

Is a Culture of Participation Possible for Serious Games in the Health Domain?

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Abstract. Culture of participation (CoP) shows its utility in the video games creation field in term of both, efficiency of production, and acceptance and retention of gamers. The authors consider the particular case of video game for health. This field involves the inclusion of various roles such as patients, game designers and health professionals to create a complex product which takes into account not only the health aspects but also video games playful mechanisms. For this reason the authors suggest that researches should be done to create a holistic participatory design approach and promote a culture of participation for games for health.

Keywords: Serious games, health, participatory design

1 Introduction

Undertaking meaningful and sustainable participation in organizations requires accepting the loss of the distinction between producers and consumers. While in domains like urban design or politics “normal” citizens' participation is well accepted, and while maker spaces bring into everyday life the hacker culture, for the healthcare domain we are far from this point of acceptance. The term participation in the health domain can have several significations and revert different aspects of the field practice. However, as [1] describes, the confusion around the meaning of participation “bedevils any attempts to think structurally and politically about improving the health system through participative and responsive means”. In addition [2] points out that the common usage of the term participation “to mean a lay member of a health service or policy committee – has tended to dominate and obscure the other meanings of the term which describe consumer participation as a social movement, or a strategy to reorient the health system”. During our field researches and experimentation in the games for health domain, we were confronted with the same “definition” problem trying to conduct participatory design sessions. While at first talking about health suggests a doctor/patient relationship, health is a domain that relates to many players with many roles. These roles are not independent but complementary to each other. In the center is, of course, the patient, the person who is in care. Around her gravitate different people. The number and kind

of roles these people can have will vary depending on the patient's health and on the aid the hospital or the care center is able to assure.

2 Culture of Participation in healthcare

When we talk about culture of participation (CoP) in the healthcare domain, we first think about humanitarian assistance, particularly during crisis. Actually, during a period of humanitarian crisis, hundreds or thousands of people around the world organize themselves to provide logistical, food or medical support for local people in need. Many organizations like the *Red Cross* or *Médecins Sans Frontières* are able to quickly provide emergency medical assistance across the world. Furthermore, humanitarian aid is increasingly structured and professionalized, and the only good will is not enough: humanitarian organizations are now looking for professionals and specialists from diverse professions. Thereby, participation in this context is an “experts' concern”: professionals participate together to provide assistance to population who is just recipient. To moderate this latter statement, we still have the massive financial participation of laypeople across the world to support these humanitarian organizations.

More in general, medical institutions and services – or other health personnel – are complex systems. They include highly specialized knowledge and skills aimed to treat the higher number of people possible. They form what can be called an expert group, using their special skills on a second group, the laypeople (patients and relative), which is inherently in a subordinate position: this second group is requesting care and is usually devoid of health competencies. As this expert/non expert relationship is the essence of care it is essential to facilitate and improve the communication between these two groups. Muller [3] highlights in her work the importance for community members to liaise with health care workers and facility managers to be sure that the services offered by the health facility corresponds to laypeople's needs. Arstein[4] described the different possible interactions between the power holders and the powerless, and proposes an eight levels ladder of participation from “citizen control” to “manipulation”. Each rung corresponds to the extent of citizens' power in determining the end product. Tritter et al [5] judge Arstein's ladder not adapted for health and too power oriented thus limiting effective responses and undermining the potential of the user involvement in the process. For this reason they propose a new model [5] and argue that user involvement in improving health services must acknowledge the value of the process, and the different knowledge and experience of both, health professionals and laypeople.

Doctors, specialists and different kind of therapists, partners and family, will interact with the patient and can influence more or less directly his health. This influence could happen through diagnosis, prescriptions, manipulation, psychological or emotional support, advice or assistance to the sick person. This rich ecosystem is rarely enacted in the form of a joint action, as the “myth of the expert” is well alive.

3 Culture of Participation in Game Development

The video game one is a young booming industry. Initially seen as a niche business, video games were able to open to the entire population, regularly innovating and reducing border between players and game creators.

At first, video games creation was reserved to few programming geniuses and specialized studios delivering their products in a physical format. In this scenario players had a simple “reactive” role. However, in the last ten years we are seeing a real upheaval with many initiatives promoting broad participation and reconciliation between game designers and players. As first example we can cite the abundant number of video game creation tutorials found on the web or in magazines, targeting all competencies levels and players' profiles. To this first example we can add the increasing number of middlewares offered to the public to create in an efficient and intuitive way video games, introduction that explains in part the upsurge of independent game developers works.

In the same way, game jams (i.e., gathering of game developers for the purpose of planning, designing, and creating one or more games within a short span of time) take now place on a planetary scale and help further democratize video games creation.

Finally, crowd-funding has been a key driver for video game creation. Many projects are only possible thanks to this participatory funding system. In this way consumactors (a term defining users that are consumers and actors at the same time) define the major trends to be followed by the industry.

Moreover, CoP in video game is not just about creating a whole video game. Sometimes developers allow and supply with tools the creation and the sharing of players' 'mods' – an alteration of content from a video game: they can be entirely new games in themselves or simply add new features, rules or items. Gamers' content creation is probably the most visible usage of CoP in VG. Some well-known examples of this trend are Little Big Planet¹ or Spore². This games give players a content creation tool that enables levels, creatures and vehicles design, as well as the possibility to share them online and get feedbacks. An other famous participatory video game is Minecraft³, in which players are free to collaborate, share or stole resources, build unique huge constructions or destroy others' creations in a massive virtual cubic world. The Internet is full of original and successful collaborative creations and participatory cities built in this game.

Hence, the video game industry has taken advantage of its culture of participation to bring closer game creators and players, increasing its own potential and diffusion.

4 Culture of Participation: bridging healthcare and computer science

While there is a theoretical discussion around participation in the health domain, for what concerns the relationship participation/health/computer science, a number of user-

1 <http://littlebigplanet.playstation.com>

2 <http://spore.com>

3 <http://minecraft.net/>

centered approaches have been introduced for the development of health information systems. We can cite in particular Participatory Design (PD), usability engineering [6] or contextual design [7] techniques. In particular, PD methods have been applied [8,9,10] in the field of health informatics to involve a maximum of stakeholders during the design process. Indeed, [9] adapted PD techniques adding a clinical trial phase to bring experimentation into real life, testing the idea with health care workers and patients who have not participated in the project. The authors conclude that PD provides an effective means for researchers from the seemingly disparate worlds of health science and computer science to work together.

Out of the health field, different design tools and methods for conceiving serious games have been proposed, such as the usage of technical tools [11], the content centered model [12], design patterns for serious games [13] or the DODDEL model [14]. All these methods aim to enable participation for users that are new to game creation but with competences on the serious domain, in order to make pedagogical games aimed to transmit knowledge or skills. However, little research exists regarding the particular case of video game design for health. In this domain it's easier to find technical tools aimed to help in serious games for health technological creation, or studies on serious games interests, effects and scope [15,16,17,18,19]. However the case of serious games is more complex: not only game designers must be able to understand the needs of patients and therapists but they have an additional challenge: integrate fun without disrupting the health flow and integrate health elements without disrupting the game flow.

5 Culture of Participation in video games for health?

Games for health are still recent and, as seen before, very few methods or tools exist in order to improve communication and collaboration between all the different concerned actors. We believe, however, that games for health have a real interest and an increased culture of participation in this area would strengthen their creation, use and potential.

As seen, the video game area has various culture of participation forms, trying to involve players so that they became not only consumers but also actors. On the contrary, the medical world requires increasingly sophisticated and specific skills naturally taking away patients from all active roles. Yet patients are increasingly concerned about their health and the related decisions, they are more aware and connected, and challenge health professionals' position of "holder of the truth". As a result there is an increasing loss of confidence towards them. This attitude is coupled with the patient's will to get involved in his own healing and rehabilitation, if only given the opportunity and means.

As it is possible to create and share games in the public domain it seems quite profitable to do the same in the serious game for health one for example for rehabilitation exercises. Thus, a health care provider could, for example, re-use a playful exercise created by a doctor or a physiotherapist colleague. This would save time, easily vary the exercises and allow to discover new possibilities explored by the community and not only by a single therapist.

6 Conclusions

Even if from our discussion, it seems difficult to reconcile the video games and the healthcare worlds, there is a notable example proving that it is not only possible but also profitable to make the video games and the medicine worlds to cooperate through technology. *Foldit*⁴ is a puzzle video game invented to imagine protein folding possibilities in order to improve the knowledge about proteins and their modeling. Thanks to this experience that brought together more than 200 000 non expert users [20], players and researchers have been able to find the 3D structure of a retroviral HIV protease, a necessary step in the development of a drug.

Expand and promote the culture of participation in video games for health seems thus to be a way to capitalize on the great potential of video games in order to develop rehabilitation methods or health treatments.

7 References

1. Horey, D. and S. Hill (2005). Engaging consumers in health policy. 3rd Health Policy Roundtable. Canberra: 10.
2. Hill, S. & Draper, M. (2011). Chapter 2: A new conceptual framework for advancing evidence-informed communication and participation in S. Hill (Ed.), *The Knowledgeable Patient: Communication and Participation in Health*. Wiley-Blackwell.
3. Muller M. (2013). Participative management in health care services. In *Nursing Update* (May 2013) Denosa.
4. Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216–224
5. Tritter, J. Q., & McCallum, A. (2006). The snakes and ladders of user involvement: moving beyond Arnstein. *Health Policy*, 76(2), 156-168.
6. Malhotra, A. Laxmisan, A. Keselman, J. Zhang, V.L. Patel Designing the design phase of critical care devices: a cognitive approach *J Biomed Inform*, 38 (1) (2005), pp. 34–50
7. Sjöberg, C., & Timpka, T. (1998). Participatory design of information systems in health care. *Journal of the American Medical Informatics Association*, 5(2), 177-183.
8. Clemensen, J., Larsen, S. B., Kyng, M., & Kirkevold, M. (2007). Participatory design in health sciences: using cooperative experimental methods in developing health services and computer technology. *Qualitative Health Research*, 17(1), 122-130
9. J.L. Martin, E. Murphy, J.A. Crowe, B.J. Norris – Capturing user requirements in medical device development: the role of ergonomics – *Physiol Meas*, 27 (8) (2006), pp. R49–R62
10. Pilemalm, S., & Timpka, T. (2008). Third generation participatory design in health informatics—making user participation applicable to large-scale information system projects. *Journal of biomedical informatics*, 41(2), 327-339.
11. Robertson, Judy, and Cathrin Howells. "Computer game design: Opportunities for successful learning." *Computers & Education* 50.2 (2008): 559-578.
12. Moreno-Ger, Pablo, et al. "A content-centric development process model." *Computer* 41.3 (2008): 24-30.
13. Marne, Huynh-Kim-Bang, and Labat. "Articuler motivation et apprentissage grâce aux facettes du jeu sérieux." *Actes de la conférence EIAH 2011*. 2011

4 <http://fold.it/portal/>

14. McMahon, Mark. "Using the DODDEL model to teach serious game design to novice designers." ASCILITE. 2009.
15. Thompson, D., Baranowski, T., Buday, R., Baranowski, J., Thompson, V., Jago, R., & Griffith, M. J. (2010). Serious video games for health: how behavioral science guided the development of a serious video game. *Simulation & gaming*, 41(4), 587-606.
16. PULSE!! <http://www.interaction-healthcare.com/offre-simulateur-medical-3d-pulse-56.html>
17. Kato, P. M., Cole, S. W., Bradlyn, A. S., & Pollock, B. H. (2008). A video game improves behavioral outcomes in adolescents and young adults with cancer: a randomized trial. *Pediatrics*, 122(2), e305-e317
18. Wattanasoontorn, Voravika, et al. "A Kinect-Based System for Cardiopulmonary Resuscitation Simulation: A Pilot Study." *Serious Games Development and Applications*. Springer Berlin Heidelberg, 2013. 51-63.
19. Ma, Minhua, et al. "Adaptive virtual reality games for rehabilitation of motor disorders." *Universal Access in Human-Computer Interaction. Ambient Interaction*. Springer Berlin Heidelberg, 2007. 681-690.
20. Marshall, Jessica (January 22, 2012). "Online Gamers Achieve First Crowd-Sourced Redesign of Protein". *Scientific America*.