Les systèmes autonomes sont des outils informatiques comme les autres

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Mon parcours

1971

1984
DUT, Licence, Maîtrise, DEA

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1995
Doctorat

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Séjours post-doc

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Maître de conférences

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Directeur de recherche

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FEDRA
Interaction Homme-Machine
Even the smartest among us can feel inept as we try to figure out the shower control in a hotel or attempt to navigate an unfamiliar television set or stove. When *The Design of Everyday Things* was published in 1988, cognitive scientist Don Norman provocatively proposed that the fault lies not in ourselves but in design that ignores the needs and psychology of people. Alas, bad design is everywhere, but fortunately, it isn't difficult to design things that are understandable, usable, and enjoyable. Thoughtfully revised to keep the timeless principles of psychology up to date with ever-changing new technologies, *The Design of Everyday Things* is a powerful appeal for good design, and a reminder of how—and why—some products satisfy while others only disappoint.

"Part operating manual for designers and part manifesto on the power of designing for people, *The Design of Everyday Things* is even more relevant today than it was when first published."

—TIM BROWN, CEO, IDEO, and author of *Change by Design*

**DON NORMAN** is a co-founder of the Nielsen Norman Group, and holds graduate degrees in both engineering and psychology. His many books include *Emotional Design*, *The Design of Future Things*, and *Living with Complexity*. He lives in Silicon Valley, California.
Communication médiatisée (1995 - 2009)
Interaction graphique "desktop" (depuis 2000)
Pré-traitement des données d’entrée (depuis 2010)
Interaction tactile et gestuelle (depuis 2010)
Interaction cerveau-ordinateur (depuis 2013)
Transitions animées (depuis 2014)
Déconstruction du pointage indirect

G. Casiez and N. Roussel. “No more bricolage! Methods and tools to characterize, replicate and compare pointing transfer functions”. In Proceedings of UIST’11, p. 603-614, October 2011. ACM.
Déconstruction du pointage indirect


Douglas Engelbart, inventeur et visionnaire
J. Aceituno & N. Roussel, janvier 2014
https://hal.inria.fr/hal-01114381
Interaction Homme-Machine
There have been various computer-driven revolutions in the past: the widespread introduction of the personal computer (PC) was one, the invention of the graphical browser was another, and the Internet yet another. There have also been computer eras where one type of computer has dominated, having straightforward implications for whether the computers were shared or personal, and for whether they were specialised commodities or not.

1. **1960s: Mainframe Era**
   - One computer per many users.

2. **1980s: Personal Computer Era**
   - One computer per user.

3. **2000s: Mobility Era**
   - Several computers per user.

4. **2020 and beyond: Ubiquity Era**
   - Thousands of computers per user.

Computers affect how we undertake the most prosaic of activities – from buying food to paying our bills – and they have likewise had a radical change. From older technologies in ways that looked merely like substitution at first but which have ended up creating wholly new experiences, for example, allowing us to see images of far-away places, instantaneously and ubiquitously. The world, now, seems so much smaller than it did even five years ago.

Photography, for example, has retained its familiarity despite moving from being chemically-based to being digital. At the point of creation, people still 'point and shoot' in much the same way as they used to.

These technological revolutions or eras might suggest that the ways computers have altered our lives, all aspects of our activities – from buying food to paying our bills – and they have also changed and their impact on our lives.
Reconnaissance de geste
Reconnaissance vocale
Reconnaissance d'activité
Reconnaissance de l'environnement
Vers un futur sans écran, ni clavier, ni souris ?
Vers des systèmes autonomes ?
L'invité de 8h20 : le grand entretien (17 mars 2018)
https://www.franceinter.fr/emissions/l-invite-de-8h20-le-grand-entretien/l-invite-de-8h20-le-grand-entretien-17-mars-2018
Amazon’s Alexa started ordering people dollhouses after hearing its name on TV

Google’s Super Bowl ad accidentally set off a lot of Google Homes

Amazon's Echo is bringing the eighties back, and not always in a good way
On n'est pas couché (24 mars 2018)

https://youtu.be/SKLTBrBT4js
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce que sait faire un système autonome ?

Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?

**Comment savoir ce qu’il fait ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?

**Comment comprendre pourquoi et comment il le fait ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?
Comment comprendre pourquoi et comment il le fait ?

**Comment influer sur ce qu’il fait ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?
Comment comprendre pourquoi et comment il le fait ?
Comment influer sur ce qu’il fait ?

**Comment lui (re)prendre le contrôle ?**
Comment savoir ce que sait faire un système autonome ?
Comment savoir ce qu’il ne sait pas faire ?
Comment savoir ce qu’il fait ?
Comment comprendre pourquoi et comment il le fait ?
Comment influer sur ce qu’il fait ?
Comment lui (re)prendre le contrôle ?

Veut-on réellement de ce système ?
Les systèmes autonomes sont des outils informatiques comme les autres
CHAPTER TWO
THE PSYCHOLOGY OF EVERYDAY ACTIONS

During my family’s stay in England, we rented a furnished house while the owners were away. One day, our landlady returned to the house to get some personal papers. She walked over to the old, metal filing cabinet and attempted to open the top drawer. It wouldn’t open. She pushed it forward and backward, right and left, up and down, without success. I offered to help. I wiggled the drawer. Then I twisted the front panel, pushed down hard, and banged the front with the palm of one hand. The cabinet drawer slid open. “Oh,” she said, “I’m sorry. I am so bad at mechanical things.” No, she had it backward. It is the mechanical thing that should be apologizing, perhaps saying, “I’m sorry. I am so bad with people.”

My landlady had two problems. First, although she had a clear goal (retrieve some personal papers) and even a plan for achieving that goal (open the top drawer of the filing cabinet, where those papers are kept), once that plan failed, she had no idea of what to do. But she also had a second problem: she thought the problem lay in her own lack of ability: she blamed herself, falsely.

How was I able to help? First, I refused to accept the false accusation that it was the fault of the landlady: to me, it was clearly a fault in the mechanics of the old filing cabinet that prevented the drawer from opening. Second, I had a conceptual model of how the cabinet worked, with an internal mechanism that held the door shut in normal usage, and the belief that the drawer mechanism was probably out of alignment. This conceptual model gave me a plan: wiggle the drawer. That failed. That caused me to modify my plan: wiggling may have been appropriate but not forceful enough, so I resorted to brute force to try to twist the cabinet back into its proper alignment. This felt good to me—the cabinet drawer moved slightly—but it still didn’t open. So I resorted to the most powerful tool employed by experts the world around—I banged on the cabinet. And yes, it opened. In my mind, I decided (without any evidence) that my hit had jarred the mechanism sufficiently to allow the drawer to open.

This example highlights the themes of this chapter. First, how do people do things? It is easy to learn a few basic steps to perform operations with our technologies (and yes, even filing cabinets are technology). But what happens when things go wrong? How do we detect that they aren’t working, and then how do we know what to do? To help understand this, I first delve into human psychology and a simple conceptual model of how people select and then evaluate their actions. This leads the discussion to the role of understanding (via a conceptual model) and of emotions: pleasure when things work smoothly and frustration when our plans are thwarted. Finally, I conclude with a summary of how the lessons of this chapter translate into principles of design.

How People Do Things: The Gulfs of Execution and Evaluation

When people use something, they face two gulfs: the Gulf of Execution, where they try to figure out how it operates, and the Gulf of Evaluation, where they try to figure out what happened (Figure 2.1). The role of the designer is to help people bridge the two gulfs.

In the case of the filing cabinet, there were visible elements that helped bridge the Gulf of Execution when everything was working perfectly. The drawer handle clearly signified that it should be pulled and the slider on the handle indicated how to release the catch that normally held the drawer in place. But when these operations failed, there then loomed a big gulf: what other operations could be done to open the drawer?
The gulfs of execution and evaluation

The Psychology of Everyday Actions

The Gulf of Evaluation was easily bridged, at first. That is, the catch was released, the drawer handle pulled, yet nothing happened. The lack of action signified a failure to reach the goal. But when other operations were tried, such as my twisting and pulling, the filing cabinet provided no more information about whether I was getting closer to the goal.

The Gulf of Evaluation reflects the amount of effort that the person must make to interpret the physical state of the device and to determine how well the expectations and intentions have been met. The gulf is small when the device provides information about its state in a form that is easy to get, is easy to interpret, and matches the way the person thinks about the system. What are the major design elements that help bridge the Gulf of Evaluation? Feedback and a good conceptual model.

The gulfs are present for many devices. Interestingly, many people do experience difficulties, but explain them away by blaming themselves. In the case of things they believe they should be capable of using—water faucets, refrigerator temperature controls, stove tops—they simply think, “I’m being stupid.” Alternatively, for complicated-looking devices—sewing machines, washing machines, digital watches, or almost any digital controls—they simply give up, deciding that they are incapable of understanding them. Both explanations are wrong. These are the things of everyday household use. None of them has a complex underlying structure. The difficulties reside in their design, not in the people attempting to use them.

FIGURE 2.1. The Gulfs of Execution and Evaluation.

When people encounter a device, they face two gulfs: the Gulf of Execution, where they try to figure out how to use it, and the Gulf of Evaluation, where they try to figure out what state it is in and whether their actions got them to their goal.
The Psychology of Everyday Actions

Pedestrians in front of me, and whether there are traffic signs or signals that I have to obey. I must move my feet back and forth between pedals and my hands to the turn signals and back to the steering wheel (while I try to remember just how my instructor told me I should position my hands while making a turn), and my visual attention is divided among all the activity around me, sometimes looking directly, sometimes rotating my head, and sometimes using the rear- and side-view mirrors. To the skilled driver, it is all easy and straightforward. To the beginning driver, the task seems impossible.

The specific actions bridge the gap between what we would like to have done (our goals) and all possible physical actions to achieve those goals. After we specify what actions to make, we must actually do them—the stages of execution. There are three stages of execution that follow from the goal: plan, specify, and perform (the left side of Figure 2.2). Evaluating what happened has three stages: first, perceiving what happened in the world; second, trying to make sense of it (interpreting it); and, finally, comparing what happened with what was wanted (the right side of Figure 2.2).

There we have it. Seven stages of action: one for goals, three for execution, and three for evaluation (Figure 2.2).

1. Goal (form the goal)
2. Plan (the action)
3. Specify (an action sequence)
4. Perform (the action sequence)
5. Perceive (the state of the world)
6. Interpret (the perception)
7. Compare (the outcome with the goal)

FIGURE 2.2. The Seven Stages of the Action Cycle.

Putting all the stages together yields the three stages of execution (plan, specify, and perform), three stages of evaluation (perceive, interpret, and compare), and, of course, the goal: seven stages in all.

The seven stages of the action cycle
Modèle conceptuel

Construit sur la base de connaissances et d'expériences

Ce que nous croyons savoir sur un objet, une procédure, un système

Non nécessairement complet ou correct, mais "suffisamment bon" pour être utile
Le bon outil transparent n'est pas celui que vous ne pouvez pas voir
Quand la caméra se cache : la porte sans vitre...
https://m.ina.fr/video/VDD10007920/la-porte-sans-vitre-video.html
Le bon outil transparent n'est pas celui que vous ne pouvez pas voir

C'est celui qui ne vous gêne pas, vous laisse vous concentrer sur votre tâche
Le bon outil doit aussi permettre un usage analytique...
Rendre les choses visibles

Permettre de déterminer l'état du système
Rendre les choix visibles
Rendre les effets des actions visibles
Permettre l'abduction et le test d'hypothèses
La technologie n'est pas une chose qui "arrive"
La technologie n'est pas une chose qui "arrive"

La technologie se décide, elle se conçoit
Pourquoi fait-on ces choses ?
Pour quoi fait-on ces choses ?
"Because we can"?
"Because we can't" ?
So, they've started psi research because they thought we were doing psi research, when in fact we weren't doing psi research?

Yes, sir. But now that they're doing psi research, we're gonna have to do psi research, sir.
Comment fait-on ces choses ?
"[...............] by design" ?
"l'humain dans la boucle" ?
Science finds,
Industry applies,
Man adapts

Exposition universelle, 1833
People propose,  
Science studies,  
Technology conforms

Don Norman, 1993
Les systèmes autonomes sont des outils informatiques comme les autres

Ils doivent être conçus en réponse à des besoins ou désirs de leurs utilisateurs

Ils doivent fournir les éléments nécessaires à leur compréhension et utilisation
Quel droit avons-nous de rejeter un futur que nous n'avons pas pris la peine de penser ?

Futur en Seine / Cap Digital, 3 avril 2017

https://blog.futuresfestivals.com/2017-futur-seine-suivra-piste-nouvelles-intelligences/
L'informatique doit être au service de chaque citoyen

Loi n° 78-17 du 6 janvier 1978 relative à l'informatique, aux fichiers et aux libertés