topic of creativity for this issue raised my awareness of such concerns, and the separation soon became abundantly clear. These two mechanisms appear especially relevant to the pursuit of game design.

Fixing Games

The lead article in this issue, 'The Double Circle Real 5×5×5' by Carl Hoff, was inspired by a limitation of existing 5×5×5 Rubik's-type cube designs: that the internal *cubies* are hidden from the solver and do not come into play. The mechanism devised by Carl – which produced this issue's eye-catching front cover image – is mind-bending enough to visualise even with the help of CAD software! So to produce a physical, working 5×5×5 twisty puzzle that incorporates all internal cubies as part of the visible exterior mechanism is a truly impressive feat.

Jimmy Goto then describes how the inventor of the logic puzzle 'Tentai Show' fixed a perceived problem in the aesthetics of its original design, by incorporating colour into each challenge. This did not have any effect on actually solving the challenges, but added a new dimension to the puzzle (Weber's second type of creativity), to entertain solvers and give setters more scope for creative expression in their designs.

Christian Freeling's article 'Dameo: A New Step in the Evolution of Draughts?' gives a brief history of the key steps in the development of the Draughts family, and highlights the problem of drawishness in competition-level play. He describes how his game Dameo emerged through a desire to address this problem, to produce a faster-playing and more decisive alternative.

The problem of imbalance in play is one that game designers must constantly grapple with. Isaksen *et al.* describe a mathematical game with an inherent balancing mechanism, that directly addresses this problem, in 'Catch-Up: A Game in Which the Lead Alternates'. Analysis reveals their simple balancing mechanism to have some subtle and interesting strategic implications.

Similarly, my short note 'Coalition Control Through Forced Betrayal' examines the problem of imbalance in multiplayer games caused by non-strategic (i.e. social) coalitions that can arise between players. Rather than employing a forced revenge rule to address this problem, I demonstrate that reversing this approach to enforce *betrayals* between players can be more effective, using two simple hypothetical games.

Néstor Romeral Andrès turned to mathematics to solve a problem with his game Omega, as described in his short note 'From Mathematical Insight to Strategy'. The problem was not with the game itself, but with its perceived complexity in the eyes of players, and a simple insight provided an intuitive strategy that made the game more tractable and enjoyable to play.

João Pedro Neto and William Taylor describe 'Game Mutators for Restricting Play'. These are simple metarules, such as movement limitations based on group connectivity or delaying piece capture, that can be applied to flawed rule sets, in order to correct undesired behaviours in the resulting games.

Mixing Games

Weber's model of creativity is explored more fully in my piece 'Explore the Design Space', which demonstrates how new games can be created by mixing ideas from existing games, using a family

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of path-based tile games as an example. I suggest ways to focus the search, in order to hopefully find good combinations more quickly, and demonstrate how modifying subsets of existing games through simple transformations (Weber's fourth type of creativity) can find new and fruitful regions in the design space.

The second piece in our regular *New from Old* column, 'Deriving Card Games from Mathematical Games', is all about mixing existing ideas in new ways. Daniel Ashlock and Justin Schonfeld demonstrate how mathematical principles from graph theory can be applied to known – and unknown – mathematical games, in order to produce novel deck-based card games of distinct character.

My own article 'Try: A Hybrid Puzzle/Game' describes a blatant example of creating a new game from existing ideas. One of these ideas comes from a solitaire puzzle and the other from a strategy board game, but both merge seamlessly to transform a flawed triangular Sudoku into a more interesting design.

Try is this issue's 'feature puzzle', and you will find sample challenges printed throughout the issue, in approximate order of difficulty. Solutions can be found on the journal's website: http://www.gapdjournal.com/issues/

This issue concludes with a reprint of Wolfgang Kramer's classic 2000 piece 'What Makes a Game Good?' This is a marvellously concise summary of the types of characteristics that designers should be aware of when developing and fine-tuning their games. While there will always be exceptions to such guidelines, and personal preference will come into play, these are in my opinion still among the best three pages that any game designer can read.

References

[1] Weber, R. J., 'Stone Age Knife to Swiss Army Knife: An Invention Prototype', in Weber, R. J. and Perkins, D. N. (ed.), *Inventive Minds: Creativity in Technology*, Oxford, Oxford University Press, 1992, pp. 217–237.

Cameron Browne is a Vice-Chancellor's Senior Research Fellow at QUT, Brisbane, Australia, whose research interests include artificial intelligence and automated game design.
Address: School of EECS, Science and Engineering Faculty, QUT, Brisbane, 4001, Australia.
Email: c.browne@qut.edu.au

Try Challenges #1 and #2

Fill the grid with numbers 1 to 5, such that no number is repeated along any orthogonal line, and no connected group of odd numbers touches all three sides. See p. 21 for details.