

PLAY TO GROW:

Augmenting Agriculture with Social Impact Games



PLAY TO GROW PROJECT REPORT ISSUE N°3

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Play to Grow is an Arts Humanities Research Council (AHRC) funded research project exploring and testing the use of computer games as a method of storytelling and learning to engage urban users in complexities of rural development, agricultural practices and issues facing farmers in India.

This is the third and final in a series of reports on the progress and findings of the Play to Grow project. The project follows on from an AHRC and British Council funded UnBox Fellowship in India in February 2013, involving a partnership with and challenge proposed by Digital Green, a non-profit organisation based in Delhi that combines technology and community engagement to improve the social, economic, and environmental sustainability of small farmer livelihoods. This report focuses on the development and findings of the project in its final stage including playtest evaluations, workshops and meetings that took place in India in March 2014 and the development of a digital prototype of the board game 'Bumper Crop' developed through the project.

With the completion of a prototype of a physical version of the board game *Bumper Crop*, the final stage of the *Play to Grow* project focused on testing and evaluating the game against our original aims and research questions and then developing a prototype of a digital version of the game.

The evaluations conducted for the project included participants from two different stakeholder groups significant to the project: 15 urban young adults in Mumbai, as representatives of the original target audience of the game, and 24 farmers in Rajgarh, in the region of Madhya Pradesh, as representatives of experts in the concept and narrative content of the game. Twelve of the farmers who participated in the evaluations were also trained by Digital Green on mediating screenings (referred to in this document as 'mediators').

With young urban adults the research questions formulated were: Can this game help urban young adults gain a better understanding of farmers' lives and promote empathy towards them? Would urban young adults find such a game relevant and engaging?

With farmers and mediators the original focus of the evaluations were aimed at testing the relevance and accuracy of the game concept and narrative originally produced in consultation with these core stakeholders at an earlier stage in the project. However, availability of a physical prototype allowed us an appropriate technology to physically playtest the game directly with this group, enabling us to include questions about their own learning, knowledge-sharing and enjoyment from the game.

Throughout the project Digital Green began upscaling their organisation to work across new sectors of health and nutrition and in new locations in Sub-Saharan Africa and Afghanistan. These significant changes in the organisation focused their attentions on development of a virtual training framework (VTI) and video-courseware,



Evaluating Effectiveness and Relevance of Social Impact Games

The *Play to Grow* project's original aims were to explore and

test the use of computer games as a method of storytelling and learning to promote young urban adults' engagement with and better understanding of the complexities of rural development and issues facing small-holding farmers in India. To this aim the project team of UK/India academic researchers and practitioners worked in partnership with the Delhi-based non-profit organisation Digital Green to design the board game, *Bumper Crop*, for both physical and digital platforms, based on the experiences and challenges of being a small holding farmer in India.

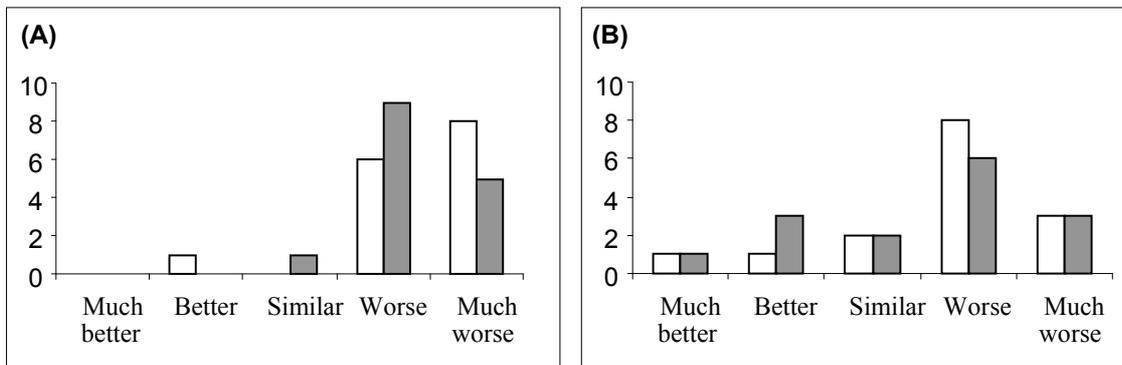


Figure 1. Responses of 15 young urban adults to the following pre and post-game questions. (A) Compared to your own life, what do you think a typical Indian farmer's quality of life is? (B) Compared to your own life, what kind of support do you think a typical Indian farmer receives from the government?

which would enable them to manage the expansion in partners using their platform and services more effectively. Therefore, the organization became interested in including game-based learning within a new VTI framework and the value of gaming for their primary stakeholders. Therefore, questions about how gamification might enhance and contribute to the improvement of their training methods became a more immediate and relevant concern than just promoting civic engagement and awareness through games. This led us to examine the efficacy of social impact games as tools and platforms both for advocacy and promotion of engagement with social issues, and also for knowledge-sharing and learning of practices amongst communities and constituents.

Therefore, the research questions formulated for the evaluations with farmers and mediators included: Is the game relevant to farmer's lives? Does it accurately represent the challenges they experience in their daily lives? Can this game help farmers gain a better understanding of farming practices?

In our analysis of the results of evaluations with both groups of stakeholders, we considered the extent to which young urban adults' responses differed from those of farmers. These different purposes and audiences for the game will be considered here in this report in relation to the contrasting results of the evaluations with both participating stakeholder groups.

Expanding minds and narrowing divides?

In all 8 pre-playtest and 34 post-playtest questions were asked to the young urban group. However, two questions were quantitatively assessed before and after gameplay to determine their initial attitude to farmers (Fig 1).

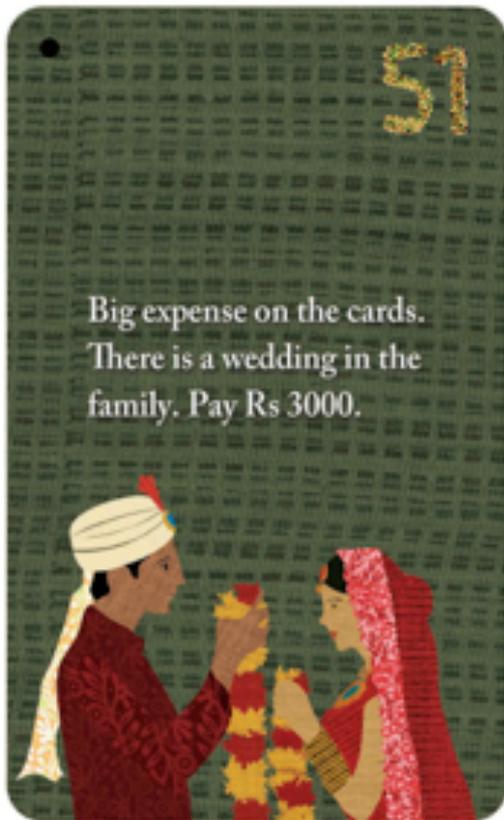
Pre-play results suggested that urban young adults already felt that farmers' lives were tough and they themselves were much better off. After playing the game for one hour, perceptions did not seem to have changed significantly. Whilst statistical significance could not be assessed given the low initial sample size, responses

indicated there was some shift from the initial attitude towards farmers. Indeed, players tested seemed to perceive less empathy generally, after playing the game. For example, three players' perception shifted from perceiving farmers' quality of life from 'much worse' than theirs to just 'worse' after playing the game. After playing the game, two players found that governmental support towards farmers was actually better than they had originally thought.

Differences were found in the responses of farmers and urban youth on questions related to relevance and engagement. When asked whether they learnt something about farming, the urban group responded with a balanced response eight agreed, one disagreed, and five were neutral, suggesting that the game was somewhat effective for promoting their learning. In contrast, seven farmers strongly agreed, four agreed, one disagreed and one was neutral.

The strategic elements of the game require the player to manage their resources and make decisions about how best to use them to both tend their crops, but also generate further income and sustainability. Farmers' responses tended to demonstrate how these elements of the game make it effective as a serious device for learning better agricultural practices by diversifying income, by being more strategic in planning and preparation or by using new techniques. The following comments from the farmers reiterated how these elements of the game promoted their own knowledge of farming: 'Learned what are the different things we can do for our farm with the money that we have'; 'I learned about the things which are needed for farming practices'; 'If children played from an early age, they would have a clear understanding from the beginning of their life how to be a good farmer'; 'Learned the right way of doing things and do tasks after applying one's mind'.

There were also differences in perceptions about how realistic the game was between urban young adults and farmers. When asked if the game communicates something about their lives, the farmers' comments indicated that it was close to their reality: 'It relates to our



lives', 'We have to pay for weddings and we run out of money, have to borrow from people', and 'Our crops are attacked by insects.' In contrast, one urban young adult commented that situations in the game were 'unrealistic'.

Some spaces in the game were intentionally placed as dramatic pitfalls, such as the wedding, where a player may be close to completing the harvest of their crops, and thereby winning the game, but then has to negotiate with other players to take out loans and sell off assets to continue playing. The social realism of these moments demotivated some urban players' engagement with the game, but was designed to generate empathy.

Storying in games operates as a 'complex-process' metaphor through the immersion of the player in a 'field of practice' where knowing unfolds by movement within an environment (Ingold 2011). As 'mediated enactive experiences' they have been proven to influence self-efficacy or impact on motivation, perseverance for success or recovery from failures (Peng 2008). This was reflected in the comments made by farmers. Their responses suggested that the social realism of the narrative content was also important in promoting self-efficacy (Peng 2008) and influenced a sense of perseverance in their own lives. When asked what was learned from the game, one farmer commented, 'In real life if you lose something, don't be disheartened. Do not give up, but try a better strategy'.

Other responses to questions regarding farmers' enjoyment of the game and its relevance to their lives indicated an identification with the game world: 'This game correlates with situation of farmers and gives us

understanding how can we move ahead in those tough circumstances'; 'It's about my life, so I like it'.

Additionally, there were differences in the two groups' responses to the statement 'I enjoyed playing bumper crop'. The urban group was split with seven agreeing, seven disagreeing and one remaining neutral, whereas eight farmers strongly agreed, three agreed and one was neutral. Farmers' comments suggested that they enjoyed the game and took it very seriously, because it strongly related to their own life, while for the urban participants, this was just another game. Also, farmers agreed the game was easy to understand in contrast to the urban groups' feedback in which only three agreed that the game was easy to understand.

Rather than enjoying playing the game for its narrative content, the urban players' responses suggested that playing to win was more important and they made more comments about wanting additional strategy and difficulty. In contrast, farmers' comments often mentioned playing cooperatively or aspects of 'people fun' (Lazarro 2004).

While farmers' strong sense of identification with the game content motivated their game play, games also provide the opportunity for fantasy, which is important to learning. For example, comments and actions made by the farmers observed during game play suggested that they enjoyed playing with the game money and put it in their shirt pockets as they would real money. One comment indicated that it was pleasurable to have physical money to do things with.

As experts the game provided farmers an opportunity safe from real consequences to practice and learn new strategies to overcome the challenges they face everyday. One particular comment recognized the immersive experience and the impact this has on motivation: 'While playing, I felt that it was really farming not just a game. So I took it seriously to play well'. Another recognized how the game promotes an integration of knowledge through doing: 'One can learn something from this game. When you do something, only then you can learn'.





Conclusions and New Directions

In the two weeks before meeting with farmers for the playtest in Rajgarh, unseasonable rain and hailstorms devastated the wheat crops being harvested at that time. Farmers elsewhere in the region were staging 'chakka jams' on highways in protest of delayed relief payments and unsatisfactory crop loss surveys by the government. These were the kind of challenges we aimed to communicate in 'Bumper Crop'. However, asking the farmers to play a game at such a time of crisis did raise questions about what direct benefit such a medium could actually bring for them and how it could possibly capture the complex issues they face daily. Nevertheless, the results surprised the research team and suggested new directions for the research and its contribution to the understanding of how Digital Green and the development sector as a whole, might best take advantage of these experiences.

While the evaluations with young urban adults did not present strong evidence for the effectiveness of the board game to promote empathy, they did indicate that they learned something about farming and the challenges farmers' experience. The digital platform may appeal more to young urban adults. While further evaluation of the digital prototype created through the project is beyond the scope of the iterative stages planned for this project, it would enable us to confirm or dispute this. However, we did find that with the move from the physical to digital platforms, the game design lost many of its most engaging strategic features, which required more sophisticated coding and artificial intelligence than was achievable within the available timescale and resources of the project.

Nevertheless, development of the physical prototype did enable new potential purposes and audiences to be found for the game, and gaming in general, as an innovative new tool of communication and training for the development sector. Evaluations with farmers and mediators revealed that the game was extremely valuable

to them as an opportunity for their own learning, knowledge sharing and enjoyment. Their responses to the game suggest that it does more than represent issues of poverty and marginalization or provide instructional learning or received knowledge. The farmers were considerably more immersed in the game and the learning opportunity it afforded. In particular, their experience with the game drew upon the participatory, situated and immersive advantages provided by games to strategise their own lives and practice.

Existing research has suggested that digital games provide tools and platforms to leverage the power of empathy, identification, self-connection, engagement and imagination (Bachen et al. 2012, McGonigal 2011, Ratan and Ritterfeld 2009). In doing so, social impact games have been used to promote outreach, fundraising, civic engagement and awareness for social change agendas such as poverty alleviation, racism or the impact of global environmental change. The results of the *Play to Grow* evaluations suggest further evaluation is necessary to determine what game platforms are most effective and worthwhile for advocacy of such agendas. However, the research did suggest new evidence that games offer opportunities for participatory learning by acting as social actors that build relationships through dialogue, feedback and behaviour modelling and that they can create immersive, situated and experiential learning opportunities that facilitate constituent training and organizing (Stokes 2011).

Games as New Knowledge-Sharing Platforms

A playtest of the physical version of *Bumper Crop* was presented at the 'Effectiveness of ICT for rural development' workshop convened by DG (Delhi, 6-7 March) with delegates including the organisation's wider global network of partners working on rural development issues, such as Oxfam, PRADAN, DIFED, Gates Foundation, Indian Minister of Rural Development and others who recognised and were interested in its potential value as a new method of communication and knowledge-sharing for their own work.

Digital Green already incorporates and promotes aspects of games within its video platform with leaderboards giving information on numbers of viewings of videos and adoptions of practices they feature. The integration of more direct game solutions could work well with these pre-existing peer-to-peer feedback and networked learning mechanisms already operating within the platform.

A game such as *Bumper Crop* could be integrated into a virtual training programme for Digital Green mediators to provide a motivating and entertaining opportunity for

them to develop their own identification and empathy with the different challenges and life situations that may face farmers within the communities in which they work. It could offer them the opportunity to try out and imagine new strategies that farmers can employ to develop their resilience. Within such a training platform, further motivational links to Digital Green's archive of videos that correspond with specific strategies and content included within the game, could not only give a motivation for them to engage with the video archive, but also give a sense of how these practices fit within the wider context of agro-food production as a whole.

Additional games could be built within the platform that spill out of and link back into Bumper Crop to reinforce the integration of this content and augment the immersive learning experience. For example, additional quiz games could be developed around the content of the videos featured within the game with good scores giving players strategic advantages within Bumper Crop.

Mediators could also use the physical version of the game as part of their own facilitation with farmer groups as an entertaining way to promote discussion, reflection and sharing of good strategies and positive peer-to-peer identification and feedback. Tips on how the game could be used and introduced within this context could be introduced at its completion.

Making the game open source, so that its narrative content can be added to, changed, its equipment repurposed with new rules or game play mechanisms, will bring further opportunities for dialogue, sharing, innovation, and customisation to specific sociocultural contexts and even different social issues and lived practices within fields of play. This is a new direction the research team hopes to pursue through future research.

Final Outcomes and Dissemination

Award-winning game designer Dave Griffiths (Kernow FoAM) joined the project towards the final stage of the project to collaborate with the team in developing a rough digital prototype now released for free download on Google Playstore at: <https://play.google.com/store/apps/details?id=foam.bumpercrop>.

A log of the progress on developing the digital prototype is available on GitHub at: <https://github.com/nebogo/bumper-crop/issues>.

A paper version of the 3D physical prototype created through the project is available to download on the project website: www.playtogrow.org.

A playtest and project findings were presented at the *Storystorm Workshop* at the *ACM Design of Interaction Systems Conference 2014* (Vancouver, 21-25 June), which explored the design of storytelling tools across different disciplines and media. The position paper 'Sustaining Stories: Story in games for social impact' developed for the workshop is available at: <https://sites.google.com/site/wearestorystorm/myers>.

An additional paper on the project, 'Expanding Minds and Narrowing Divides in India through Gamivism', was presented at the *Videogame Cultures & the Future of Interactive Entertainment 6th Global Conference*, *Interdisciplinary.net*, 17-19 July, Oxford. The extended abstract of this paper is available at: <http://www.interdisciplinary.net/critical-issues/cyber/videogame-cultures-the-future-of-interactive-entertainment/conference-programme-abstracts-and-papers/session-6-game-design/>

In addition, the PI gave a keynote talk on preliminary findings of the UnBox Fellowship at the *Extended Narrative Symposium* (Plymouth University, 2-3 November 2013), and presented the physical and digital prototypes and project findings at the *Impossible Constellation: Practice-Led Research Special Event* (University of Lincoln, 2 July 2014).

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Project Team Biographies

Dr. Misha Myers, Principal Investigator, is a performance practitioner and researcher who creates digital, participatory and located performance that engages recipients in co-production and co-presentation of knowledge to story complex social issues and geographies. She is leader and founder of Falmouth University's Articulating Space Research Centre. Her project *way from home* (2002-2008) involved partnerships with refugee and asylum seeker support organisations to explore practices and experiences of home-making through processes of walking, talking and mapping (www.wayfromhome.org). Her on-going *Walking Library* project, co-created with Deirdre Heddon, is a peripatetic library and reading group bringing together books and walking, first commissioned and carried 334km across Belgium for Sideways 2012 – a walking festival engaging the public with issues of sustainability and

ecology (www.walkinglibraryproject.wordpress.com). Myers has published a number of articles and chapters about walking, locative media, and participation.

Saswat Mahapatra, Animation Consultant, is a creative entrepreneur, who has an experience of working with brands like Walt Disney Co., Cartoon Network, BBC UK, Channel 4, Cambridge University Press, Scottish Institute for Enterprises and few more. He has handled diverse responsibilities in video, print and games industry such as television promo producer, animation director, script writer, visual designer, book producer, video editor, game designer etc. He has conducted exhibitions and workshops at London, Dundee, Glasgow and New Delhi. Saswat completed his design education from Glasgow School of Art with the help of Scotland Saltire scholarship. Currently he works with DG Media College, Mumbai where he conducts campaigns, workshops and handles web and interior branding of the organisation. He runs a blog at <http://mahapatra-saswat.blogspot.co.uk/>

Dr. Nina Sabnani, Video Consultant, is a storyteller who uses film, illustration and writing to inform and enlighten her audience. Her research interests focus on exploring the dynamics between words and images in storytelling. As a filmmaker, she brings together animation and ethnography in old and new ways. Her published stories are often rich collaborations with artists and folk fablers and have earned critical acclaim. Nina graduated from the Faculty of Fine Arts, Vadodara, and received a master's degree in film from Syracuse University, NY, which she pursued as a Fulbright Fellow in 1997. Her doctoral research at the IDC focused on Rajasthan's Kaavad storytelling tradition. She taught at the National Institute of Design for 22 years before moving to Mumbai in 2006. Nina draws inspiration from her students at the Industrial Design Centre, IIT, Bombay, where she teaches and coordinates the PhD programme.

Dr. Anirudha Joshi, User Research Consultant, is Professor in the Industrial Design Centre (IDC), IIT Bombay. He works in the field of Human-Computer Interaction (HCI) design, education and research in India. Anirudha interacts with the industry regularly. He conducts open workshops on HCI for the professionals and internal training programs for companies. He is a consultant to companies and helps them develop a user-centered design approach to product development. He helps companies to integrate their internal product development processes with the design process. Anirudha's research is focussed on designing interactive products for less educated users in developing economies. He also works in integrating HCI activities with software engineering. He was co-chair of the program committee of the first India HCI 2004 conference held in December, 2004.

Dave Griffiths (Kernow FoAM, Cornwall, UK) is an award winning game designer and software artist. Previously a Senior R&D programmer for Sony Computer Entertainment Europe (2006-2008), Lead programmer in feature film special effects for The Moving Picture Company in London (2003-2006), his current work as part of FoAM (since 2009) - an international interdisciplinary research network, includes developing open source citizen science games and apps with Cambridge University, Duchy College Cornwall and the University of Exeter.

Advisory Panel Members

David Griffiths, Game Designer, FoAM (UK); Prof. Naomi Alderman, Game Designer, Zombie Run (UK); Tasso Stevens, Co-Director of Coney (UK); Bharath Palavalli, Fields of View (IN); Guillaume Benoit, Head of Game Design, DSK Supinfogame (IN); Rohit Gupta, Game Designer (IN); Michael Straeubig, Game Designer, i3 Games (DE); Megan Lloyd-Laney, Comm Consult (UK); Nance Klehm, Social Ecologies (US); Jen Southern, Centre for Mobilities Research (CeMoRe) (UK); Dr. Katerina Psarikidou, Centre for Mobilities Research (CeMoRe)(UK).

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