# Serious Game Best Practices and Recommendations

Throughout the development and deployment of *Green My Place*, and evaluating the effect it had on players, the ultimate objective has been to understand and explain how serious games can be used to increase energy efficiency through user behaviour transformation. To this end, we present our consideration of lessons learned across the phases of work, which roughly speaking were design, development, deployment, maintenance and evaluation. In any given SSOG project each of these phases will need attention in a greater or lesser degree, so each will be considered here with our recommendations.

## Design.

Designing a serious game is more constrained and complex than designing an entertainment game, because there are now two domains of design interacting – the entertainment domain and the educational domain. However, this can actually be an advantage since constraint can foster creativity and the dual objectives efficiently narrow the range of available choices. The process of integrating the two domains of design, though complex, can actually be quite precisely planned and mapped out.

The mapping of the design of *Green My Place* has been documented in two journal publications (Cowley et al., 2011; Cowley, 2014). The latter is in fact a generic process model for software development, applied to the case of *Green My Place*. It can easily be applied to other serious game designs, as shown by the chapter (Cowley, Bedek, Heikura, Ribiero, & Petersen, 2012).

The interaction between two design domains is an important aspect of SSOG design. It includes the requirement to achieve synergy between the design process and the real life challenges encountered by those who deal with the serious topic (i.e. as a professional or societal function). For instance, the GMP development team worked closely with energy experts from local project partners to ensure that energy efficiency concepts from the everyday world were taken into the game design as often as possible.

## Development

There is little we can add to the large body of literature on the constantly evolving subject of software development. It is clear that although software is free to replicate and can require very low overheads to produce, software engineering cannot be done without expertise. This implies that serious game development and software development are two separate but intertwined R&D processes – the research should be done by researchers, and the software by software professionals, and both sides need to be constantly informed on the needs and challenges the other team is facing. It is not realistic to expect the serious game developers to first make a complete plan of the platform and programs they need and then simply ask the software team to "make it so". On rare occasions a ready platform can be converted to a specific serious game, but even then software expertise is needed. Thus two teams and preferably a coordinator with expertise in both fields is called for.

Although *Green My Place* is a complete piece of software and has won plaudits and awards, throughout the development process there were issues which could have been handled more optimally.

### Facebook

The initial design called for social networks integration, however liaising with the pilot groups led us to understand that most pilot members would not be heavy users of social networks. Thus this design feature was initially decommissioned, but when the audience of the game spread beyond the pilots, it became clear that Facebook integration could in fact be valuable. However, by that point it came several months after game launch, which hurt the synergy between game novelty and social media ‘buzz’. In today's world, the sector of population that is not active in social networks is very unlikely to be a target for a serious games approach.

### *Unworkable game content*

It is always possible that a game concept might never achieve the elusive ‘fun factor’. This should be recognised and such concepts cut as early as possible. A similar case is the minigame ‘*Energy Dash*’. This required several resource-intensive technical solutions, such as A\* pathfinding and raytracing. In a research organisation, it is usual to spend resources to implement technically demanding software. However, the *design* aim was to produce low-cost, short-to-develop games built on ready-made technology like Flash Catalyst. This worked well in the instances where it was done (e.g. *Electrickery*, *Knocking Off*), and yet in the case of *Energy Dash* resources were consumed which would have been needed elsewhere, and the fact that the game was so technically challenging ultimately prevented it from ever receiving sufficient polish to be released.

## Deployment

Publicity is the key requirement of deployment. One simply does not release a game in today’s open market without a publicity budget at least as large as the development budget. However, in this respect a serious game might have an advantage, since the market may *not* be open. In the case of SAVE ENERGY, the market began with the pilot buildings and expanded to the cities backing up the pilots. It still required publicity, which implied marketing spend, to tap those markets but the comparison with the entertainment market was very favourable. However it is clear that the deployment process for GMP could have been improved with some strategic changes.

### *Synergy with pilot groups*

As was the case with the energy monitoring side of the project, the game deployment worked best when there was closer coordination with the pilot partners and pilot inhabitants. The best pilot was clearly Helsinki, where it was possible to meet regularly with the pilot liaisons and the energy-monitoring team; to be represented at Helsinki pilot meetings, and to present the work in progress to the target audience. Such steps in any pilots required commited personnel, which in the Helsinki case came directly from the game development team but in other pilots were less integrated to the development process.

### *End to end publicity*

In certain types of projects, publicity can begin at the conception of the project and run for the duration (indeed this approach was used with overall publicity for SAVE ENERGY). However since it was not known from the beginning what format the game would be or the type of involvement players would have, it was hard to publicise the product before launch. Such publicity should be rolled out as early as possible, especially when (as with GMP) one is not trying to sell a product but a long-lasting experience.

### *Regular events and contacts*

To facilitate publicity, it is preferable to have regular contact with the core target audience. In the entertainment games industry, this is done through teaser footage and demos at fairs, conferences and media-events.

### *Promotional tie-ins*

Where budget allows, one may also utilise promotional tactics – in other words, to run pre-games or other participatory events which come with some kind of reward attached. In the case of GMP, the most successful recruiting of new players came from events in the Helsinki schools, where new computing machinery was awarded to the school.

### *PR manager*

In respect of all the above points, it is quite important to have a single person responsible for the management of the publicity process. This role can easily be underestimated, and having that responsibility spread across 5 locations was less than ideal in the case of GMP. Our approach of a serious game working group was a good compromise, but could have been even better as a supportive measure for the PR manager.

## Maintenance

The first thing to note is that maintenance *will* be necessary; there will always be some aspect of producing a technological entertainment that requires resources past the date of launch. The baseline minimum is tech support and IP protection. Tech support may be as simple as having the capacity to address technical questions from pilot partners (or their equivalent – i.e. the ones who manage the project *after* game launch) to a member of the development team, or failing that, a suitably briefed partner. For GMP, we had also to do updates and maintenance, which required the same technical personnel who developed the system to be contactable even after termination of employment.

IP protection is a quite specific issue – it is simply advisable to note that where a large number of stakeholders are involved and exploitation is expected, as in an EU project, legal advice on the matter is required.

The second thing to note is that *any* social features, or a game with a lifetime (as opposed to a one-shot release), will require community management. Community management involves having a person highly familiar with the game system (if familiar only as a user they must have very good access to the tech support personnel), who not only supports queries from the community, but monitors and tracks community-level trends in order to pre-empt negative scenarios of use and promote positive ones. Inter-player relations is a good example, since in a competitive game between strangers, negative relations are quite possible. Even in a social game aimed for adults, cyber-bullying can happen and should be dealt with quickly and responsibly. In a low-budget setting, this would be a good secondary role for a PR manager, whose main duties tend to be reduced after game launch.

## Evaluation

In the case of serious games, evaluation has a clear goal and purpose if the pedagogical goal and purpose of the game is clear. In that case evaluation can be ‘solved’ in the design phase, if the educational designers have sufficient expertise to also design evaluation. The implementation and analysis of results for the evaluation is then built in the game from the start and should be straightforward to execute. Naturally, if changes in attitudes or behaviour are to be measured, baselines must be recorded before the game is played. Intermediate questionnaires can help clarify the process of behaviour change, but too much time spent answering questions is likely to alienate players.

Evaluation can also be much simpler, if requirements or budget constrain the investigation. Simple measures of success are the uncorrelated metrics of the targeted behaviour – for instance energy consumption. It might have less scientific validity, but that is not often required in the domain of business consultancy, for example. Number of players and played games are a good metric for the success of marketing. Number of technical support calls measures both the quality of engagement (which must be good if people are willing to invest more time in a game after it presents them with a technical problem) and the quality of development (naturally this is a sign of bad quality, but can be used as a learning tool for later projects). User satisfaction is an important metric – technical problems tend to reduce player commitment, and boring games are likely to have small impacts.