Gamification of Appropriation: Increasing the Curiosity for Tinkering

Antti Salovaara

Department of Computer Science, University of Helsinki

Helsinki, Finland

firstname.lastname@helsinki.fi

1. Serendipitous discoveries (i.e., outside of an immediate need) of novel creative uses are very rare: appropriation does not usually happen through fortuitous accident, but requires a perceived need (e.g., [2]).

2. Discovery based on a perceived need (e.g., development of a workaround) requires technological expertise and/or programming skills about the surrounding IT resources, which most users do not possess.

3. Purposeful but playful exploration of technological resources (e.g., by spending time tinkering and hacking) does not interest most people.

Table 1: Three challenges that impede the frequency of IT appropriation among users.

Abstract

The purpose of technologies is to increase human capabilities and increase the quality of life. This happens best in the everyday life if its users are able to appropriate technologies to many different purposes. This is however rare, since appropriation often requires technological skills in all but the most basic situations. In this paper I suggest three reasons for appropriations' rarity, and discuss whether appropriation could be gamified through system design, thus increasing users' excitement for reprogramming and customization.

Author Keywords

Appropriation; end-user computing; gamification.

ACM Classification Keywords

H.5.2. Information interfaces and presentation (e.g., HCI): User interfaces — User-centered design.

Introduction

Humans are creative tool users and able to discover novel solutions for practical problems in their work and everyday life tasks (e.g., [3,5]). This creative potential for *IT appropriation* remains however largely untapped: most systems do not offer support for appropriation or customization on one hand, and the ability for creative appropriate seems to require technological expertise from users [3], which typically does not interest users enough. Thus, although end-user computing possibilities such as configurability and script languages offer resources for appropriation, appropriation through reprogramming is rare.

Based on this brief analysis above, I have summarized the challenges of widespread appropriation in Table 1.

Making Exploration of IT Resources Exciting

The challenges listed in Table 1 could be overcome if users spent voluntarily more time with the technology, thus increasing the potential for serendipitous discoveries (point 1); if they found it more exciting to learn technology-related skills and knowledge (point 2); and if also tinkering was more exciting (point 3).

For some people, the desired relationship with technology already has such characteristics: consider the maker/DIY community and the flow experiences that programmers

Preparation:

Create "Shower time counter" and set it to 0:00:00 as its initial value.

Recipe 1:

IF hot water pipe is hot in the shower **and** there is loud noise in the shower [i.e., someone is having a shower]…

THEN keep the Shower time counter active as long as the IF condition is true.

Recipe 2:

IF it is Friday evening 6PM **and** the Shower time counter is under 60:00:00 [one hour]…

THEN award **"**Energy savers' ice cream badge" to whole family **and** reset Shower time counter to 0:00:00.

Result:

Figure 1. A collaborative weekly energy saver game for family members, created by chaining two recipes by using a time counter.

(Credits: Antti Salovaara, Lumin Wei, Andrea Vianello and Giulio Jacucci)

may experience while coding. Moreover, many people know the experience of excitement coming from building things using Lego bricks. In these cases, it is inherently satisfying to appropriate the resources at hand and invent entirely new projects or new improvements to old works. How could the same experiences be part of any IT use?

Gamification of Smart Home Automation

Gamification of IT use is a solution to this challenge, and we are exploring it in our ongoing project. We are developing end-user programmable Internet of Things technologies for homes [1]. By extending the trigger–action programming paradigm that IFTTT web service has made popular [4], we are in a process of empowering users with a toolkit, consisting of sensors, actuators, and an end-user programming environment with which they can develop self-programmed automation routines, such as games, reaching considerable expressive power in an incremental fashion. Yet they can start this process from simple yet useful "recipes" which they then can chain together. Figure 1 shows its schematic visualization.

In addition to gamifying the system usage with points, level-ups and other traditional game mechanics, our goal is to achieve excitement also with other means. Taking inspiration from the experience of playing with Legos, we aim at providing users with a continuous sense of progress and achievement when they are adding every new element, i.e. real-time sensors, in the recipe editor. The goal is to make them feel that by adding one more feature the automation becomes even more complete.

With this approach, we aim to tackle the three challenges. We encourage the users to design new rules just for the sake of its inherent enjoyment, which creates more opportunities for serendipitous discoveries. The excitement of

exploration increases perseverance and motivates users to continue interacting with the system, identifying new challenges. Finally, the experiences of success in turn increase self-efficacy and expertise. We hope to show that this way even those not usually interested in programming will find the system interesting and will remain as active users.

About the author

Antti Salovaara is an adjunct professor and a computer and cognitive scientist interested in creativity and unexpectedness in IT use.

References

1. Andrea Bellucci, Andrea Vianello, Yves Florack, and Giulio Jacucci. 2016. Supporting the Serendipitous Use of Domestic Technologies. *IEEE Pervasive Computing* 15, 2 (2016), 16–25.

2. Antti Salovaara. 2012. *Repurposive Appropriation and Creative Technology Use in Human–Computer Interaction*. Unigrafia, Helsinki, Finland.

3. Antti Salovaara, Sacha Helfenstein, and Antti Oulasvirta. 2011. Everyday Appropriations of Information Technology: A Study of Creative Uses of Digital Cameras. *Journal of the Association for Information Science and Technology* 62, 12 (2011), 2347–2363.

4. Blase Ur, Elyse McManus, Melwyn Pak Yong Ho, and Michael L. Littman. 2014. Practical Trigger-Action Programming in the Smart Home. In *Proceedings of the SIGCHI Conference on Human Factors in Computing (CHI 2014)*. ACM Press, New York, NY, 803–812.

5. Ron Wakkary and Leah Maestri. 2007. The Resourcefulness of Everyday Design. In *Proceedings of the 6th ACM SIGCHI Conference on Creativity and Cognition (C&C 2007)*. ACM Press, New York, NY, 163–172.