

Princípios de Usabilidade (continuação)

Interface Pessoa-Máquina - 25/26 - LEI / UM

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Exemplo

Universidade de Minho

eVotUM

OS MEUS PROCESSOS ELEITORAIS

DADOS PESSOAIS

MENSAGENS (8)

HISTÓRICO

Os meus processos eleitorais » Processo de Eleição para o Conselho Geral ... » Eleição para os Representantes dos Profess... » Consulta das referências de voto

CONSULTA DAS REFERÊNCIAS DE VOTO

Insira a sua

13d4d4b87661c8e7f2f83d74aced3f93a8ee63e4fb3236b6b96f4021e48a4e76

VALIDAR

Lista de referências de voto

1876dlj765asd098lk143kg5k4a93b5b94537c9f4e2s6ado237bn1d9mn6sl879
1976dlj76ks823bnjg5k4au93b5b94537c9f4e2s6ado237bn1d9mn6sl879sd45
1243dlj76ks823bnjg5k4au93b5b94537c9f4e2s6ado237bn1d9mn6sl890sd28
1289dlj76ks823bnkg5k4au93b5b94423c9f4e2s6ado237bn1d9kh6sk890re45

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CONSULTA DAS REFERÊNCIAS DE VOTO

Insira a sua referência de voto e valide se o seu voto foi contabilizado.

13d4d4b87661c8e7f2f83d74aced3f93a8ee63e4fb3236b6b96f4021e48a4e76

VALIDAR

O seu voto foi contabilizado com sucesso!

Lista de referências de voto

13d4d4b87661c8e7f2f83d74aced3f93a8ee63e4fb3236b6b96f4021e48a4e76
--

Exemplo

Learnability	Flexibility	Robustness
Predictability	Dialogue initiative	Observability
Synthesizability	Task migratability	Recoverability
Familiarity	Substitutivity	Responsiveness
Generalizability	Customizability	Task conformance
Consistency	Multithreading	

Exemplo (Learnability)

- **Predictability** (capacidade de determinar o efeito de ações no sistema)
 - Validação podia ser live as you type
- **Synthesizability** (capacidade de determinar o efeito de ações passadas no estado atual)
 - + Efeito da validação é óbvio
 - + Aparente independência de validações anteriores
- **Familiarity** (utilidade de conhecimento anterior sobre o mundo ou outros sistemas)
 - O que é uma referência de voto?
 - Nenhuma metáfora de eleições

Exemplo

Learnability	Flexibility	Robustness
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Exemplo (Flexibility)

- **Dialogue initiative** (maximizar o sentimento de controle do utilizador)
 - + Iniciativa do lado do utilizador, mas adequado
 - Poderia haver mais apoio na pesquisa de referências
- **Substitutivity** (suportar valores equivalentes como permutáveis)
 - Não existem outras formas de referenciar votos
 - Por exemplo, suportar referências parciais à lá G i t?
- **Multithreading** (suportar interação com o utilizador para várias tarefas em simultâneo)
 - Apenas processa uma referência de cada vez

Exemplo

Learnability	Flexibility	Robustness
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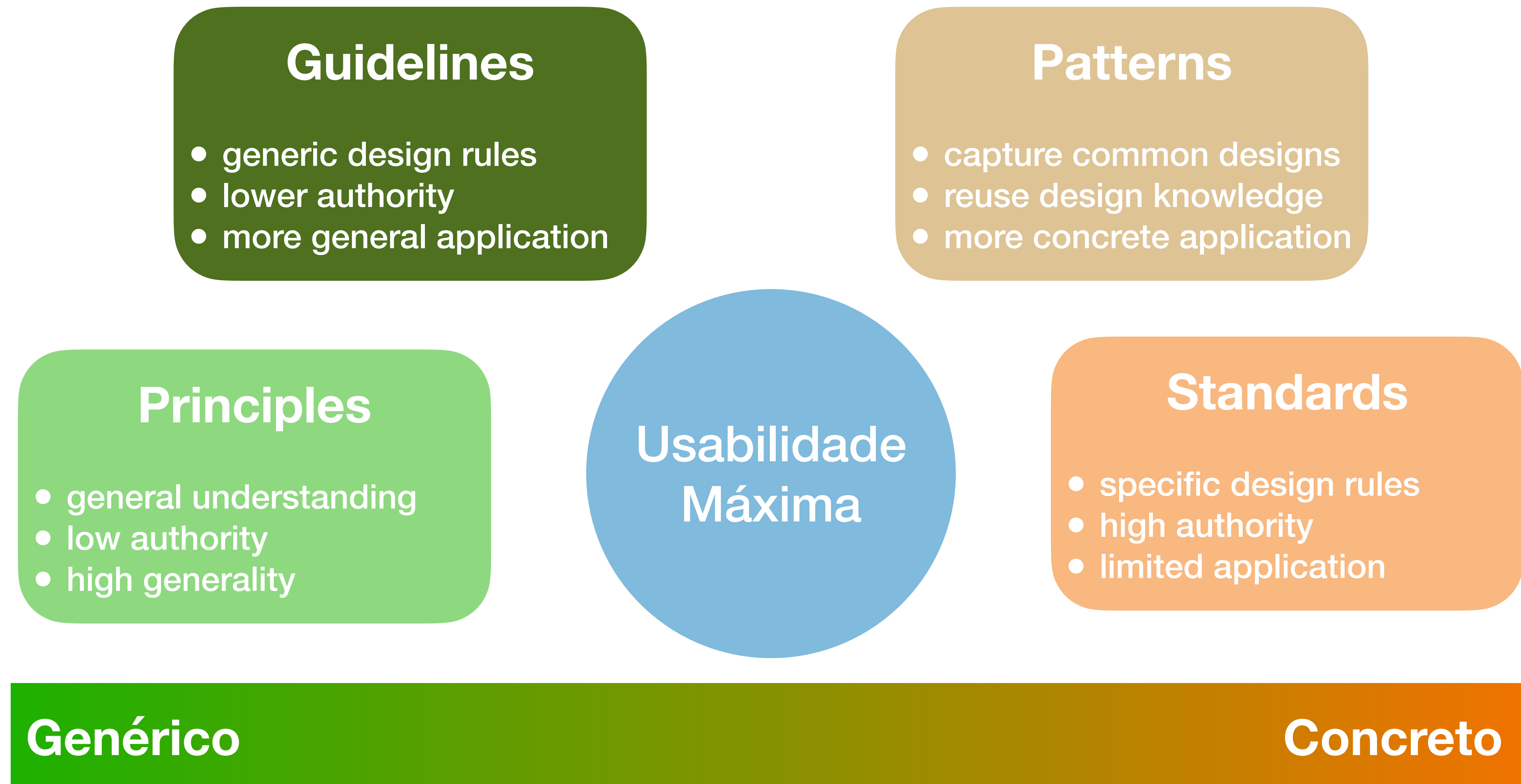
Exemplo (Robustness)

- **Observability** (capacidade de compreender o estado interno do sistema)
 - + Affordance simples, mas óbvio qual o comportamento da operação Validar
 - Lista de referências atualizada a cada validação? Porquê múltiplas referências? Porque não manter histórico completo? Mensagem de validação efémera?
- **Responsiveness** (qual a taxa de comunicação percebida com o sistema)
 - + Feedback adequado e atempado
 - Podia haver atualização da lista para referências parciais, live as you type
- **Task conformance** (quanto o sistema suporta as tarefas dos utilizadores)
 - Nada óbvio como obter uma referência, fora da UI?
 - Lista de referências depois de validação parece inútil

Exemplo

Learnability	Flexibility	Robustness
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Desenhar para usabilidade máxima



Guidelines de usabilidade

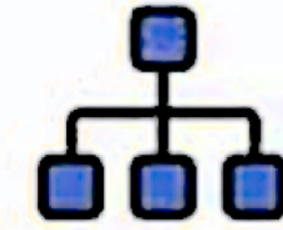
- Mais operacionais, derivadas dos princípios
- Muitas compilações de guidelines (mesmas ideias, organização diferente)
 - Norman's principles (4)
 - Shneiderman's Golden Rules (8)
 - Tog's First Principles (19)
 - Tognazzini's principles (16)
 - **Nielsen's Heuristics (10)**
- 💡 Regras de design de “pincel largo”
- ! Nem sempre úteis para todos os contextos (exige prática)

Heurísticas de usabilidad

1. Visibility of System Status



6. Recognition rather than Recall



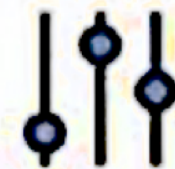
2. Match between System and Real World



7. Flexibility and Efficiency of Use



3. User Control and Freedom



8. Aesthetic and Minimalist Design



4. Consistency and Standards



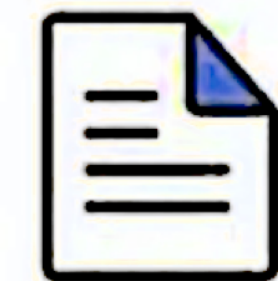
9. Help Users Recognize, Diagnose, and Recover from Errors



5. Error Prevention

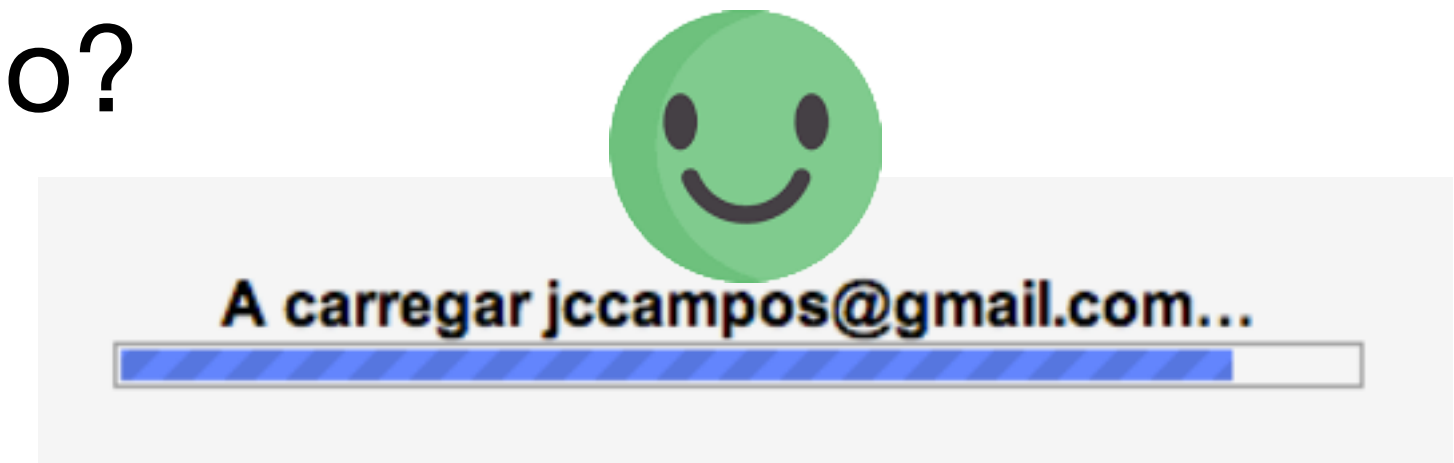


10. Help and Documentation



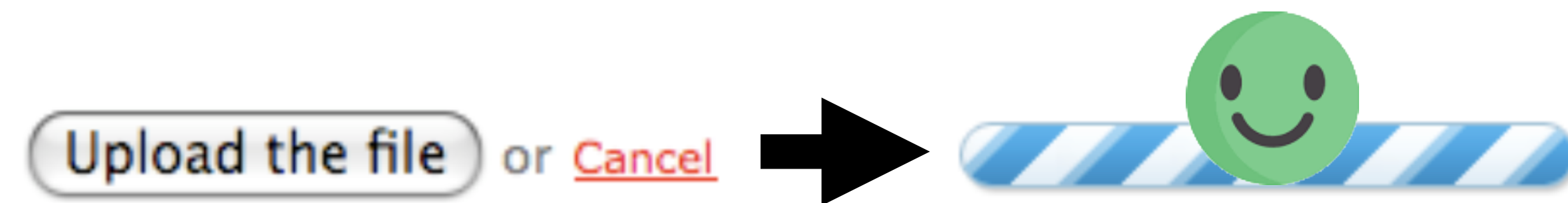
Heurística #1: Visibility of system status

- O sistema mantém o utilizador informado sobre o seu estado?

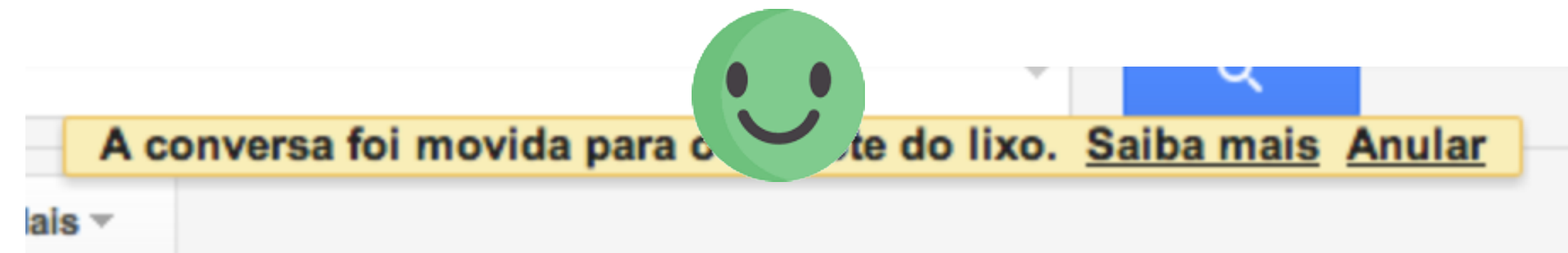


- E.g., barra de progresso

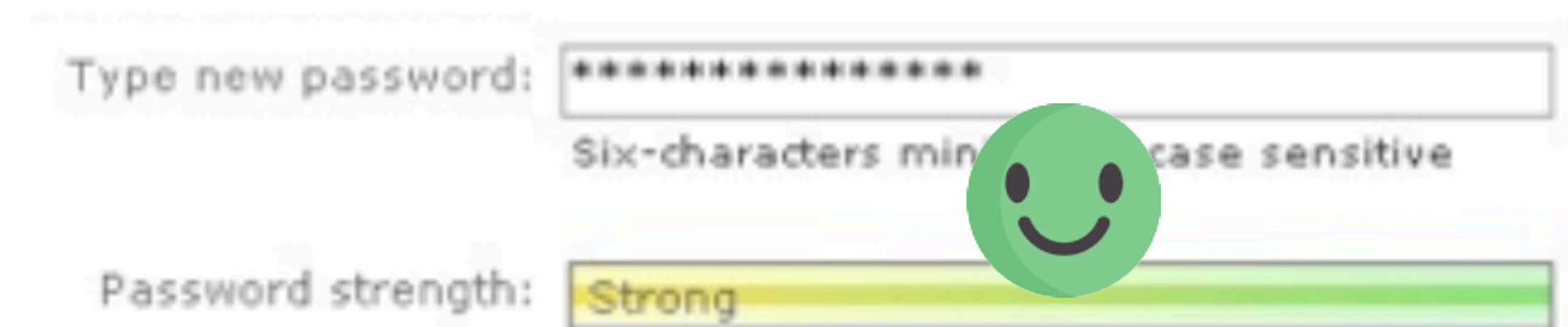
- E.g, mudança de widgets



- E.g., mensagem de feedback

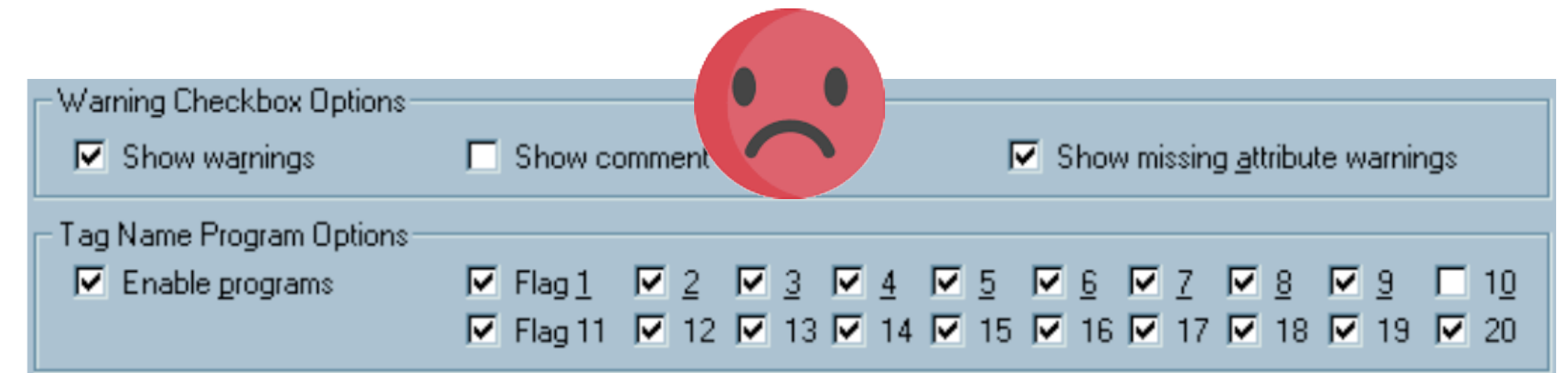
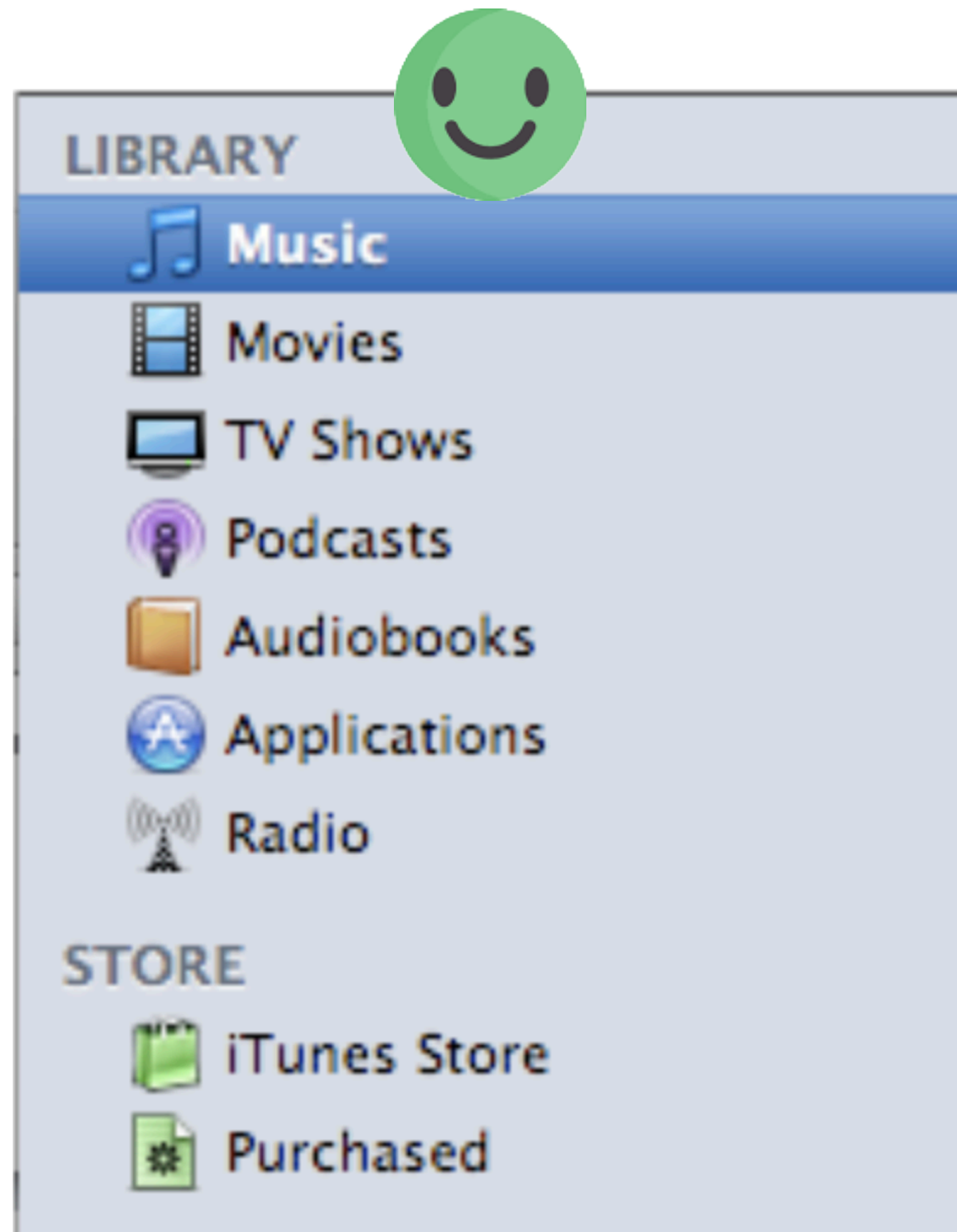


- E.g., Atualização contínua

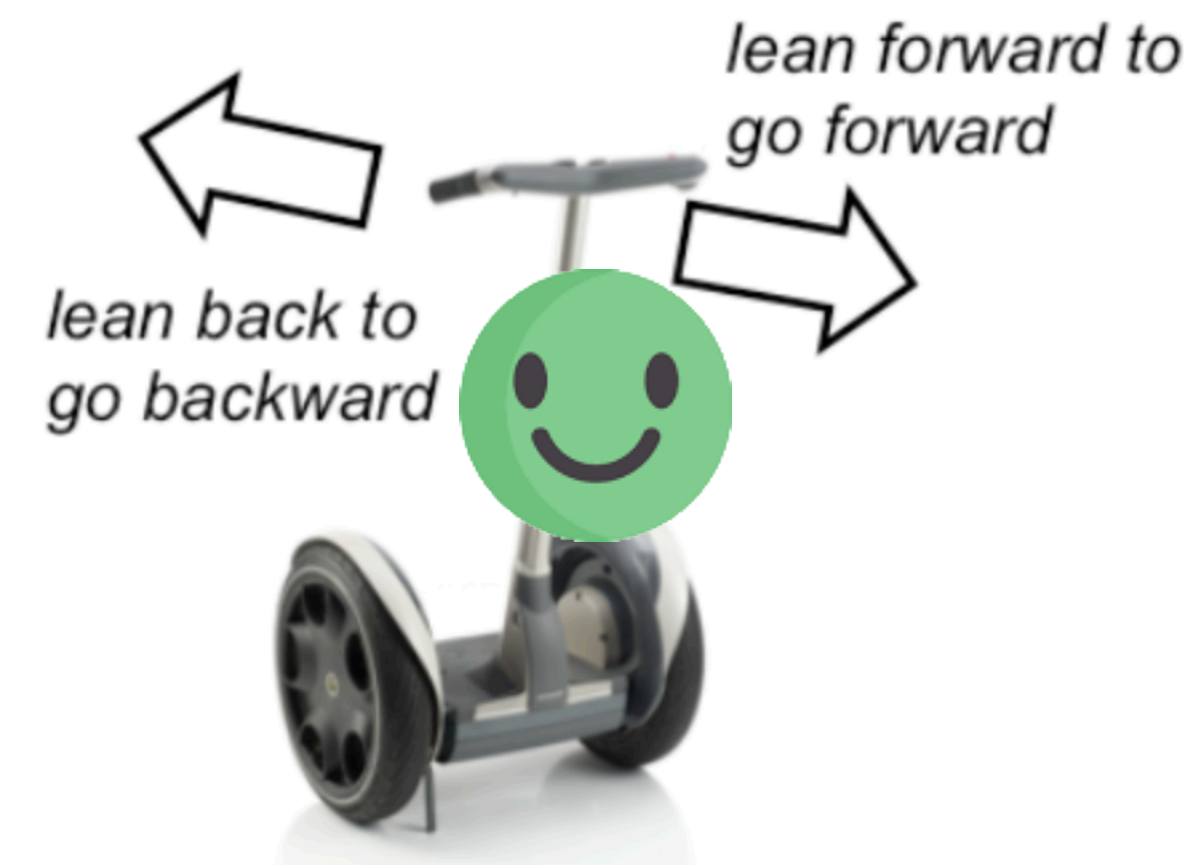


Heurística #2: Match system and real world

- Falar a linguagem do utilizador
 - E.g. utilizar metáforas
 - E.g., evitar jargão técnico



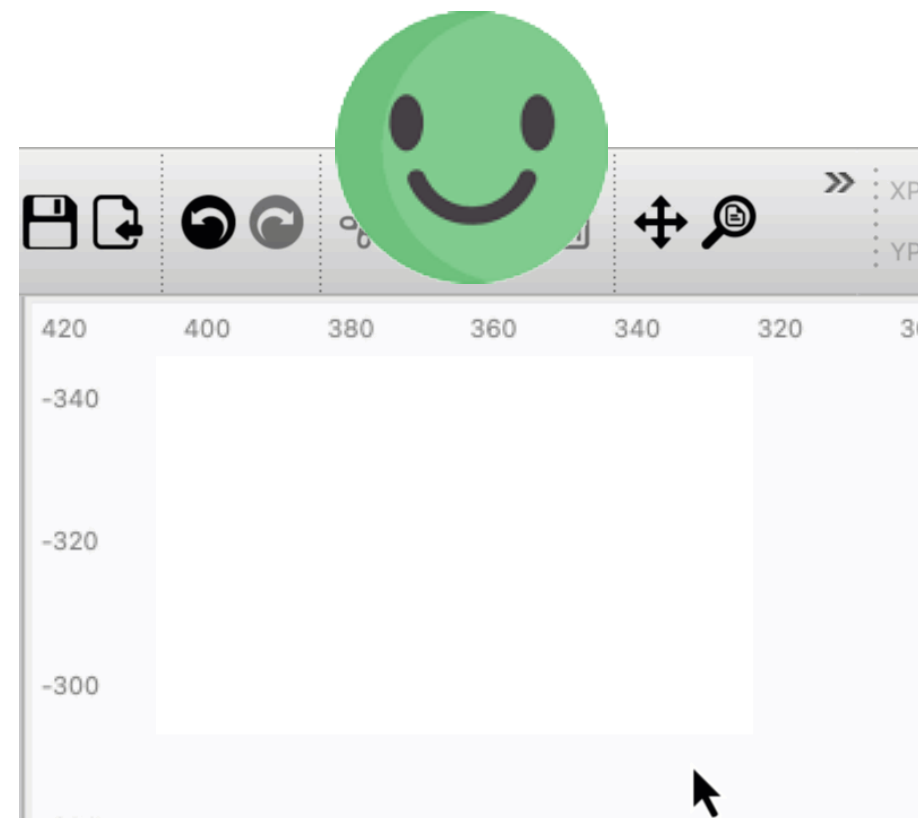
- E.g., mapeamento natural entre função e interface



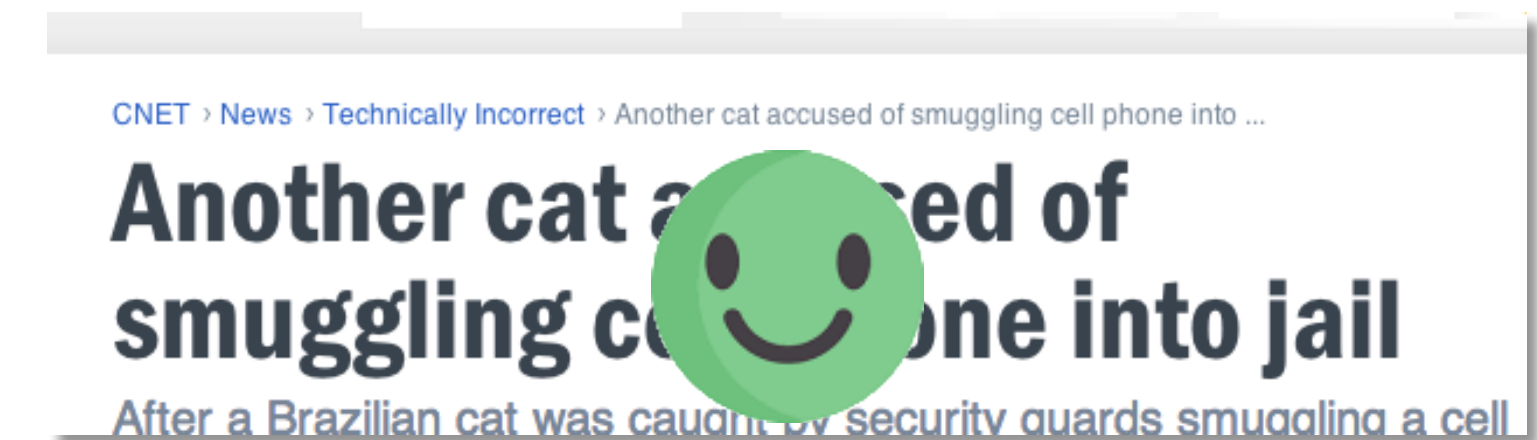
Heurística #3: User control and freedom

- Ajudar o utilizador a navegar pela interface

- E.g., undo/redo



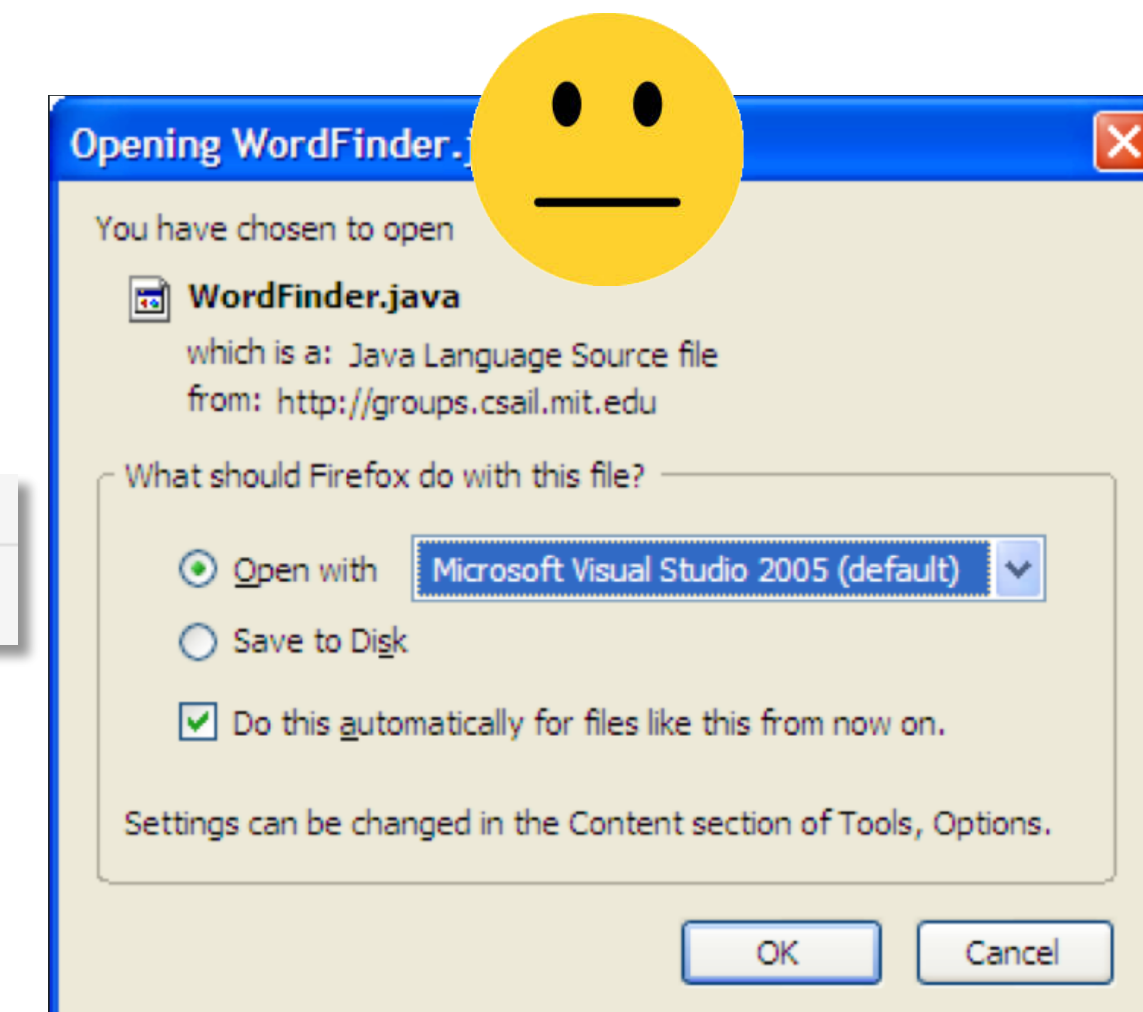
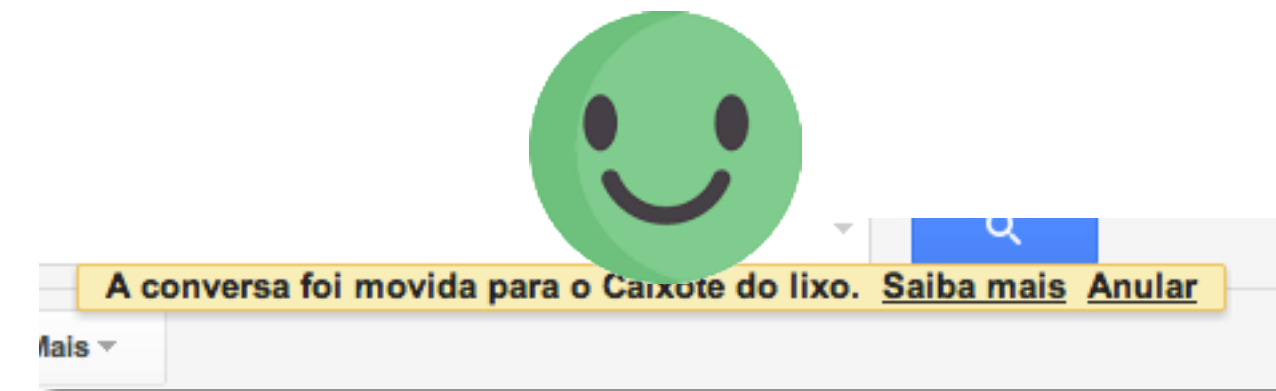
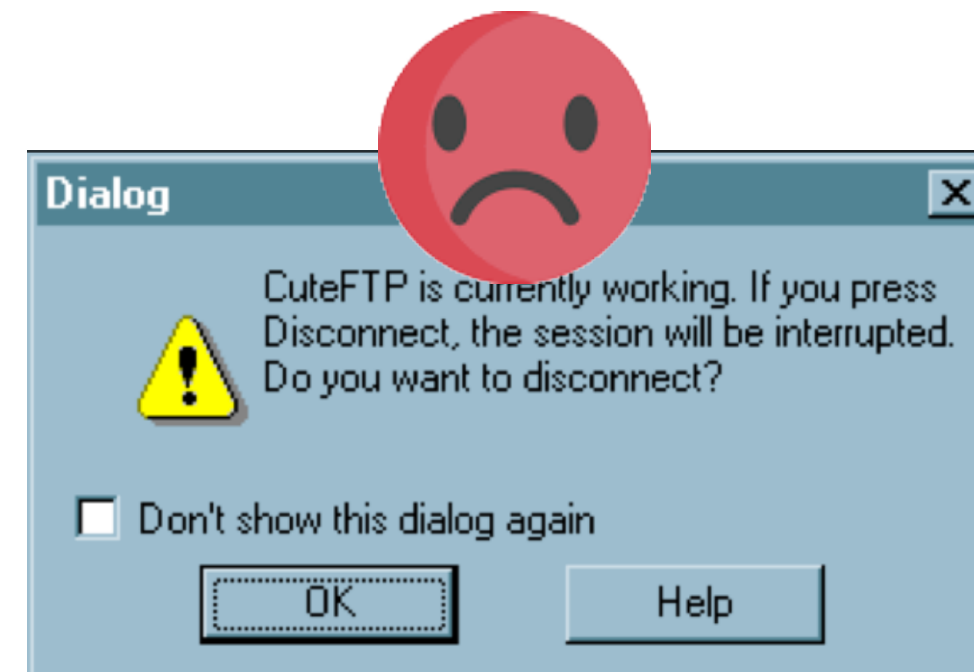
- E.g., o utilizador sabe onde está?



- E.g., recuperar de erros (inclusive do utilizador)

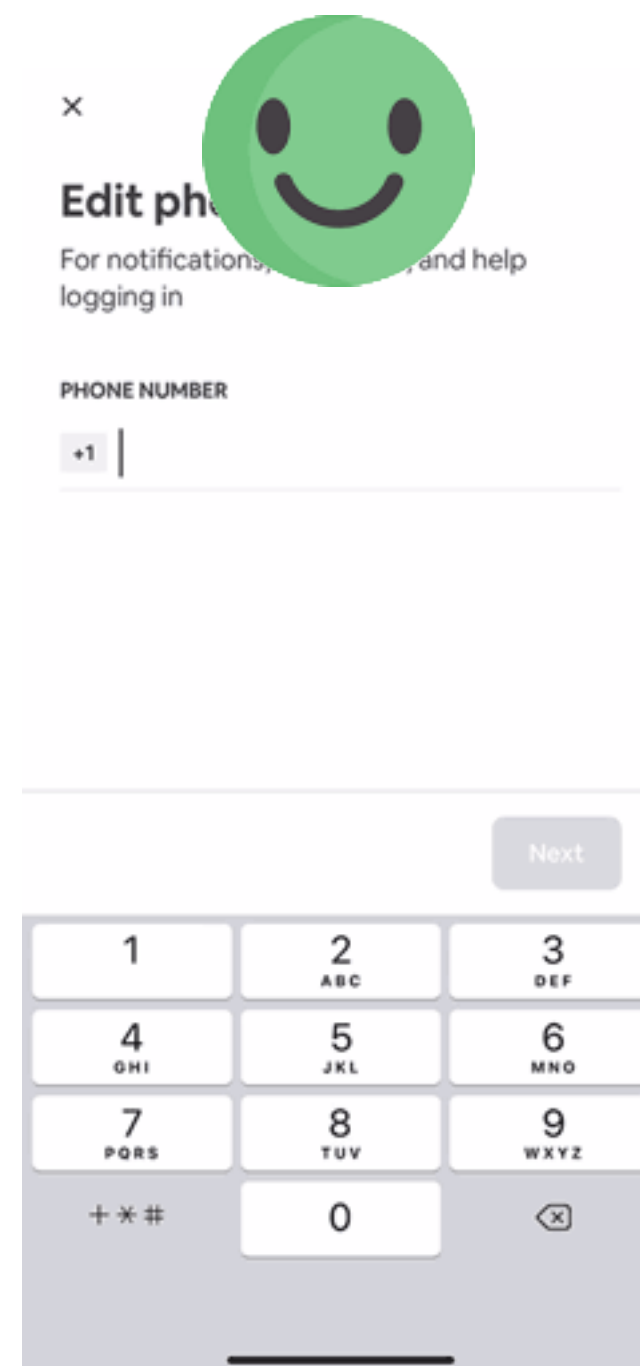
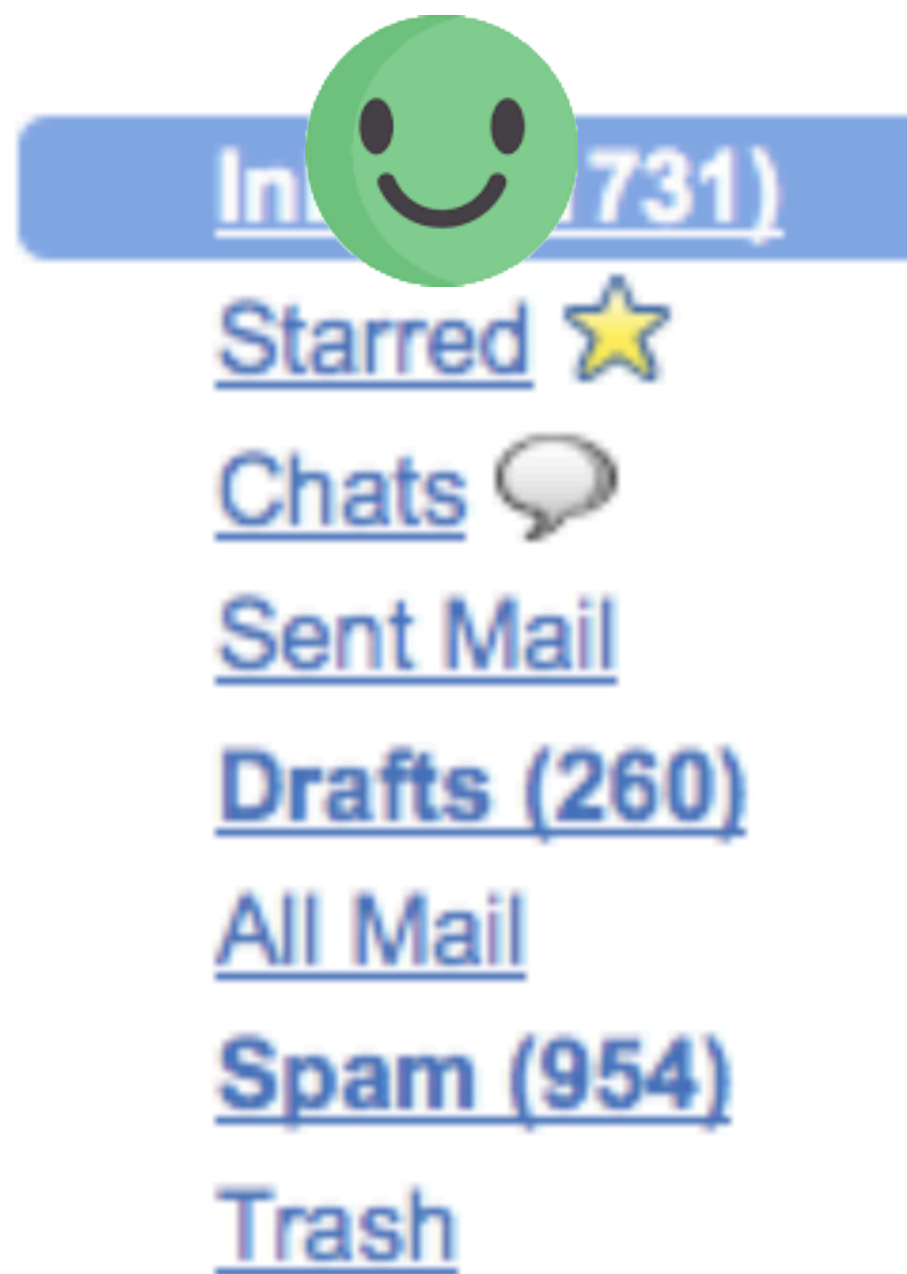
- E.g., cancelar operações

	A	B	C	D
1	Item	Quantity	Price	Total
2	Tacos	40	\$5.00	=B2*C2
3				

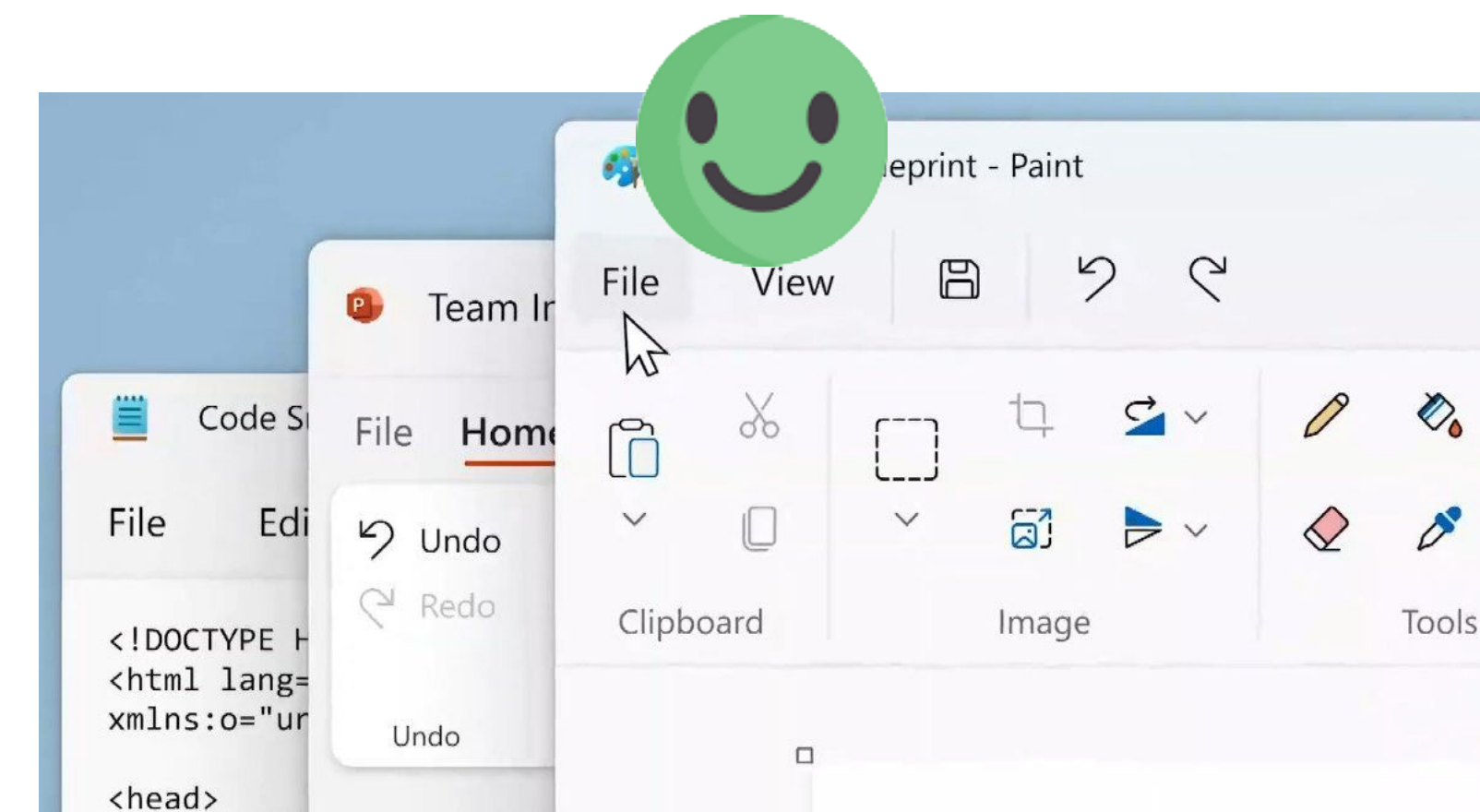
A screenshot of a spreadsheet application. It shows a table with columns A, B, C, and D. Row 1 contains headers: Item, Quantity, Price, Total. Row 2 contains data: Tacos, 40, \$5.00, and a formula =B2*C2. A green smiley face icon is overlaid on the table.

Heurística #4: Consistency and Standards

- São seguidas convenções (informais) e normas (formais)?
 - E.g., nomes / formatos comuns
 - E.g., entre aplicações (Word + Excel)

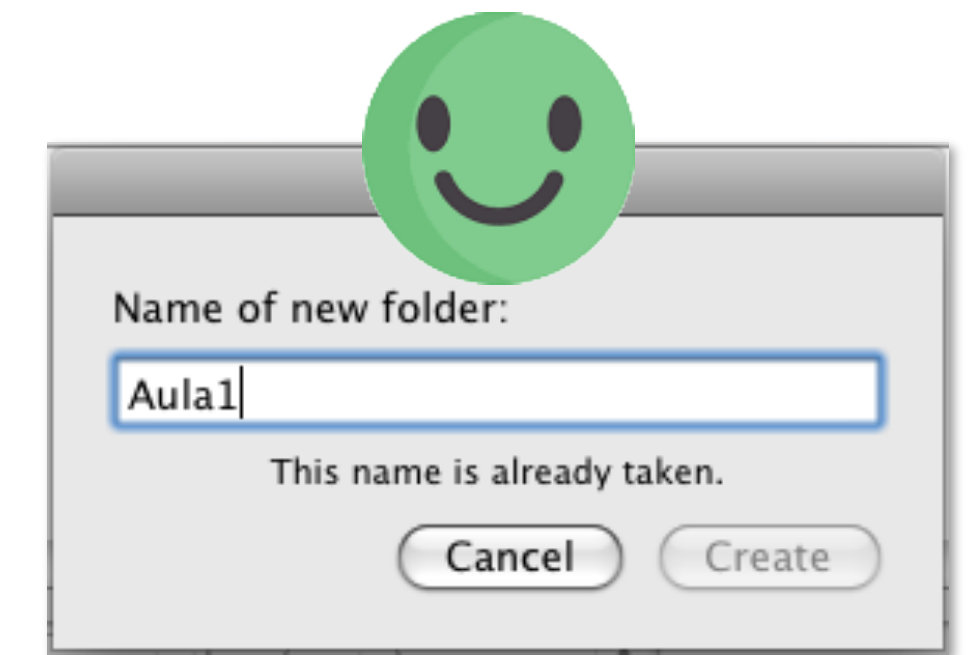
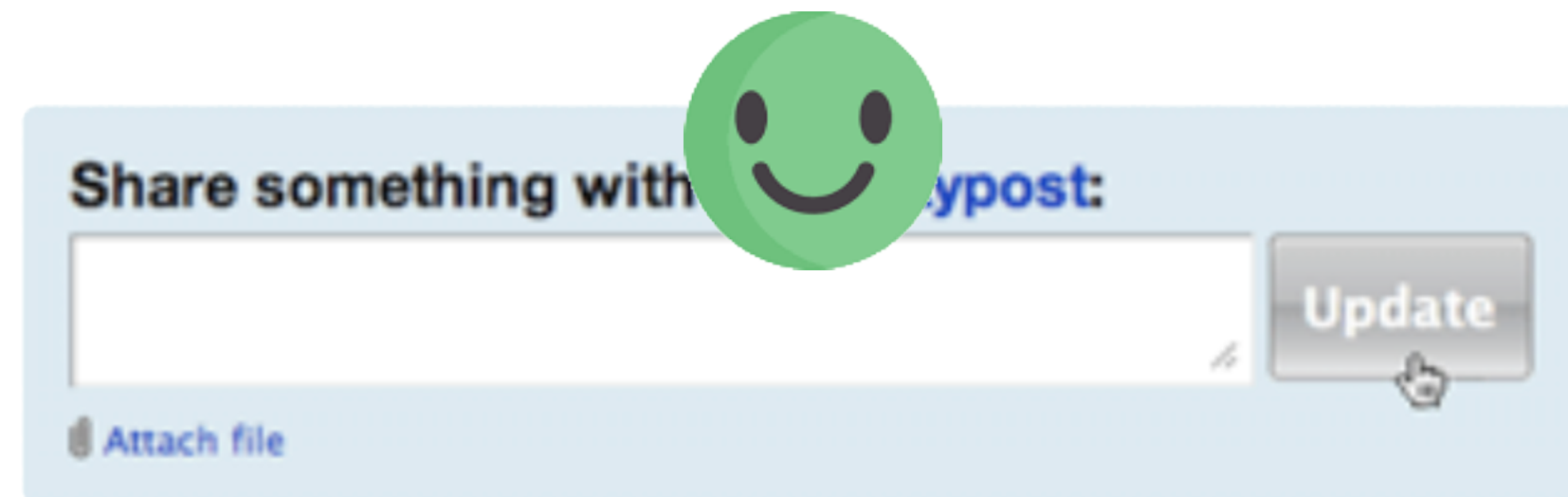
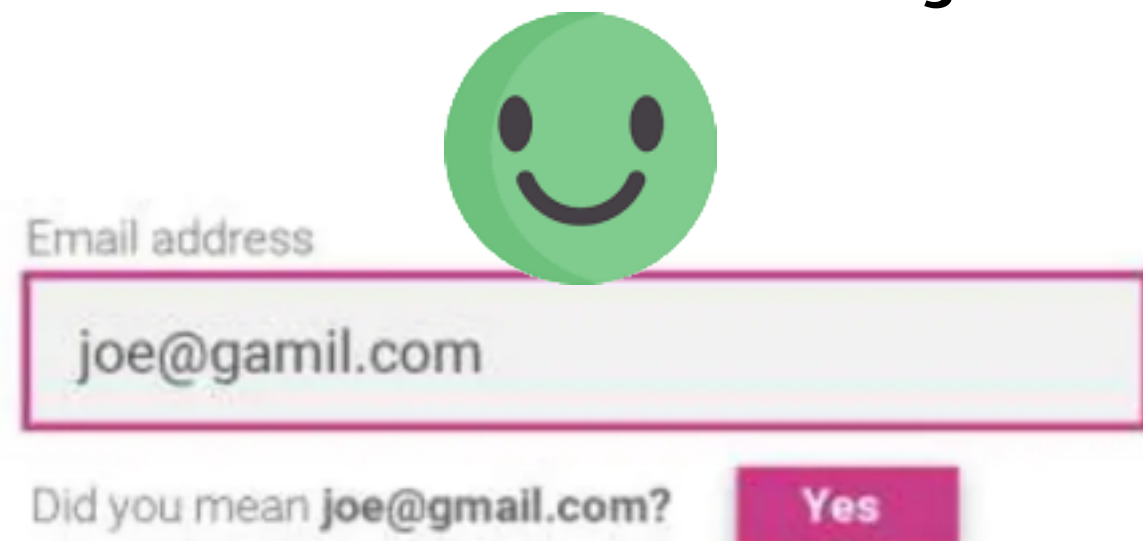


- E.g., Microsoft Fluent Design System

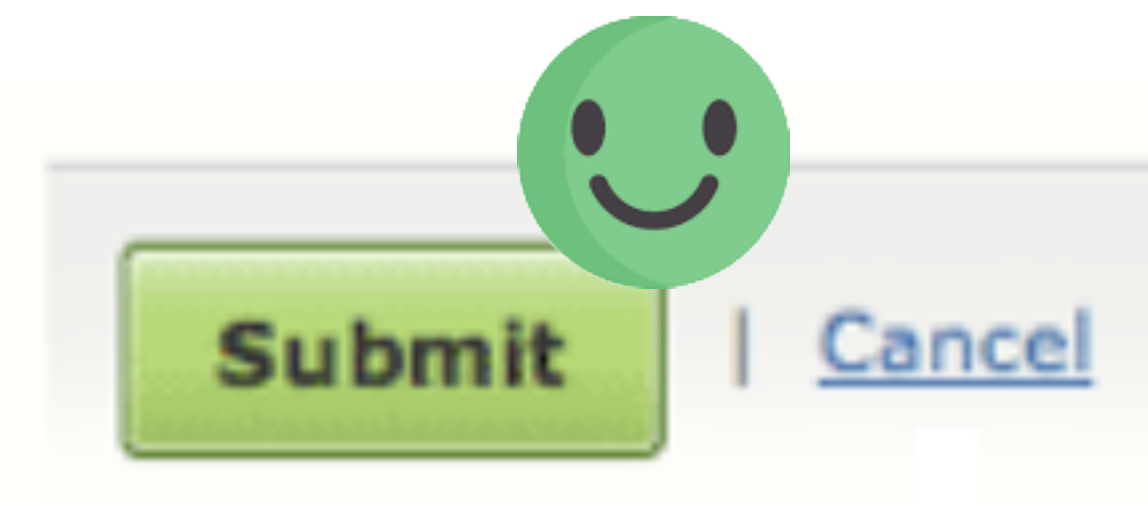


Heurística #5: Error prevention

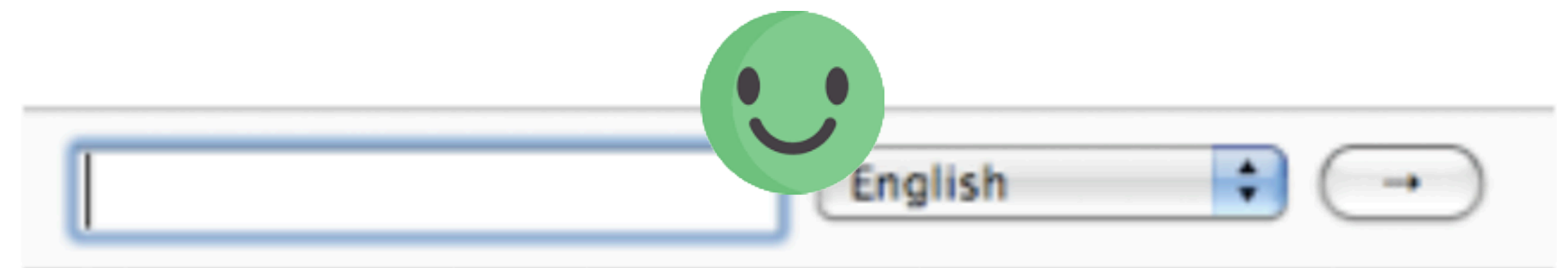
- A interface impede erros evitáveis?
 - E.g., fornecer informação e desativar botões



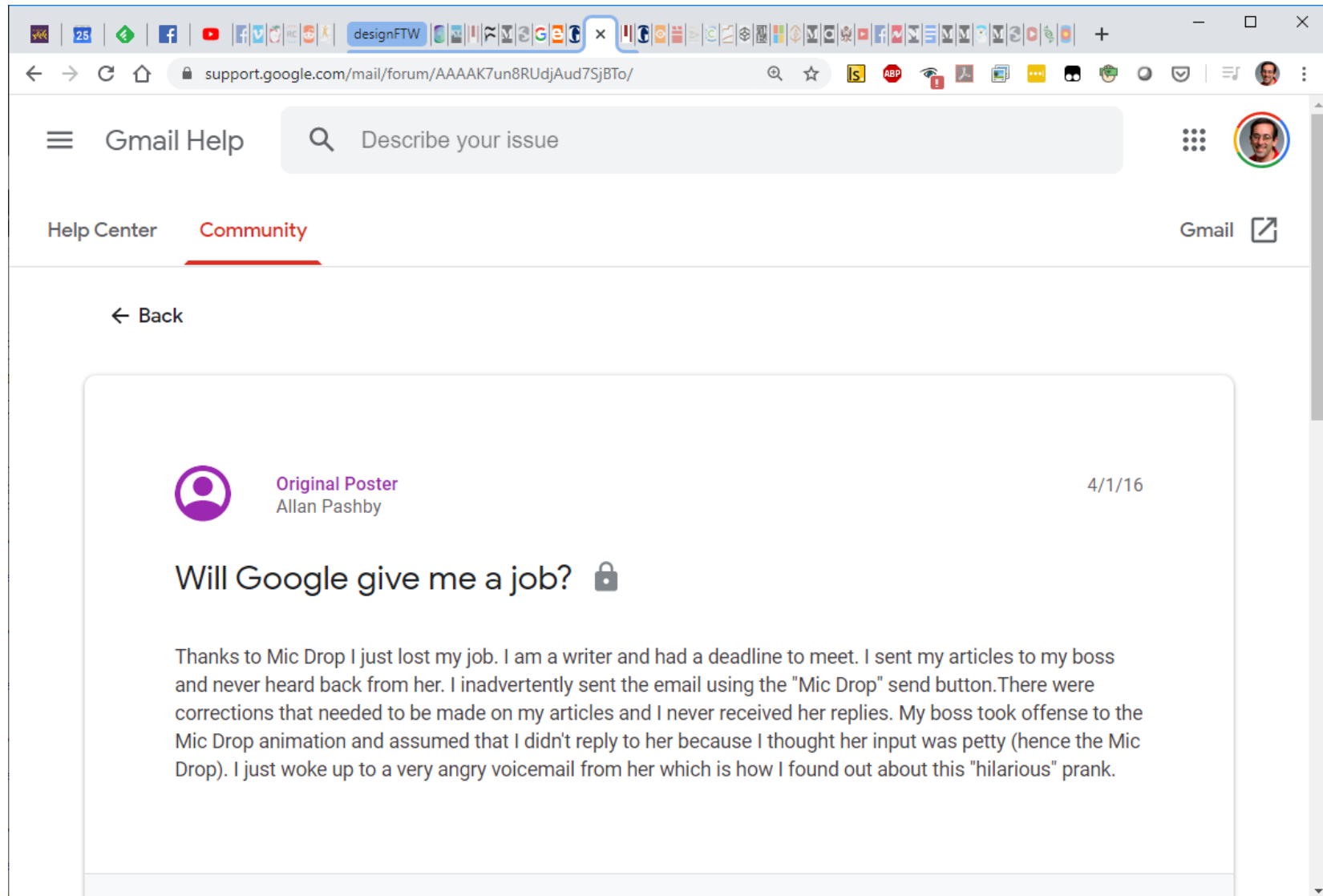
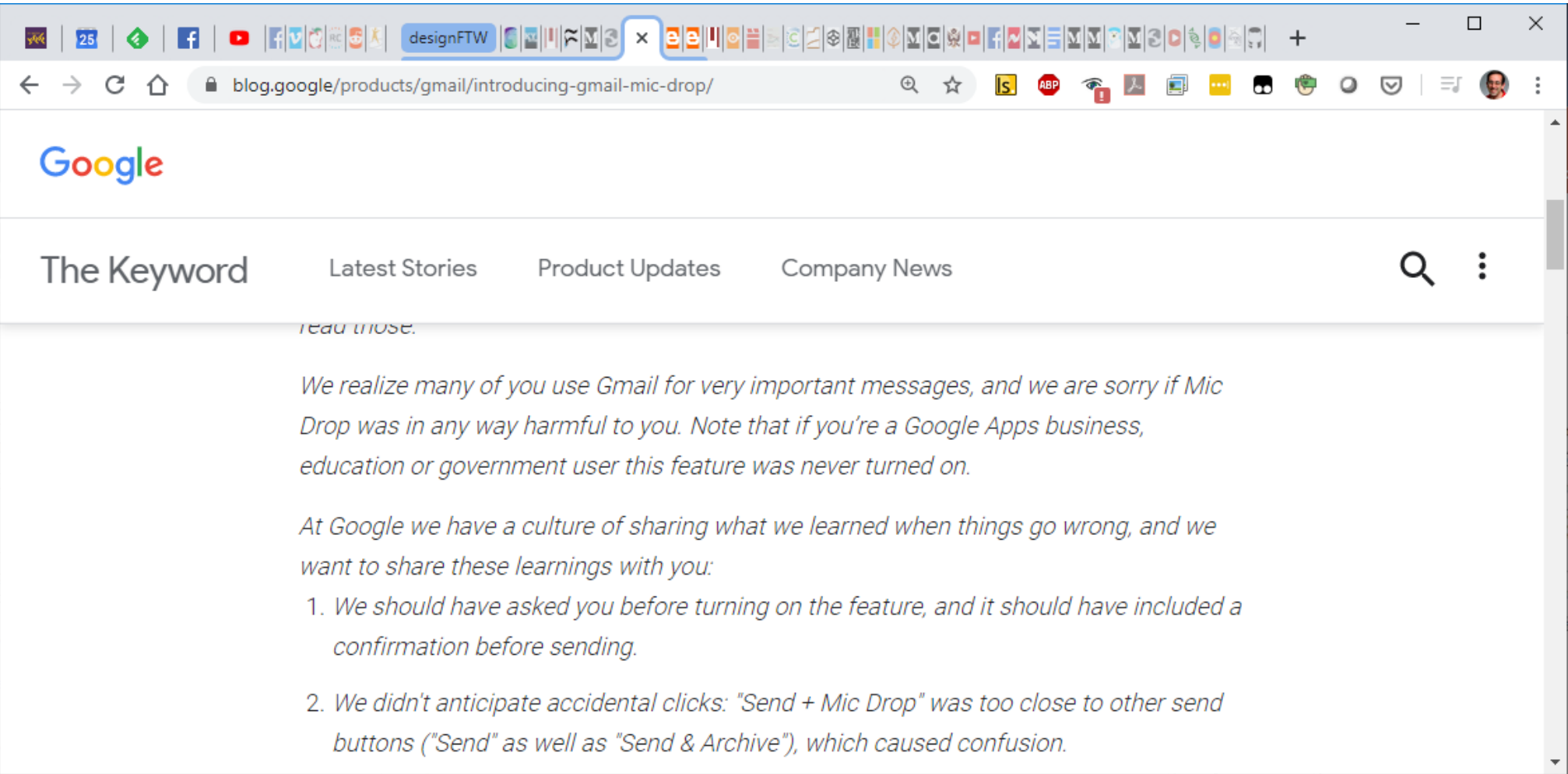
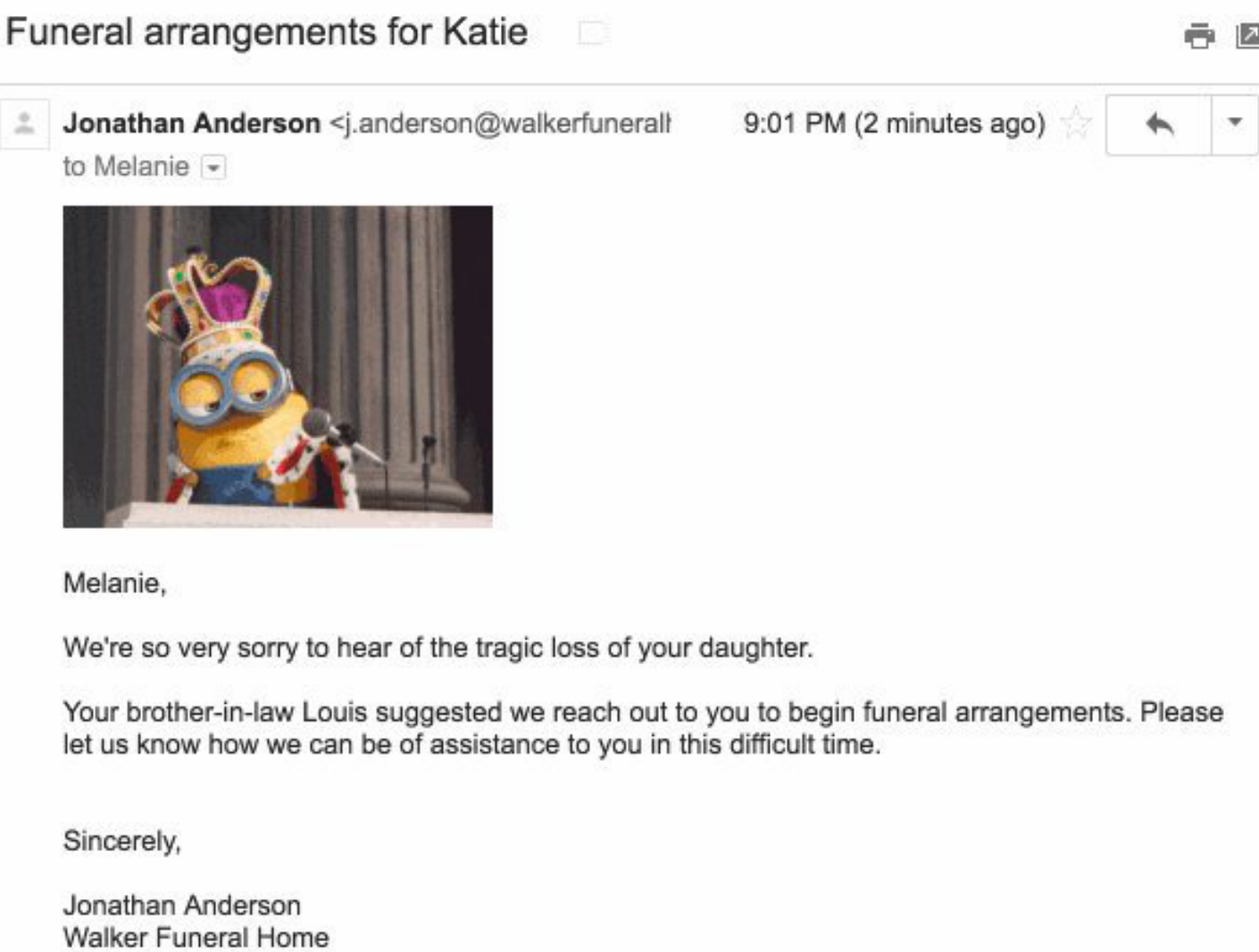
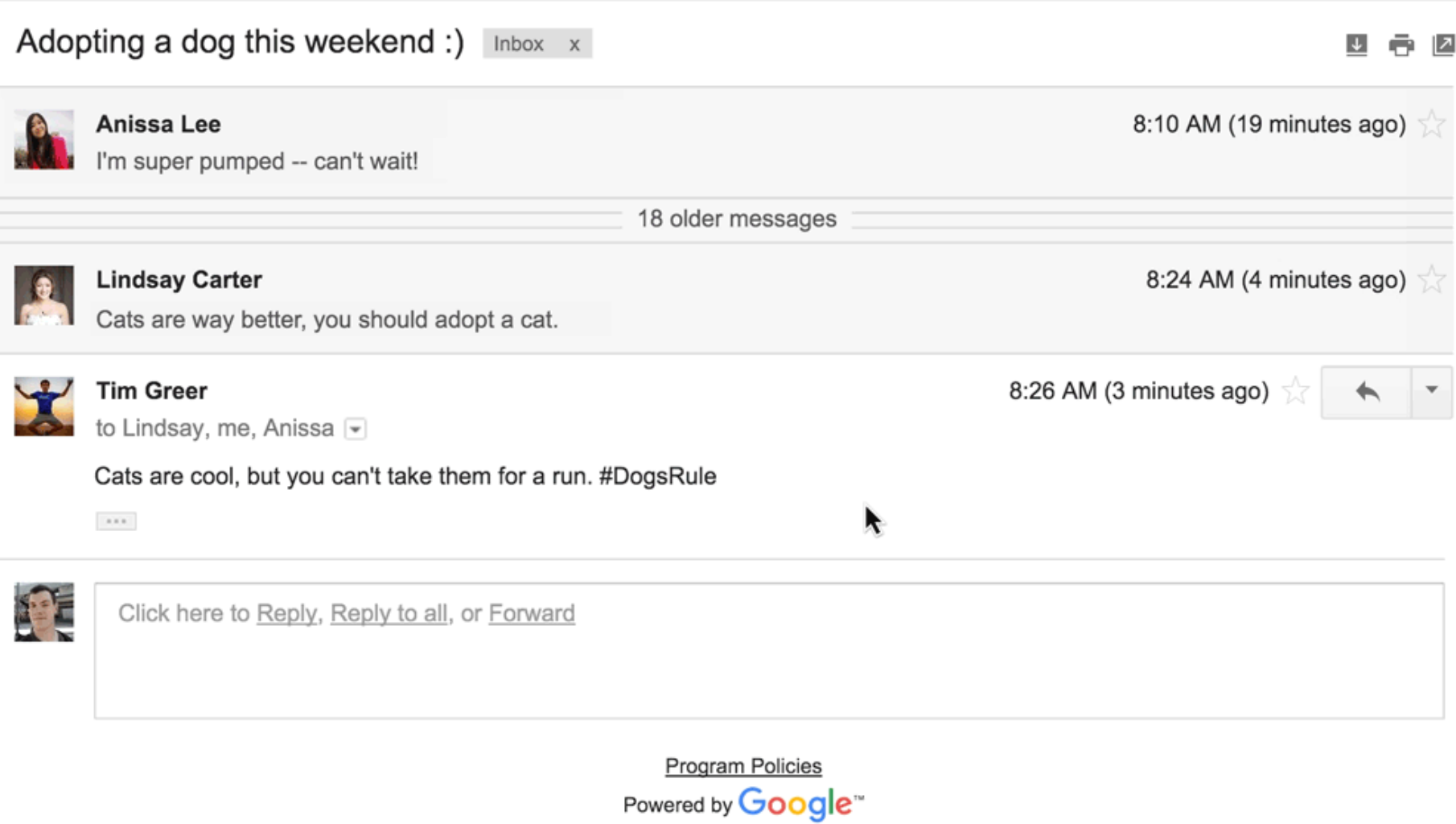
- E.g., ação primária dominante



- E.g., foco automático

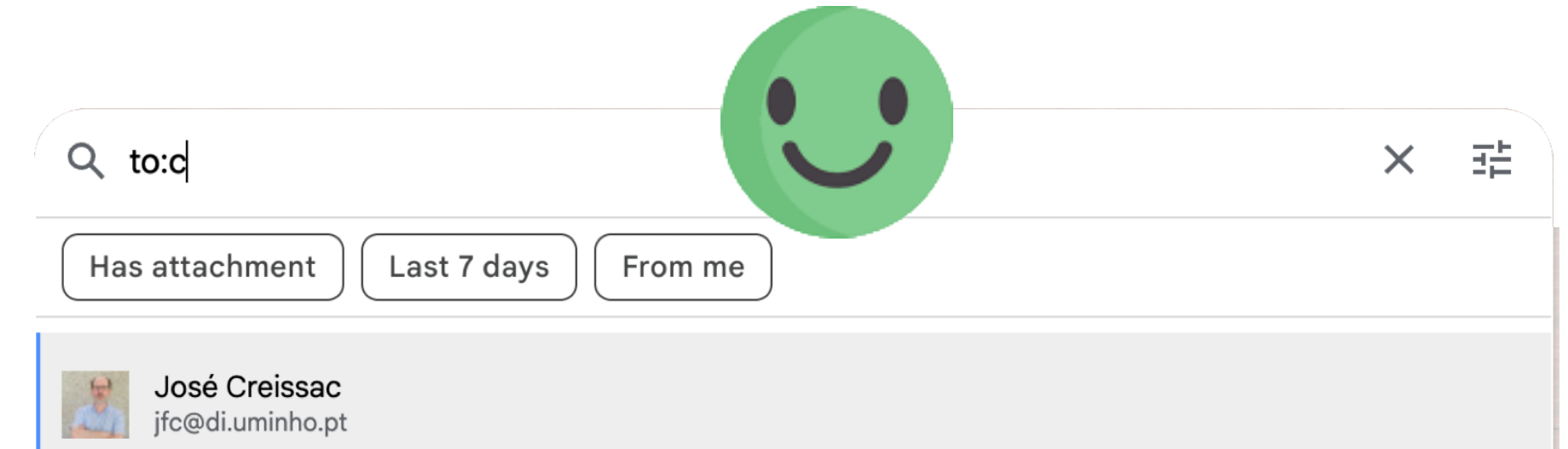
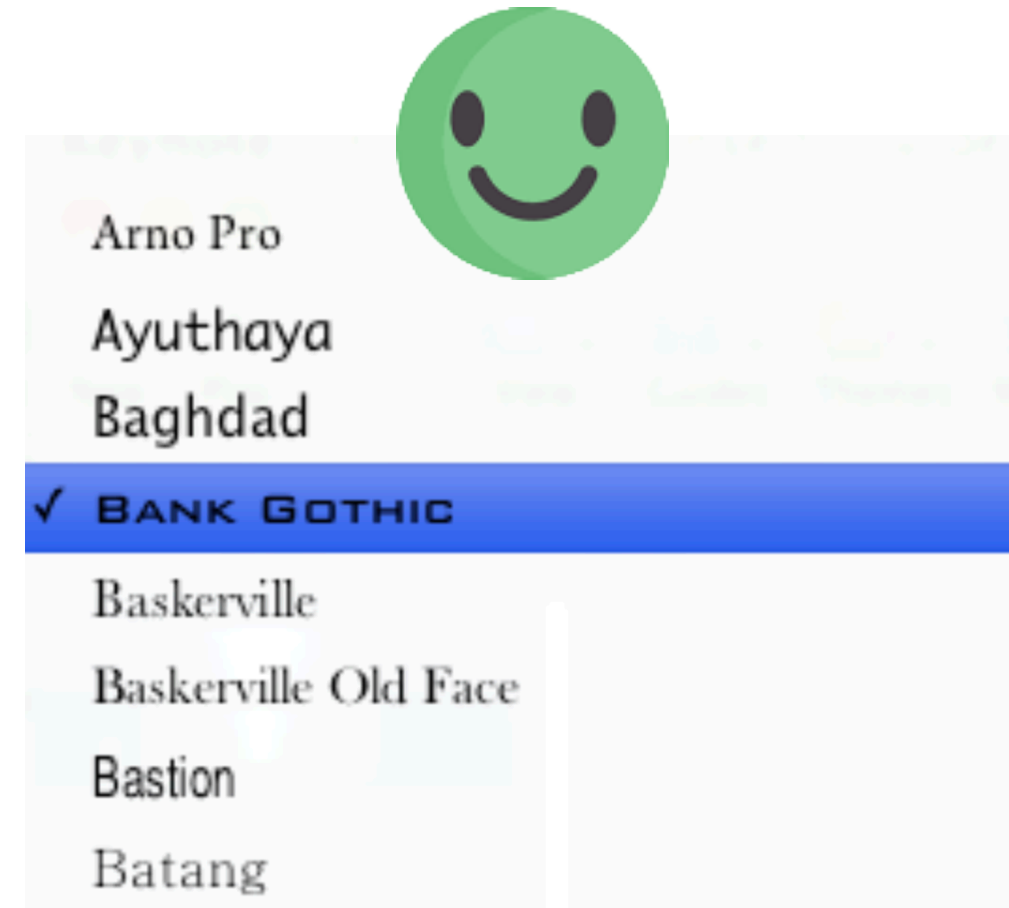
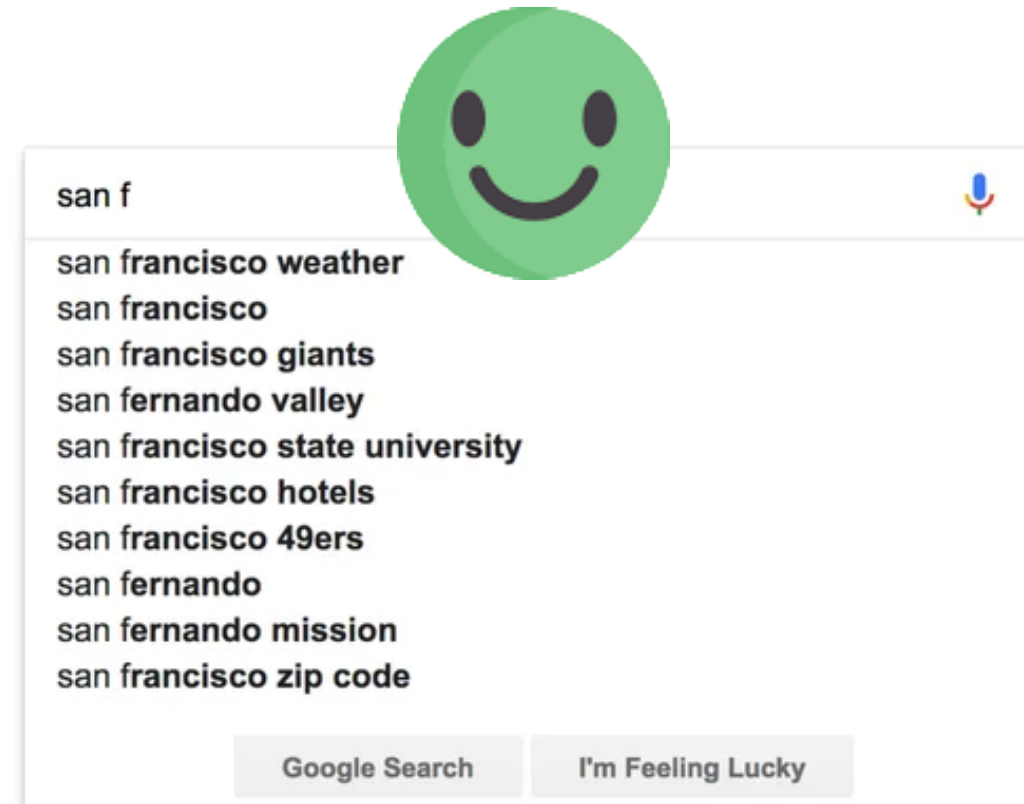


Heurística #5: Error prevention



Heurística #6: Recognition over recall

- O utilizador não deve ter que se lembrar de informação (inclusive de outras partes do interface)
 - 💡 Recognition (relembrar com dicas visuais - “knowledge in the world”)
 - 💡 Recall (relembrar sem ajuda - “knowledge in the head”)
- E.g., autocomplete, dropdown menus



Heurística #7: Flexibility and efficiency of use

- Permitir a utilizadores experientes acelerar a interacção
 - E.g., “hotkey shortcuts”
 - E.g., “previews”



Common shortcuts

Add Action	Return
New Window	⌘N
Synchronize with Server	⌘S
Clean Up	⌘K
Planning Mode	⌘1
Context Mode	⌘2
Inbox	⌘1
Quick Entry	⌘Space

Quick Entry's shortcut can be customized in Preferences



Styles

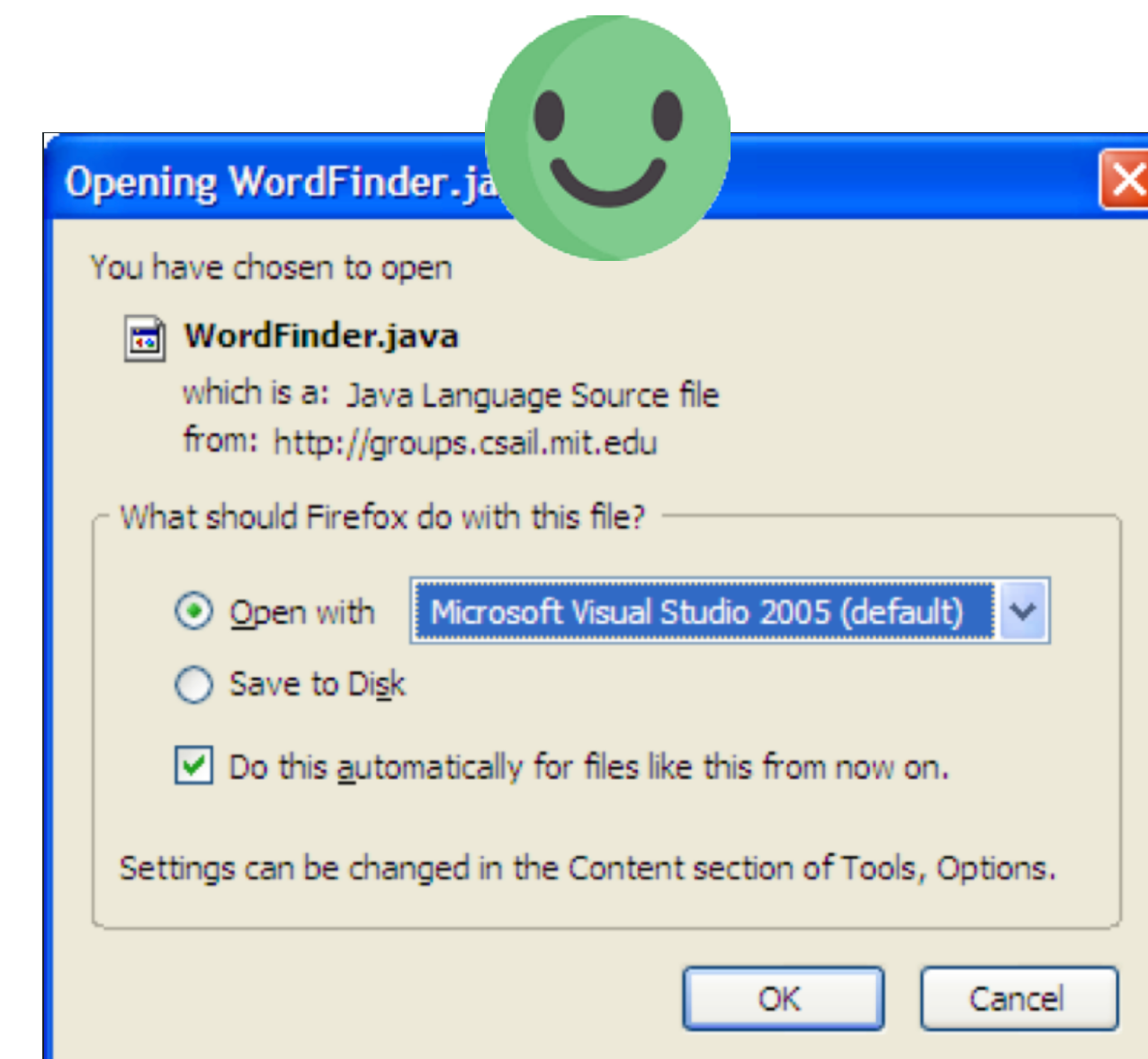
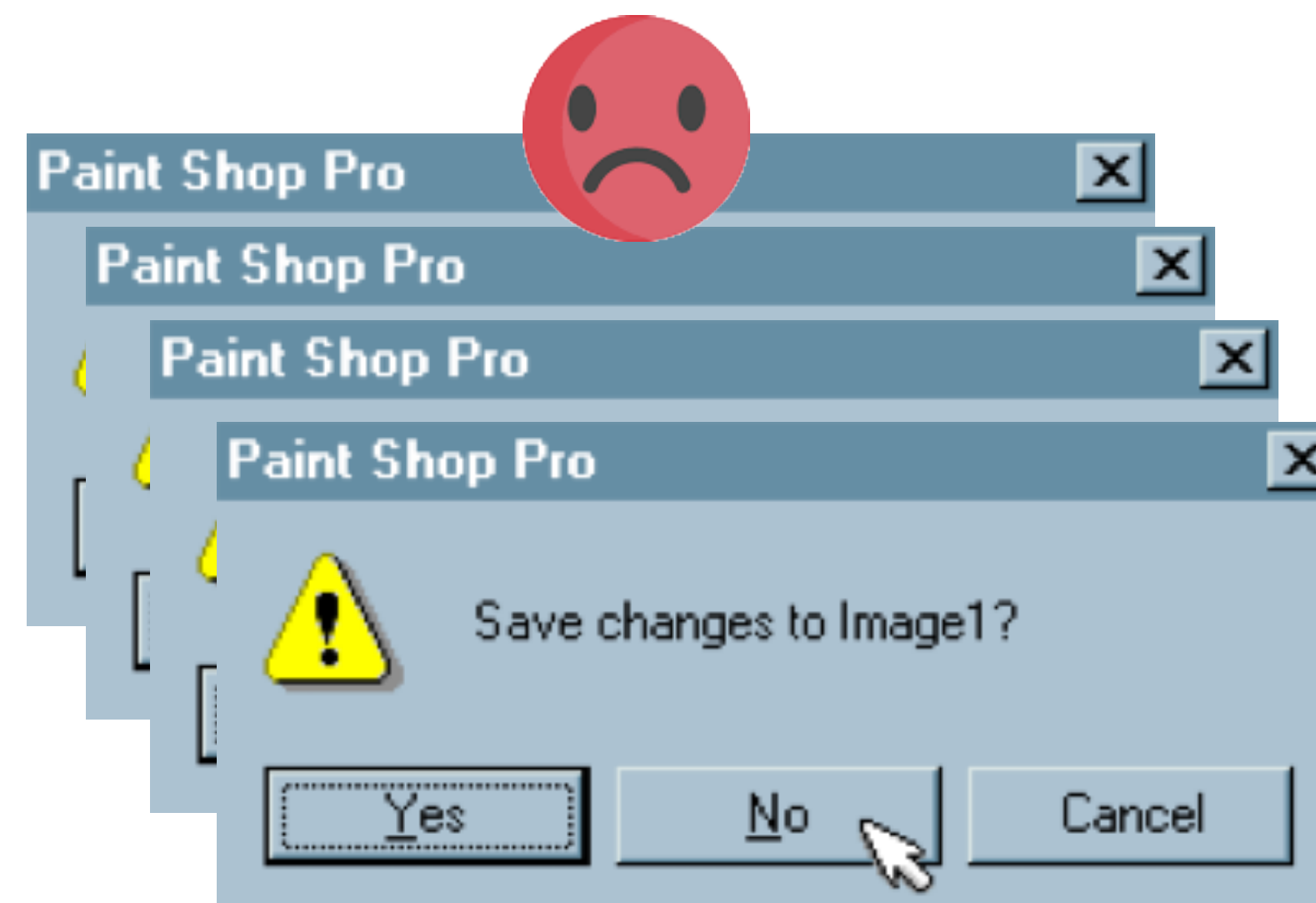
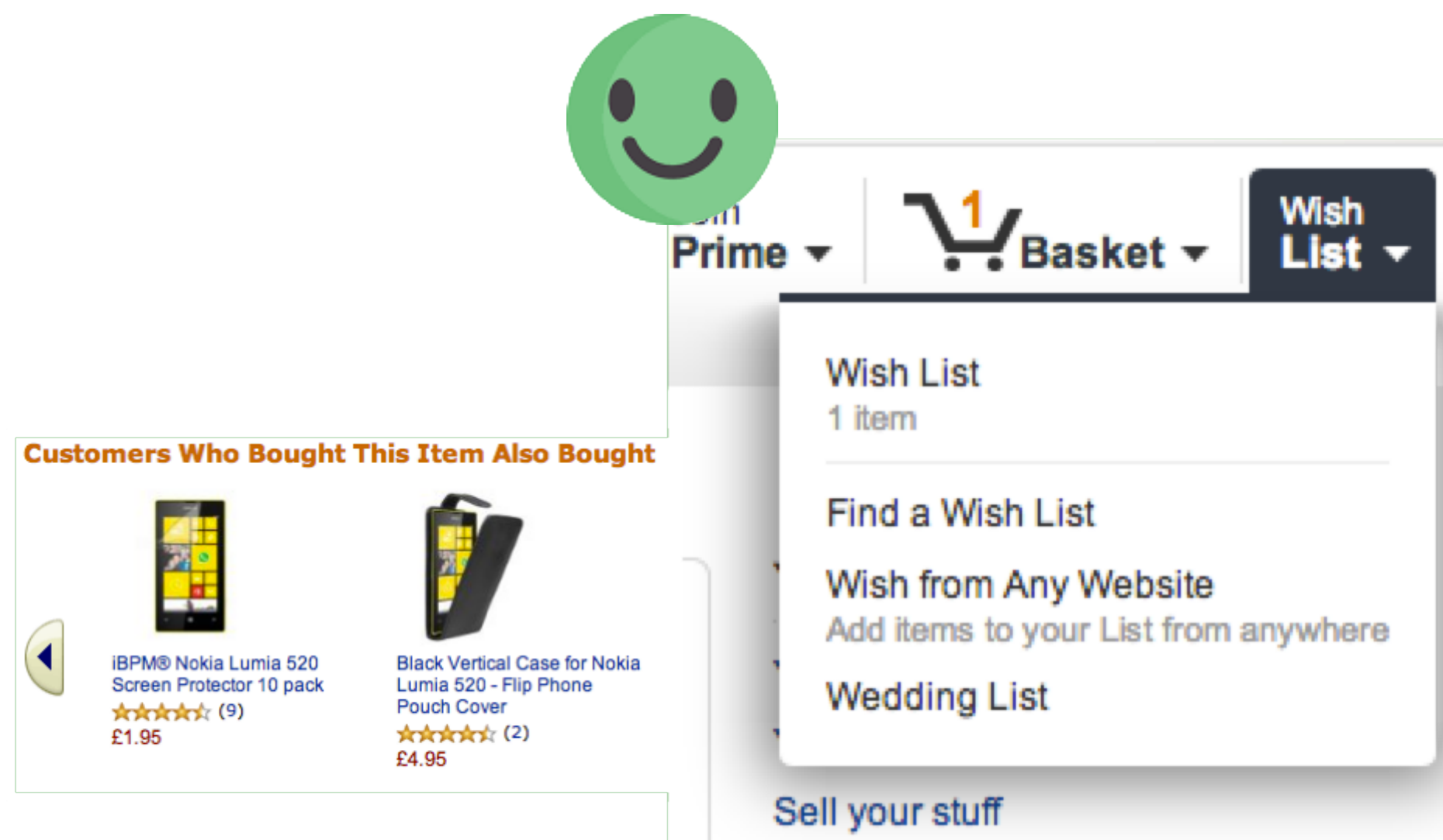
- Basic
- Basic (No Grid)
- Gray
- Gray Headers
- Gray Fill
- Beige
- Ledger
- Blue
- Blue Headers
- Blue Fill
- Gravity**

sum	23.2264292787289
avg	1.78664840605607
min	0.00086222222222...
max	10
count	13

	A	B	C
3	Mean	1.81	1.85
4	Median	1.81	1.85
5	Standard deviation	0.03	0.04
6	Variance	0.00086	0.00138
7	Alpha	0.05	0.05
8	T-value	2.26	2.26
9	Confidence interval	0.01820	0.02304
10	Upper limit	1.82620	1.87704
11	Lower limit	1.78980	1.83096
12	T-interval	0.02100	0.02659
13	Upper limit	1.82900	1.88059
14	Lower limit	1.78700	1.82741

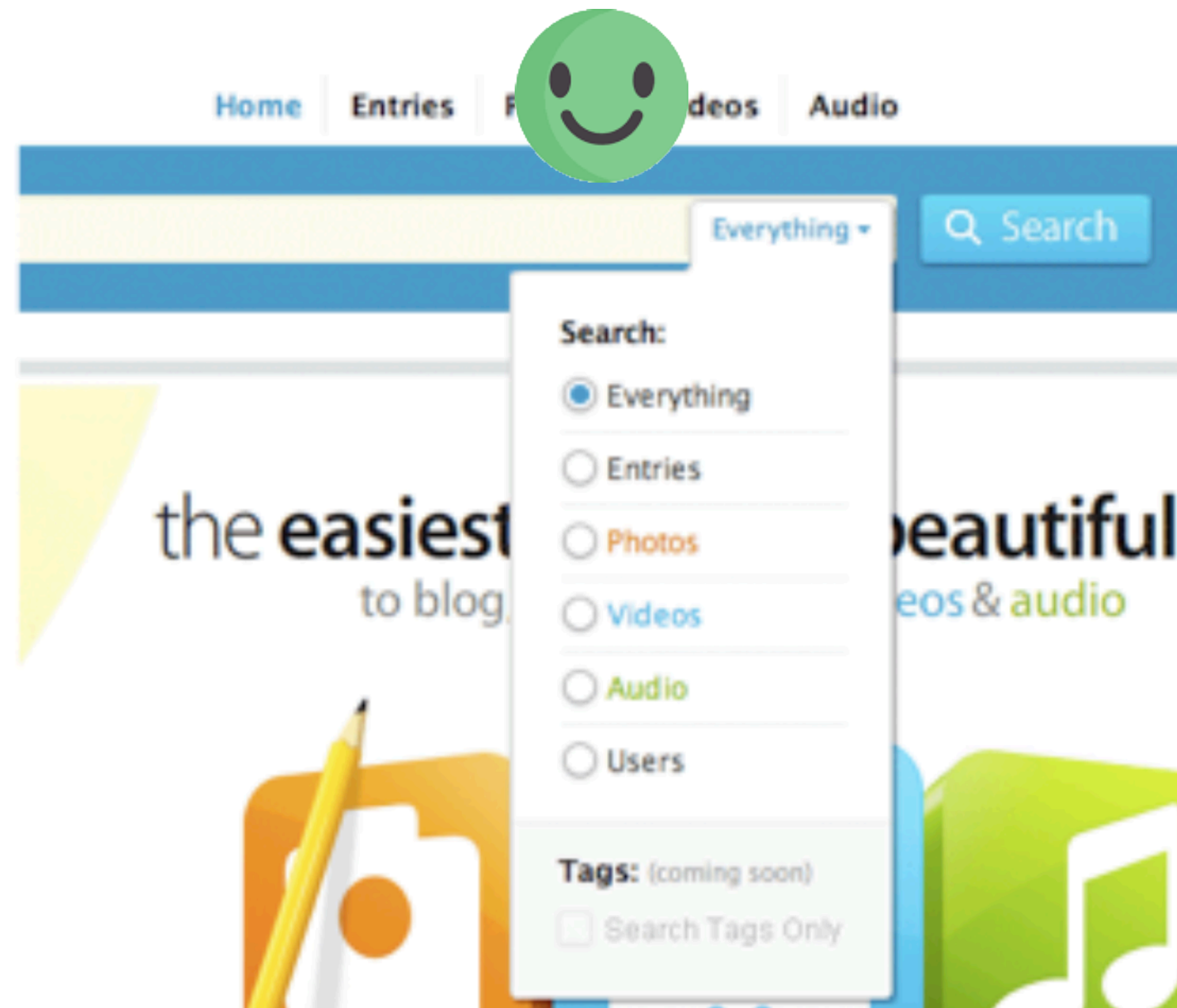
Heurística #7: Flexibility and efficiency of use

- Permitir a utilizadores experientes acelerar a interacção
 - E.g., personalização
 - E.g., preferências e automatização



Heurística #8: Aesthetic and Minimalist Design

- Estética geral
 - E.g., cores, contrastes, alinhamentos, etc
- E.g., diferenciação clara entre elementos

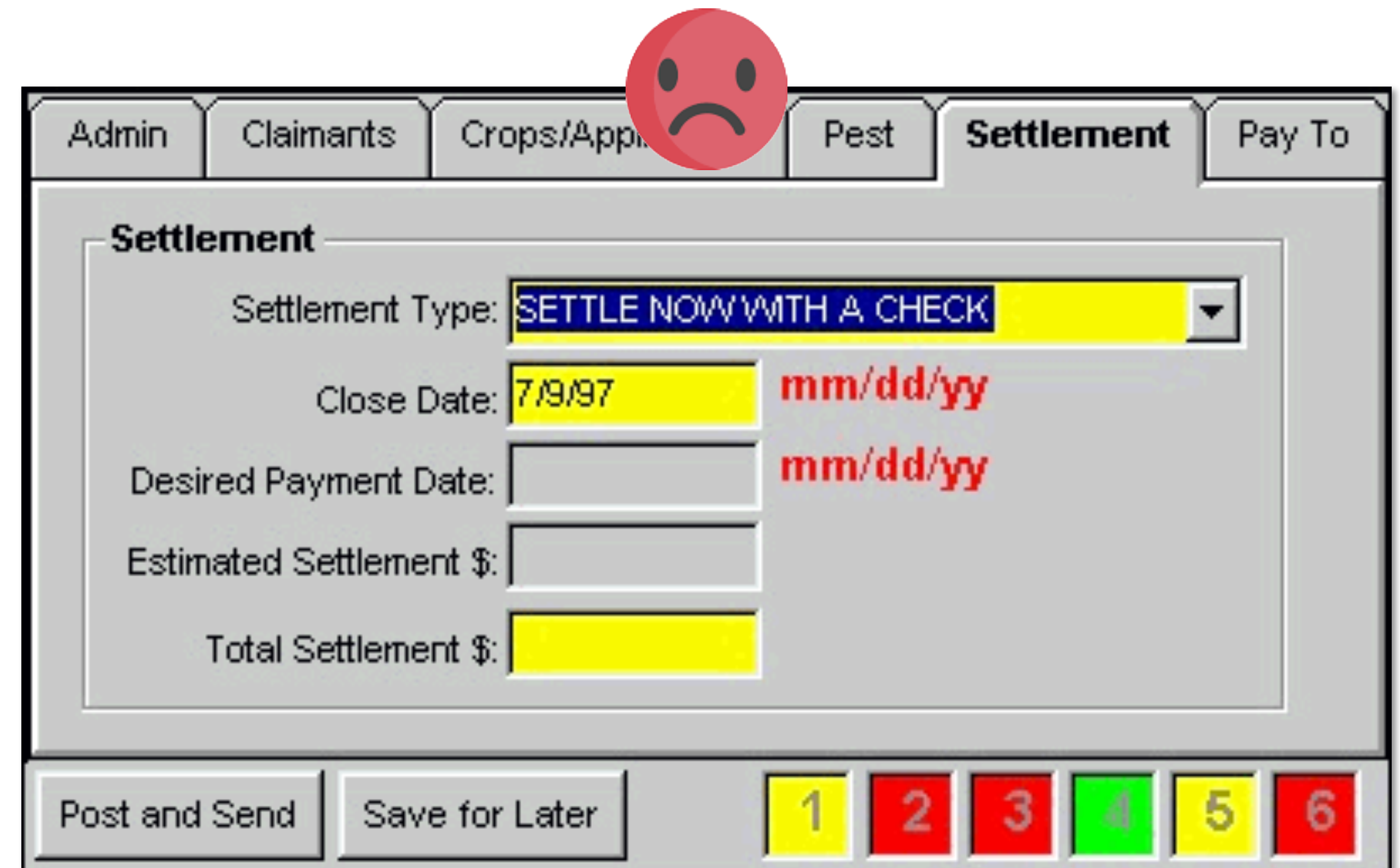
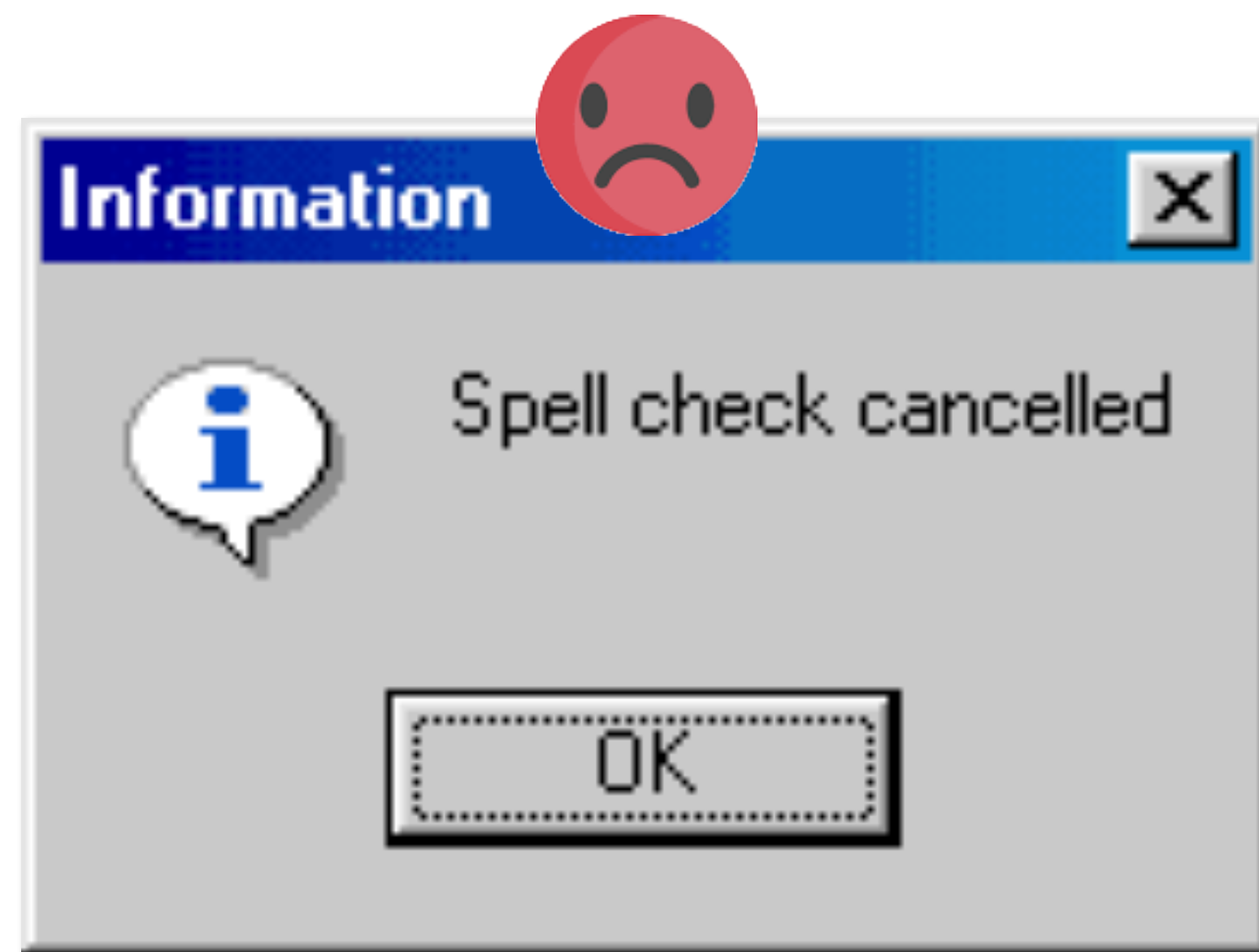


A screenshot of a timesheet application titled 'Timesheet for Theresa Neil'. It shows a date range from 04 May 2009 to 10 May 2009. The interface includes a table with columns for days of the week and a total column. The table contains data for various projects, with time entries in hours. A green smiley face icon is overlaid on the top right of the table.

CLIENT - PROJECT (TASK)	Mon May 04	Tue May 05	Wed May 06	Thu May 07	Fri May 08	Sat May 09	Sun May 10	TOTAL
...					4.00			4.00
...					2.50			2.50
...			4.00					4.00
...			1.00					1.00
...			1.00					1.00
...				4.50				4.50
...			1.00					1.00
...				1.50	1.00			2.50
...	10.00	6.00						16.00
...					2.00	2.00		4.00
Total	10.00	6.00	7.00	6.00	9.50	2.00	0	40.50

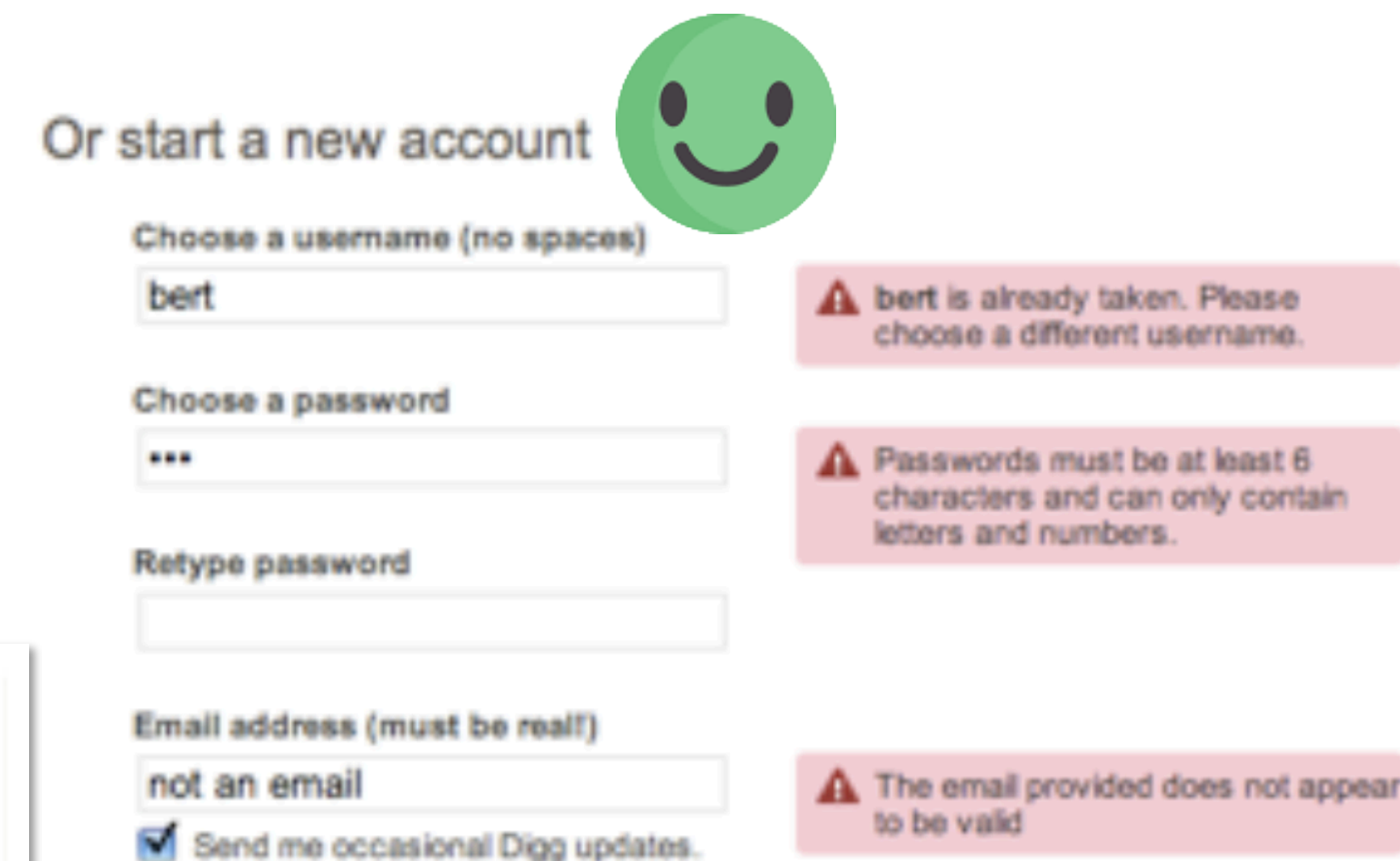
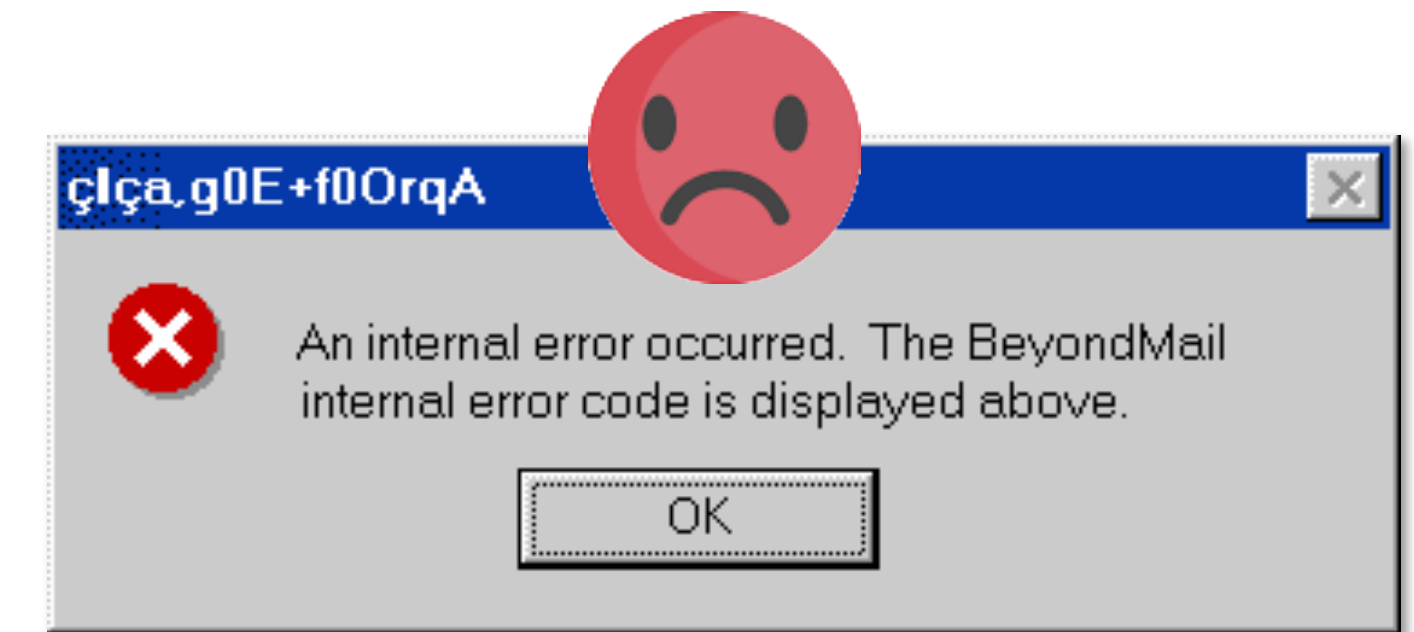
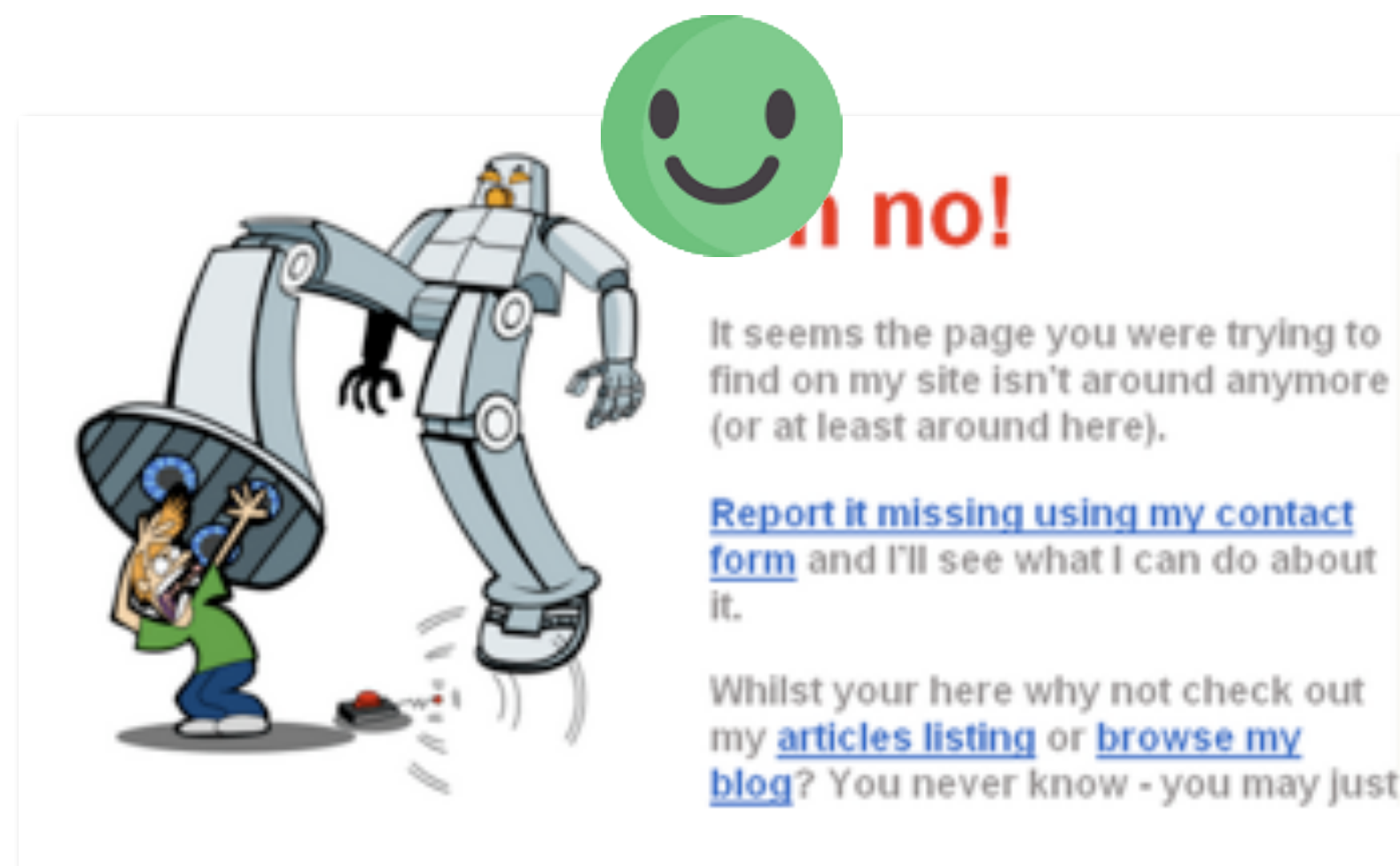
Heurística #8: Aesthetic and Minimalist Design

- Apresentar apenas informação relevante e de forma compreensível



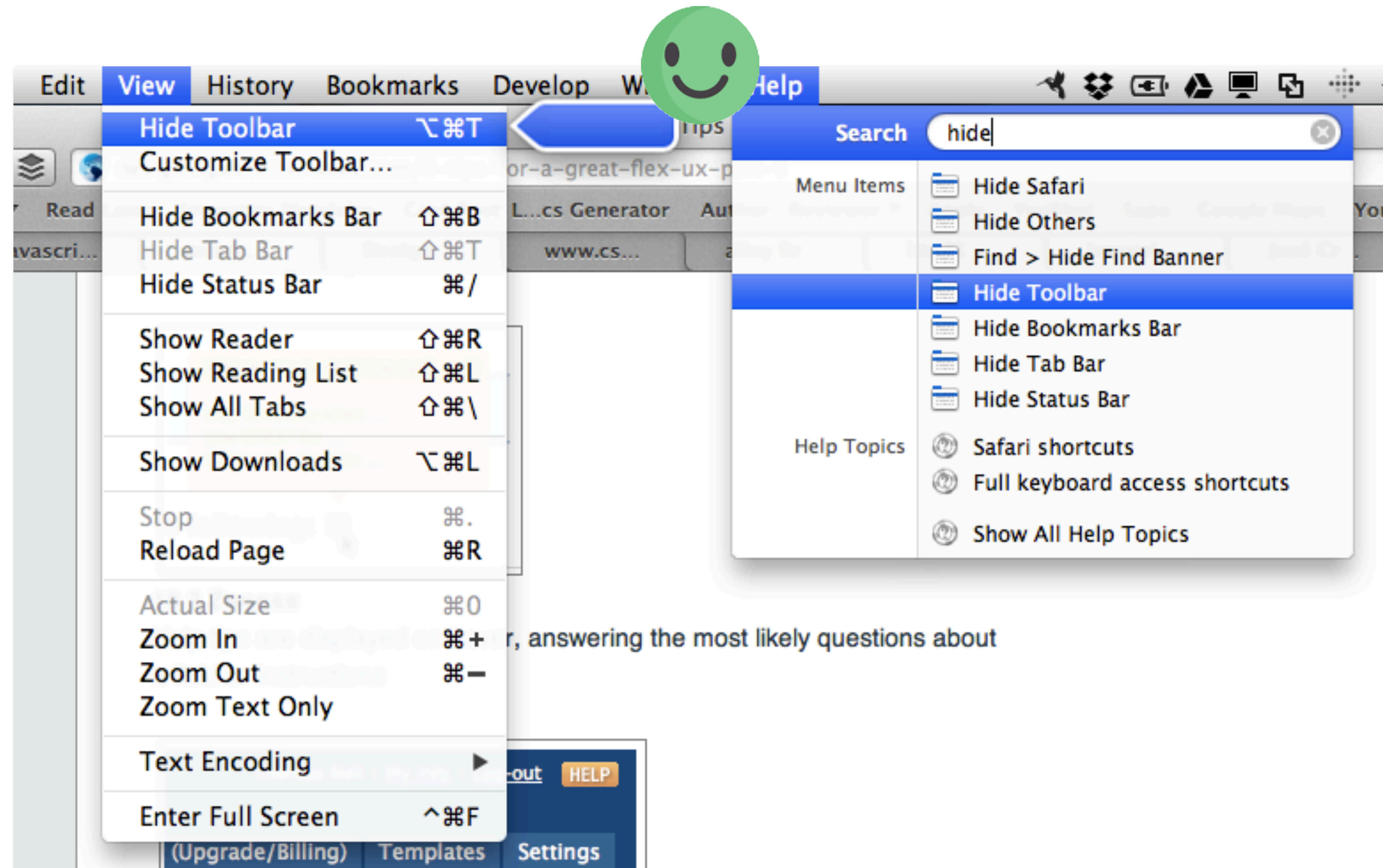
Heurística #9: Help users recover from errors

- Permitir recuperar de erros, mensagens inteligíveis
 - E.g., indicar qual o problema
- E.g., feedback com instruções
- E.g., sugerir soluções

A screenshot of a user registration form. A large green happy face icon is in the top right corner. The form has the heading "Or start a new account". It contains four input fields: "Choose a username (no spaces)" with the value "bert", "Choose a password" with three dots, "Retype password", and "Email address (must be real!)" with the value "not an email". To the right of each field is a red error message box: "bert is already taken. Please choose a different username.", "Passwords must be at least 6 characters and can only contain letters and numbers.", and "The email provided does not appear to be valid". There is a checkbox labeled "Send me occasional Digg updates." which is checked.

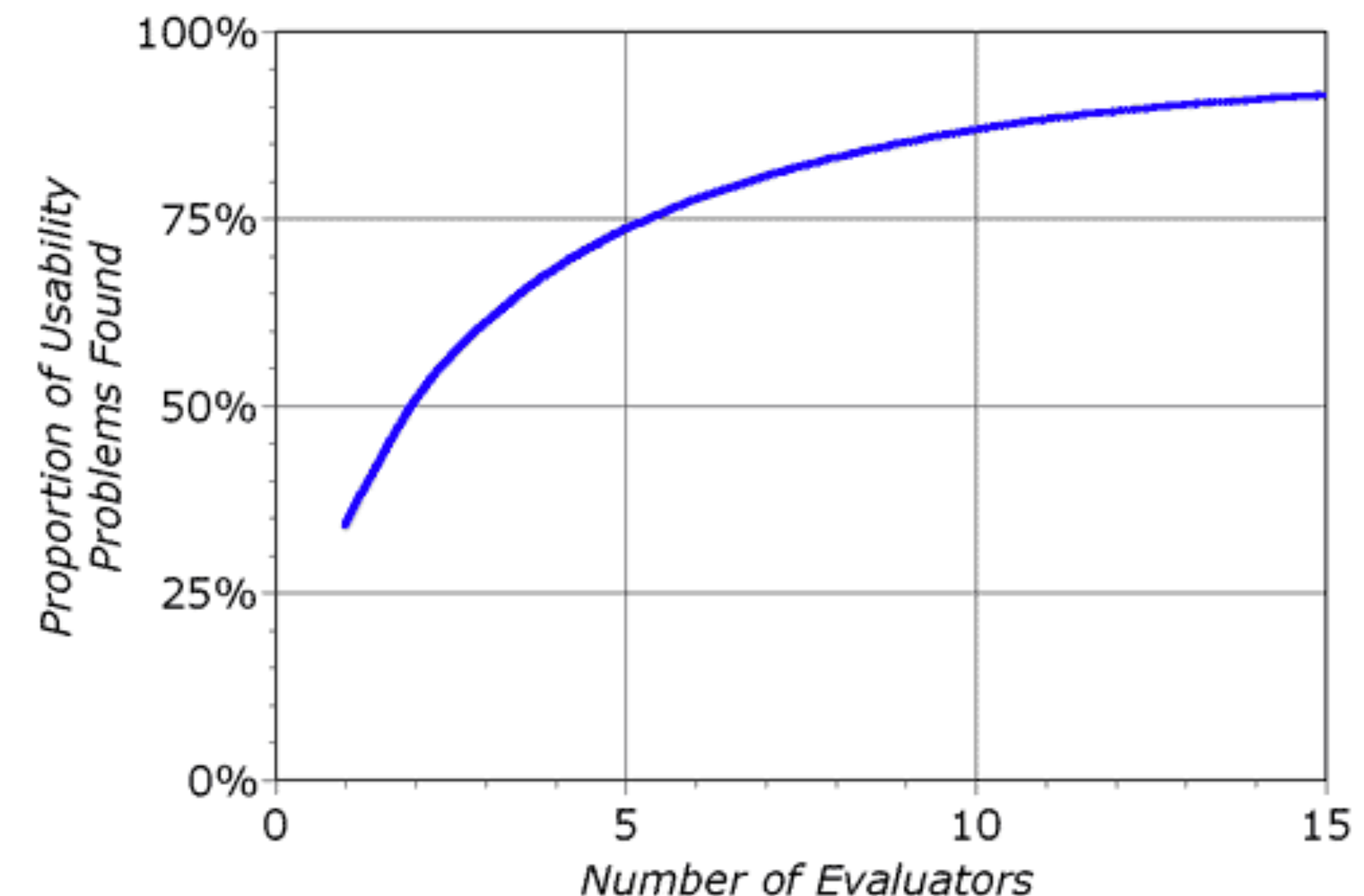
Heurística #10: Help and documentation

- Disponibilizar documentação
 - 💡 Não deve ser requisito para utilizar a aplicação
 - 💡 É sucinta, clara e fácil de procurar?
 - 💡 Fornece exemplos concretos?



Avaliação Heurística

- Técnica de inspeção, “code review” para design de interfaces
 - 💡 Um conjunto de heurísticas é utilizado para guiar a análise
- É executada por equipes de avaliadores
 - + Ajuda avaliadores a encontrar problemas com interfaces
 - 💡 Avaliadores devem:
 - 💡 Ser especialistas
 - 💡 Ser exteriores à equipa de desenvolvimento
 - 💡 Proceder de forma isolada
 - 💡 Entre 3 a 5 é bom o suficiente



Avaliação Heurística: Procedimento

- Cada avaliador:
 1. Inspecciona cuidadosamente o fluxo da interface e cada ecrã
 2. Identifica pontos onde alguma heurística é quebrada
 3. Descreve o problema
 4. Explica e justifica cada problema, referenciando as heurísticas
- Repetir o processo pelo menos 2 vezes
 1. Ganhar uma intuição do sistema
 2. Focando-se em elementos mais particulares
- Agregar os resultados de todos os avaliadores

Avaliação Heurística: Dicas

- 💡 Avaliação heurística $\neq$ “user testing”
 - 💡 Avaliador $\neq$ utilizador
 - 💡 Avaliador $\neq$ developer
 - 💡 Observador: pode ajudar avaliador VS não pode influenciar utilizador
 - 💡 Avaliação heurística mais barata
 - 💡 “User testing” é o “gold standard” de usabilidade
- 💡 Avaliação heurística $\simeq$ “code review”

Heuristic Evaluation Form

Heurística	Dificuldades	Oportunidades de melhoria
Visibility of system status The system should always keep users informed about what is going on, through appropriate feedback within reasonable time		
Match between system and the real world The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow realworld conventions, making information appear in a natural and logical order.		
User control and freedom Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.		
Consistency and standards Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.		
Error prevention Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate errorprone conditions or check for them and present users with a confirmation option before they commit to the action.		
Recognition rather than recall Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.		
Flexibility and efficiency of use Accelerators unseen by the novice user may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.		
Aesthetic and minimalist design Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.		
Help users recognize, diagnose, and recover from errors Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.		
Help and documentation Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.		

Exemplo (Blackboard)

- Goal: criar um aviso na página principal da UC, usando formatação simples

The screenshot displays the Blackboard LMS interface for a course. The top navigation bar includes links for Conteúdo, Calendário, Anúncios, Debates, Livro de classificações, Mensagens, Análise, Grupos, and Realizações. A sidebar on the left contains icons for various functions. The main content area is divided into sections: 'Informações Gerais' (General Information) with a visibility toggle and access code, and a list of weekly topics ('Semana 1' through 'Semana 4') each with a visibility toggle and topic details. The right-hand sidebar, titled 'Pré-visualização de aluno', contains sections for 'Corpo docente do curso' (Course Faculty) listing Daniel Rodrigues P... and Hugo José Pereira Pa..., 'Detalhes e ações' (Details and Actions) with links for 'Lista' (List), 'Descrição do curso' (Course Description), 'Imagem do curso' (Course Image), 'Class Collaborate', 'Manuais e ferramentas' (Manuals and Tools), and 'Conjuntos de perguntas' (Question Sets). At the bottom of the right sidebar is a button to 'Adicionar agenda do curso' (Add course agenda) and a link to 'Ignorar' (Ignore).

Exemplo (Blackboard)

1. Visibility of system status

- + Feedback adequado, animações úteis

2. Match between system and the real world

- + Hierarquia de pastas intuitiva
- Módulo de Aprendizagem vs Pasta?
Documento é uma lista de Bloco?
Bloco é um Conteúdo vs HTML?
- Descrição de Módulo de Aprendizagem perde formatação?

3. User control and freedom

- + Possibilidade de cancelar todas as operações
- Conteúdos distintos com formas de edição e visualização distintas

Exemplo (Blackboard)

4. Consistency and standards

- Externo: alguns conceitos específicos ao Blackboard
- + Interno: mesmos conceitos para criação / edição

5. Error prevention

- + Foco adequado, confirmação de “Fechar sem guardar”

6. Recognition rather than recall

- + Affordances da interface genericamente intuitivas
- Exceção para criação de listas em modo Conteúdo. Conversão automática? Menu expansível para ¶ inclui formatação de listas?

Exemplo (Blackboard)

7. Flexibility and efficiency of use

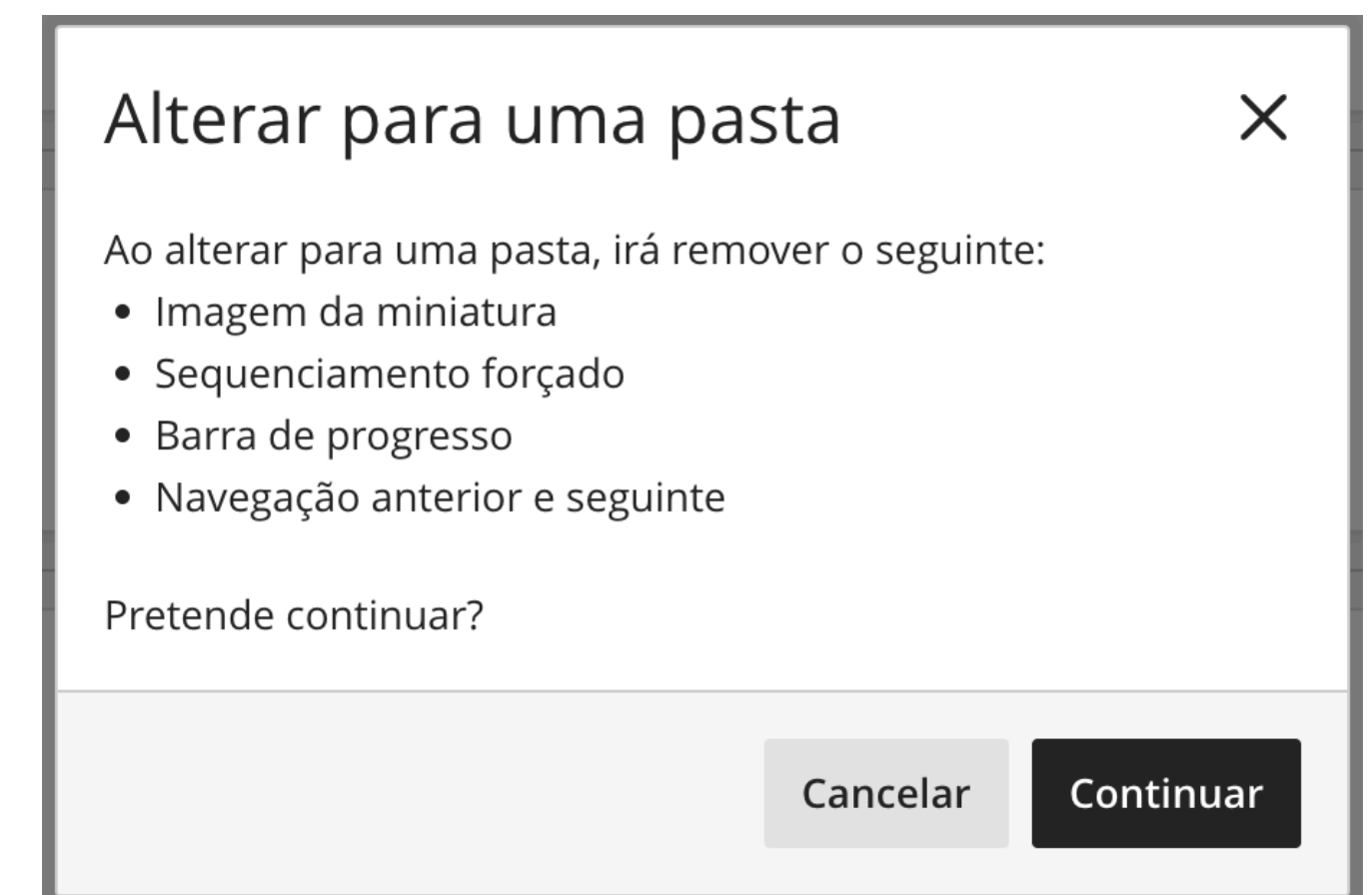
- Sem atalhos ou automação
- Escolha à cabeça de Conteúdo vs HTML bastante rígida. Porque não na página principal?

8. Aesthetic and minimalist design

- Interface pesada. Todos os campos são necessários? Necessidade de diferentes conceitos?

9. Help users recognize, diagnose, and recover from errors

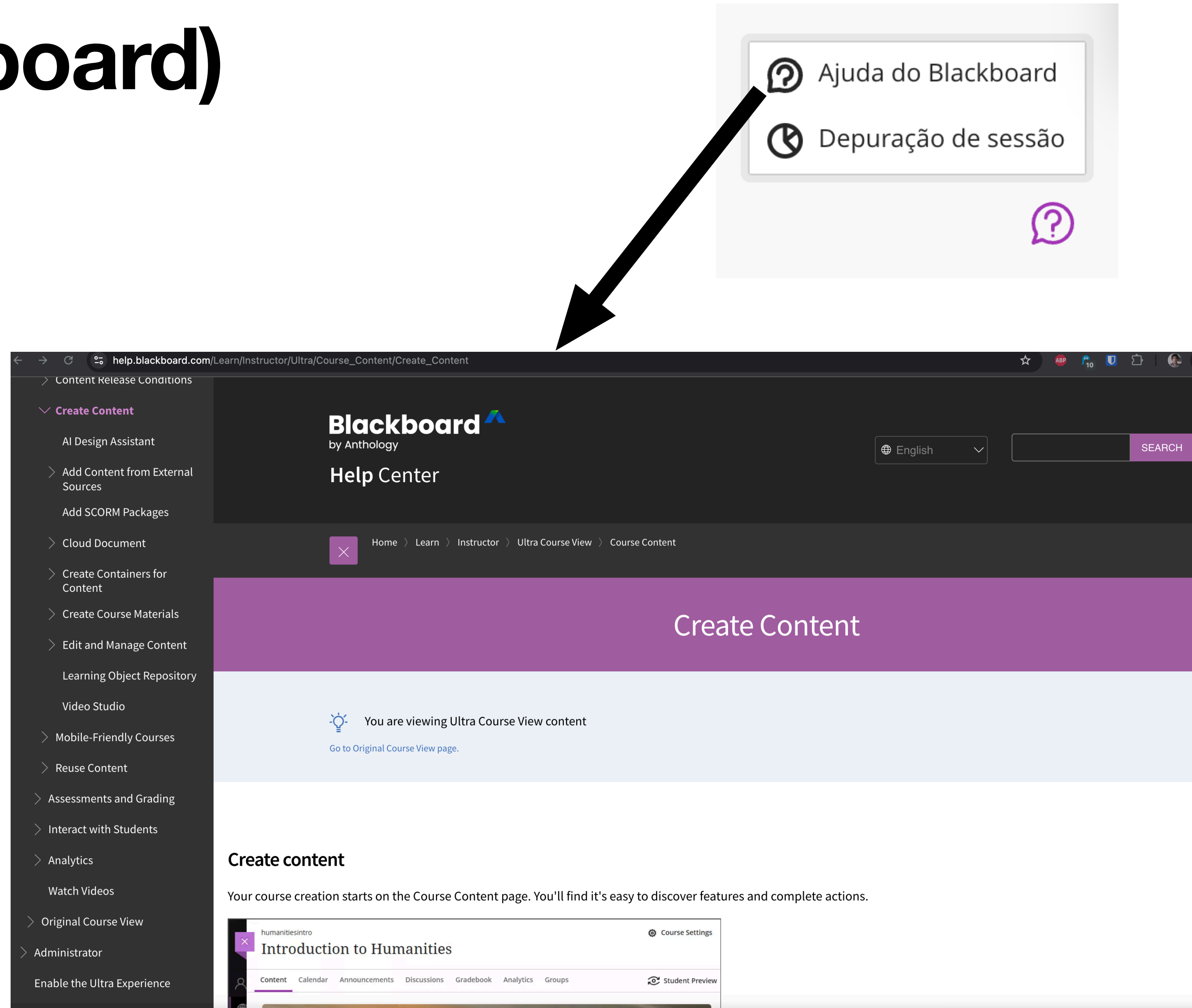
- + Boas mensagens de erro no geral
- O que significa tudo na conversão
Módulo de Aprendizagem → Pasta?



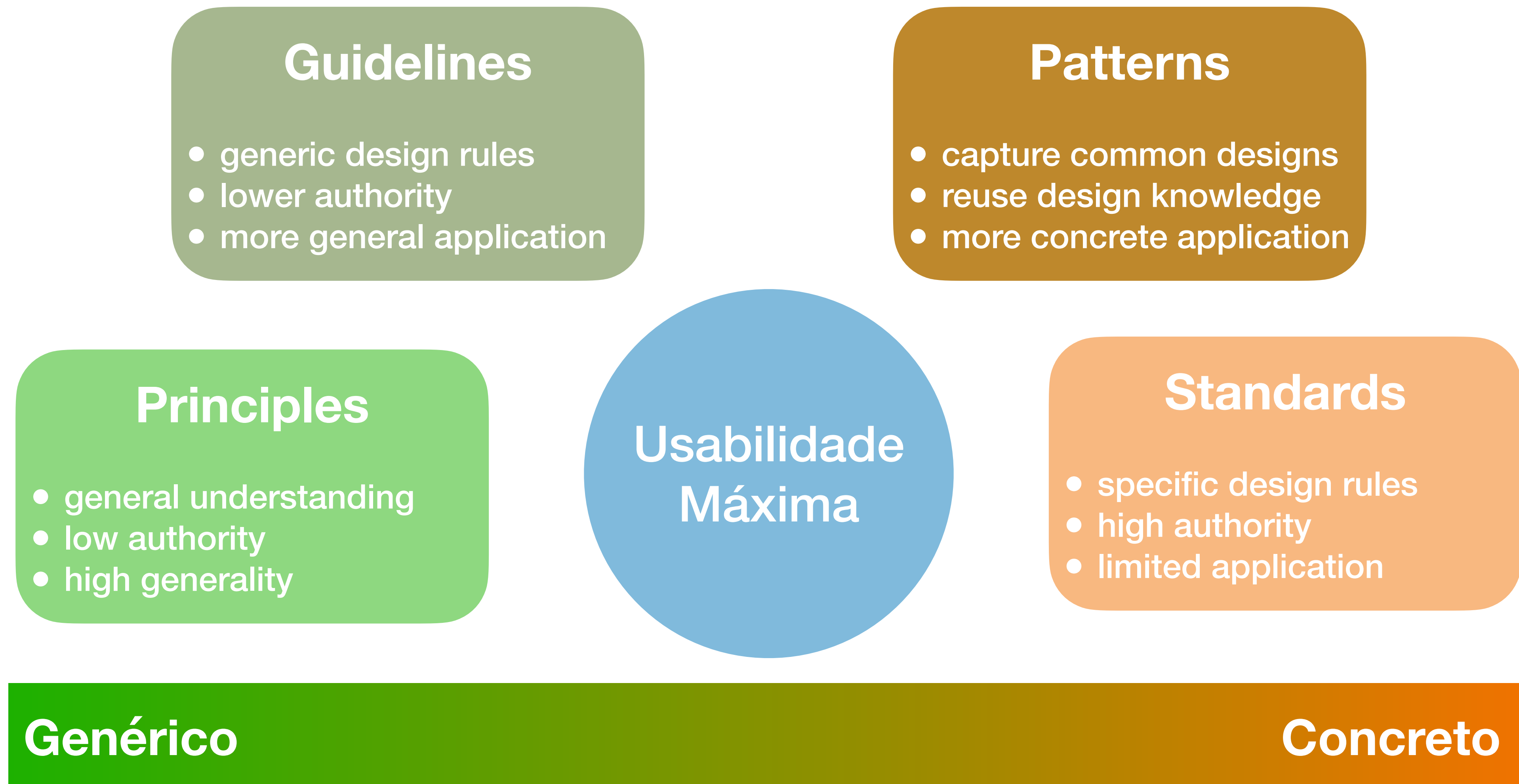
Exemplo (Blackboard)

10. Help and documentation

- + Documentação existente
- Para a plataforma completa. E a instância @UM?
- Não customizada para as tarefas do utilizador



Desenhar para usabilidade máxima



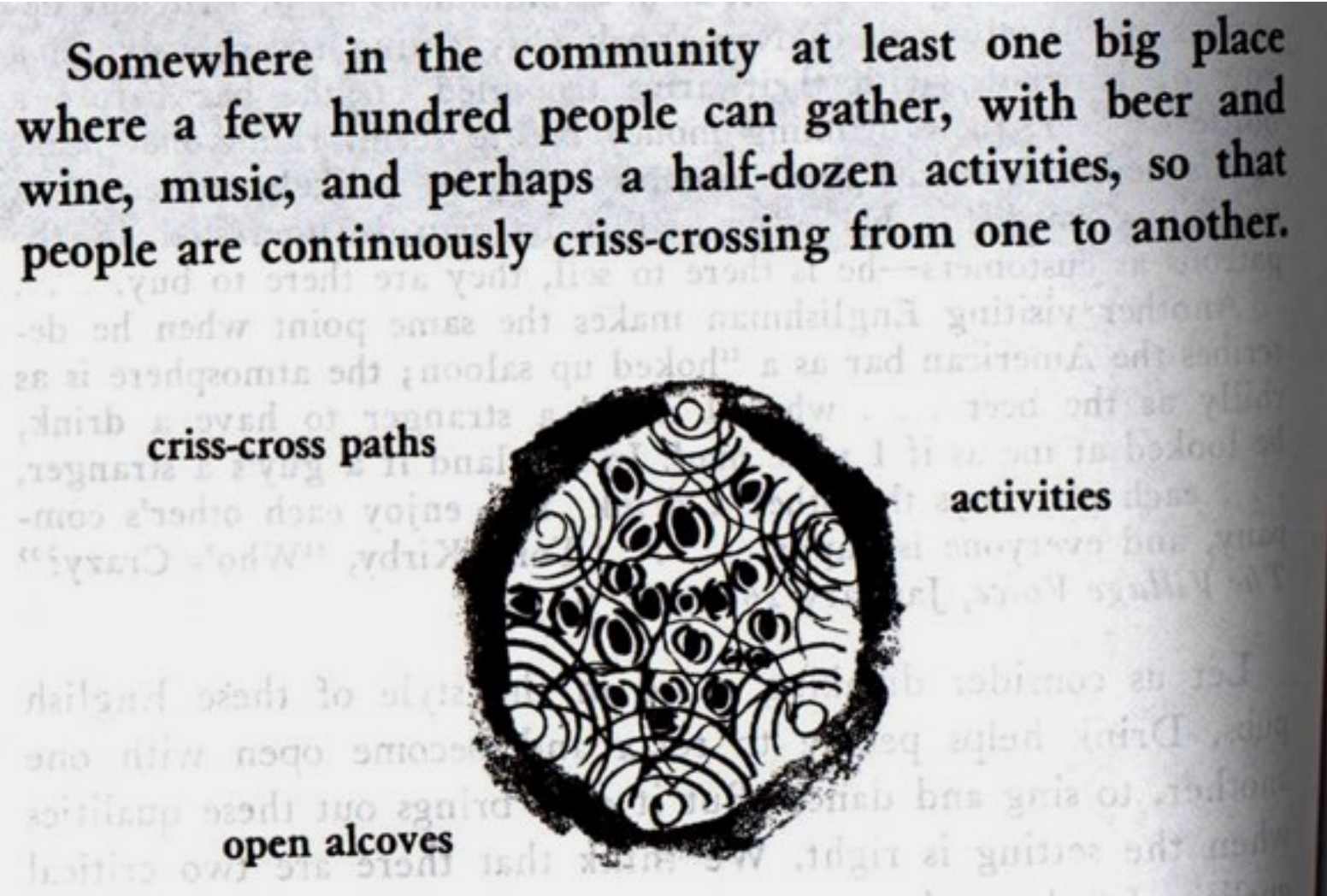
Padrões de usabilidade

- Design consiste em encontrar soluções
- Designers frequentemente reinventam
 - esforço significativo
 - incluindo erros!
- 💡 Reutilizar conhecimento sobre soluções de design bem sucedidas
- **Design Patterns**
 - Implementação concreta de uma solução
 - + Indicam
 - + Qual o problema
 - + Como é resolvido
 - + Como reutilizar
 - + Ligações a outros padrões

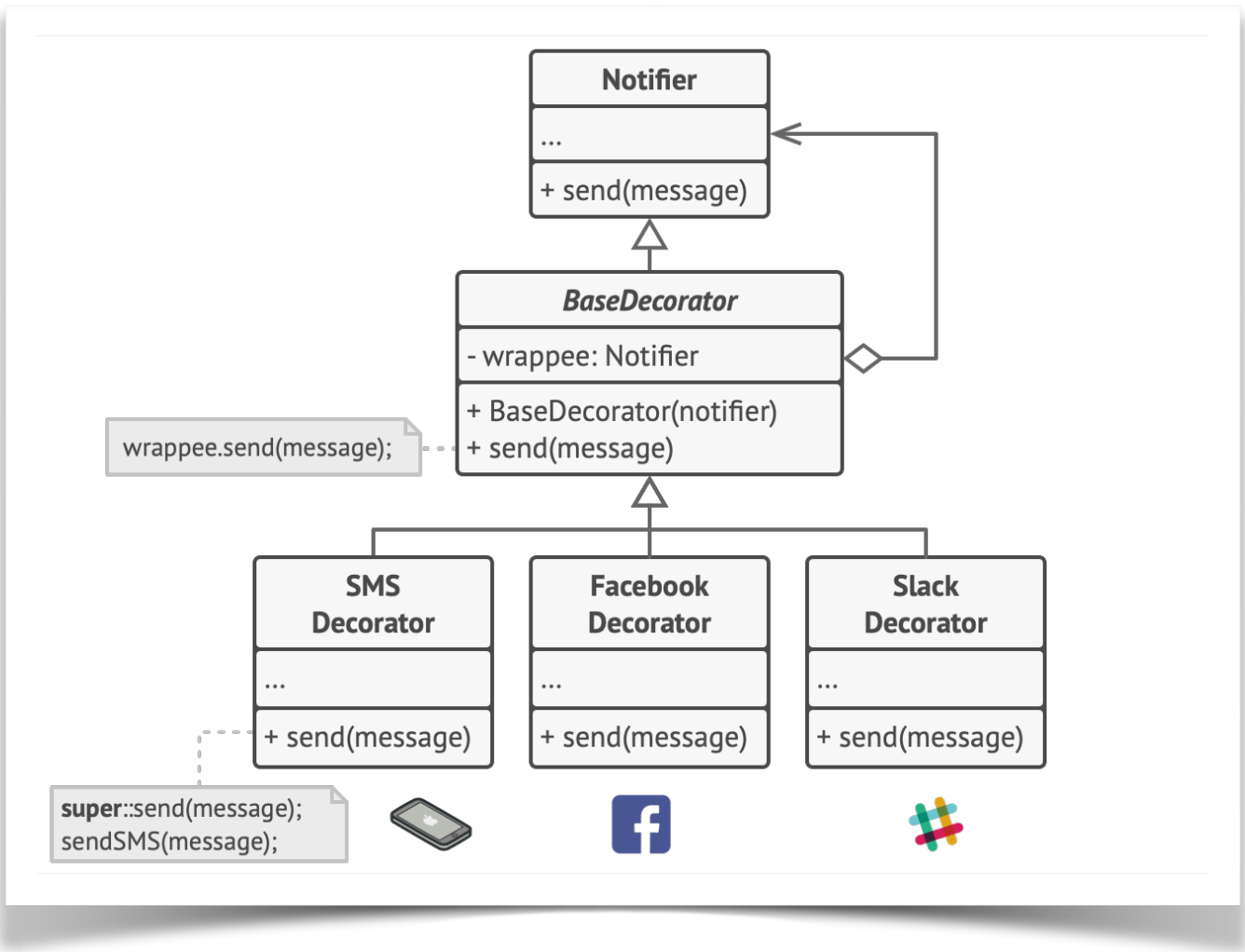
Design Patterns

- Originários de arquitetura
- Exemplos

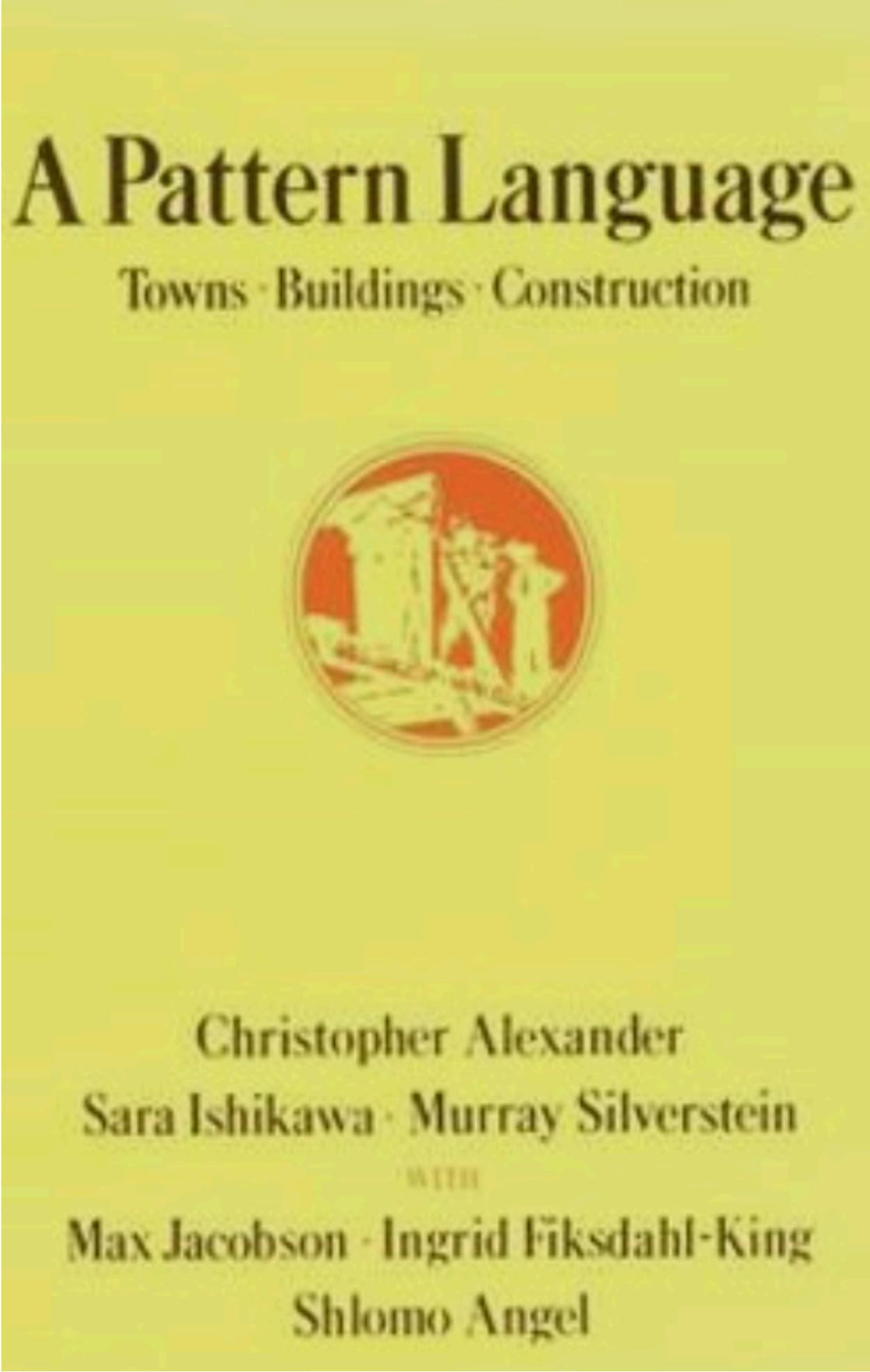
Beer Hall Pattern (Arquitetura)



Decorator Pattern (Arquitetura de Software)



Breadcrumbs Pattern (Interfaces Web)

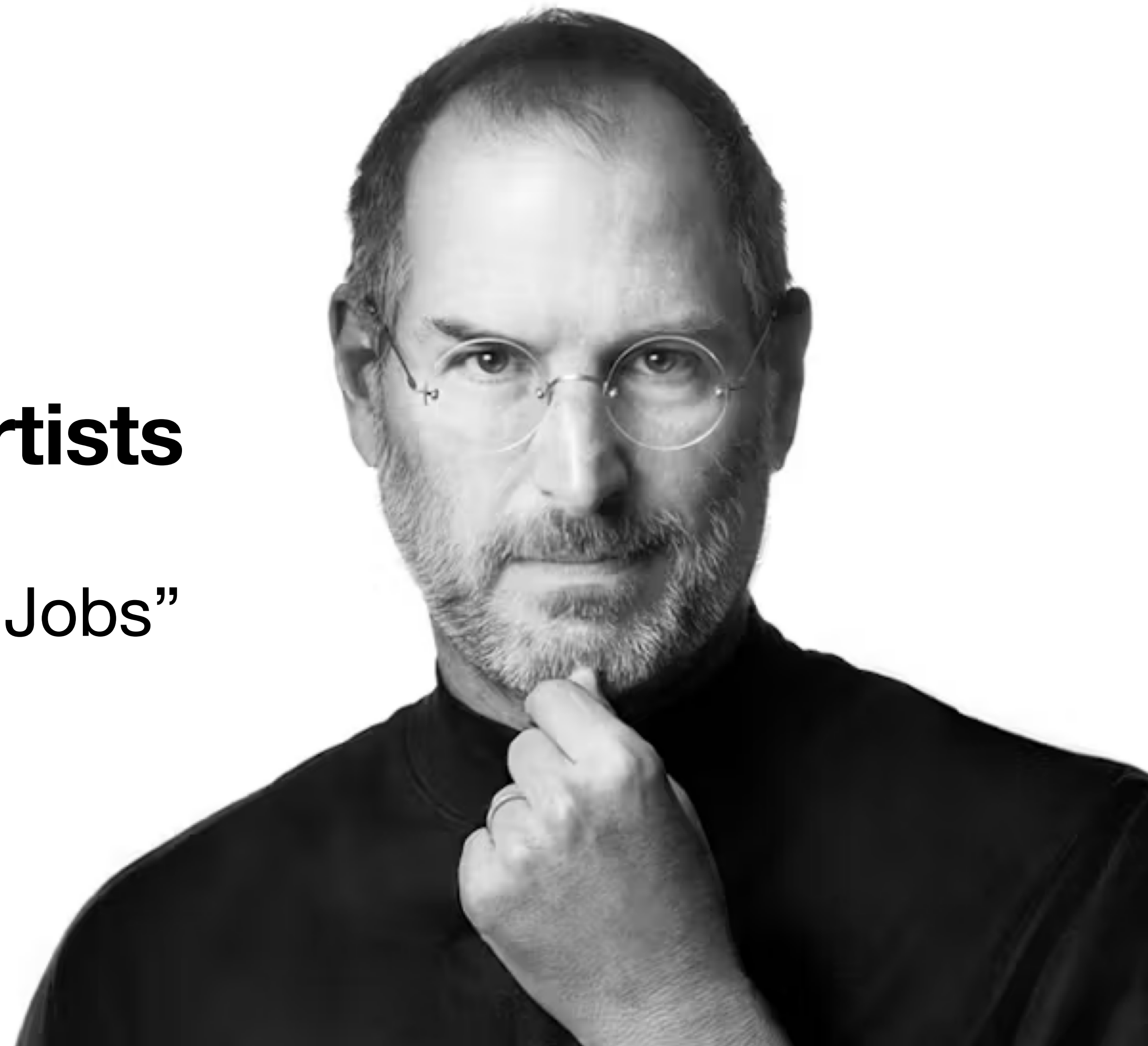


Design Patterns

- + Evitar reinventar a roda
- + Reduzir custos
- + Designs mais testados (correção e usabilidade)
- + Modularidade de padrões permite a construção de designs completos
- + Melhoram consistência (interna e externa)
- + Melhoram learnability (vocabulário mais comum para developers e utilizadores)
- 💡 Inspirados por stakeholders influentes na área
- 💡 Com o uso, influenciam a tecnologia e podem vir a tornar-se nativos

“Good artists copy, great artists steal”

“Steve Jobs”



“Good artists copy, great artists steal”

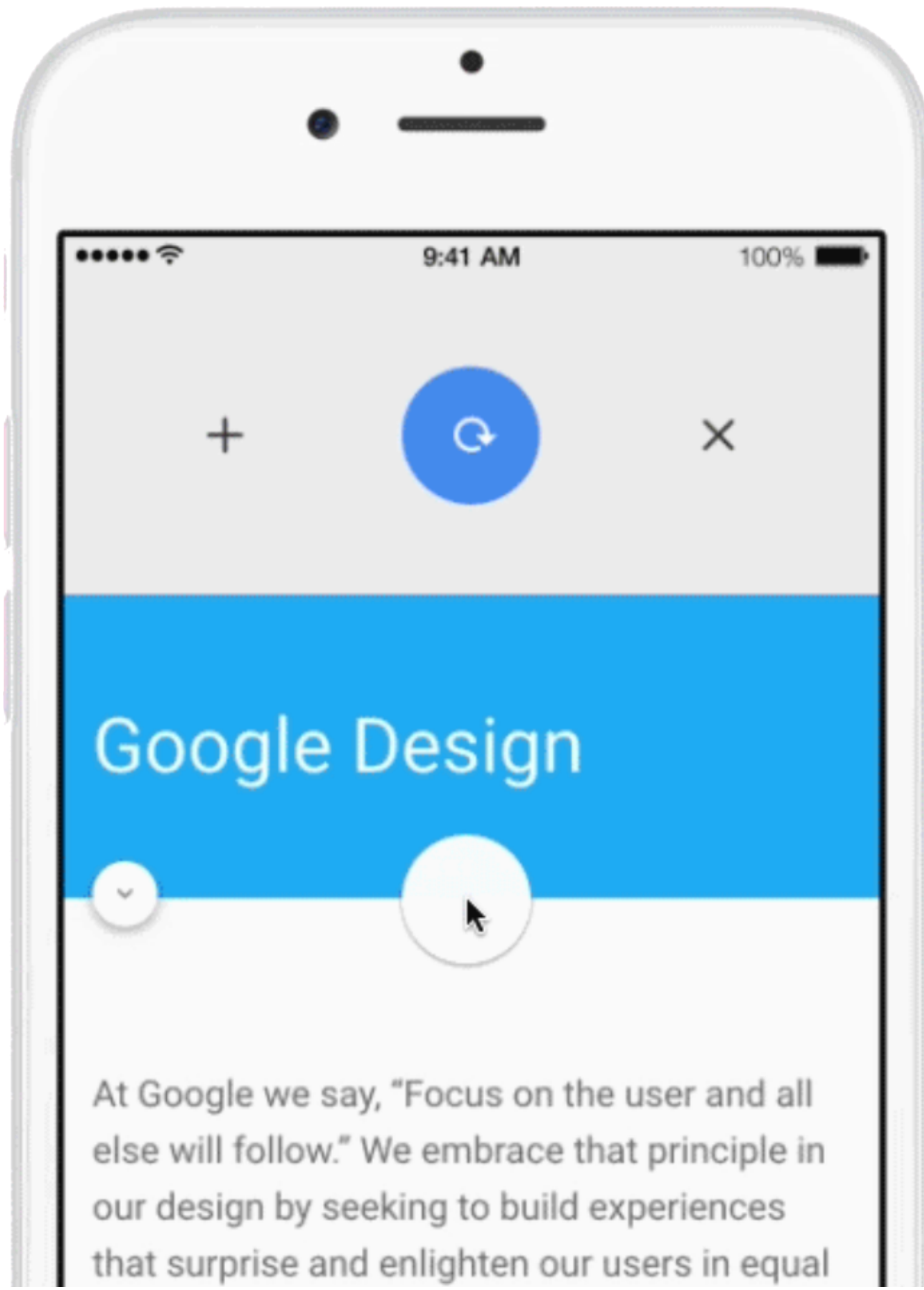
**adapt and
build upon**

“Pablo Picasso”

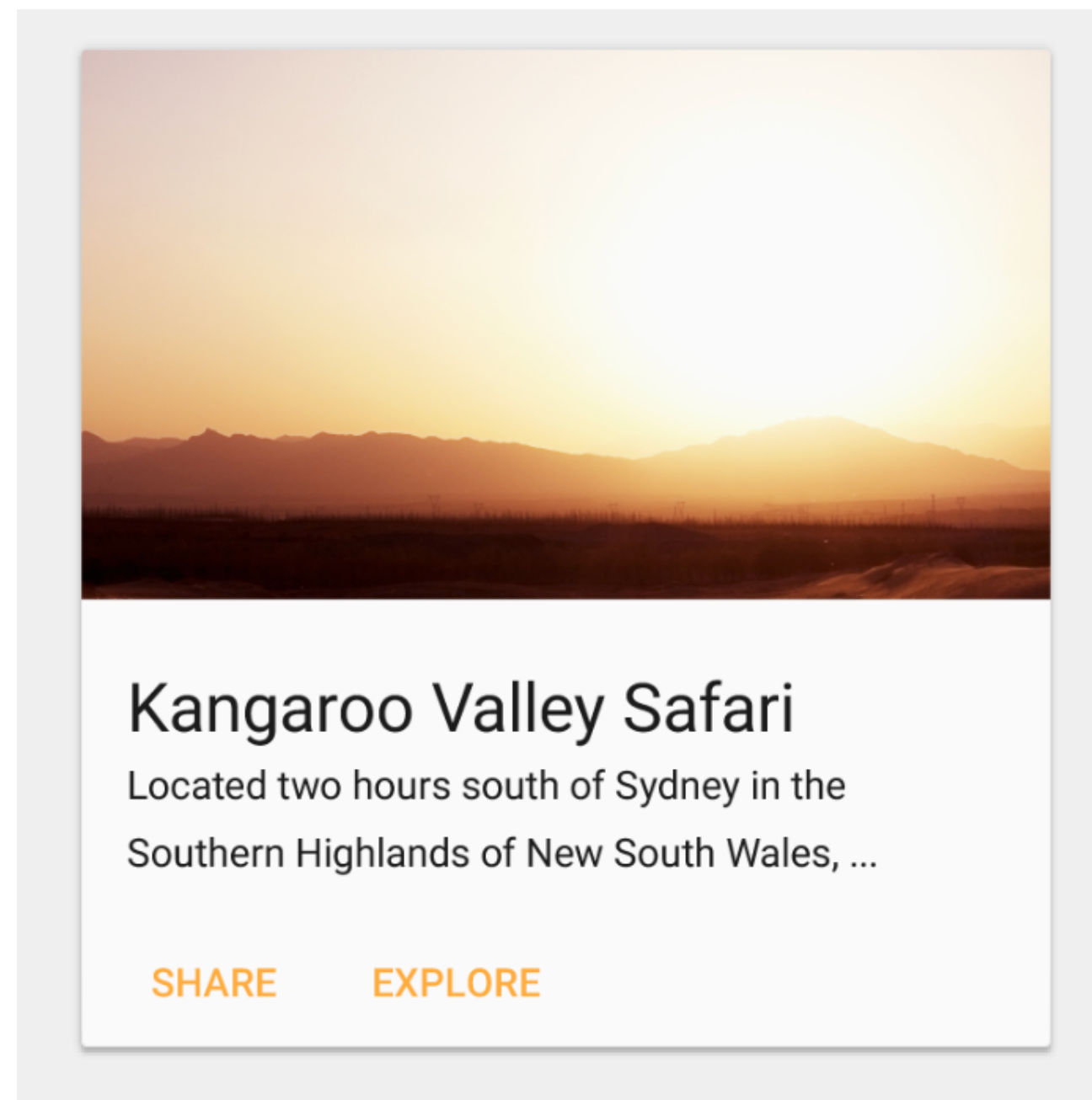


UI Design Patterns: exemplos

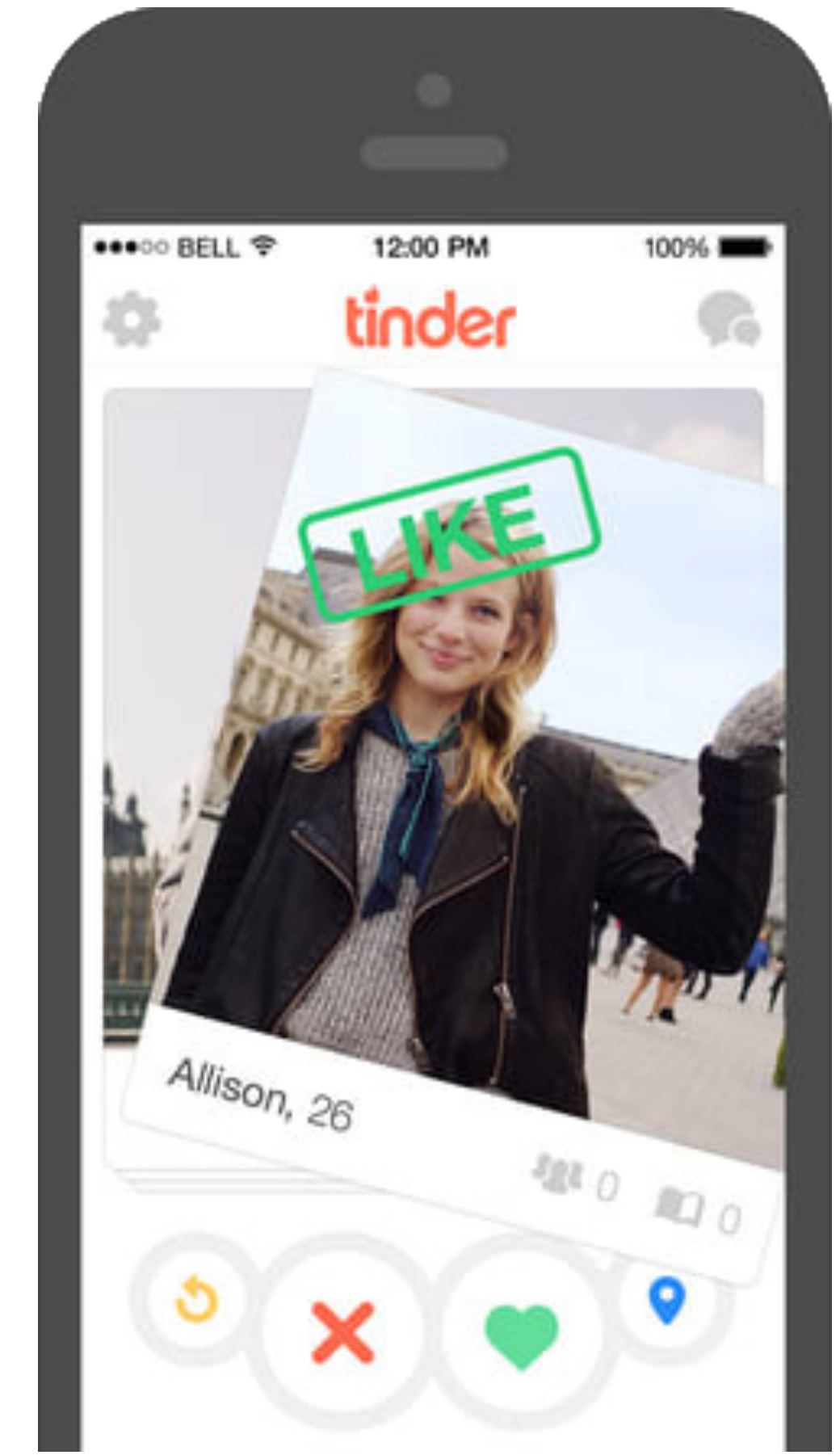
Pull to Refresh



Cards



Swipe for Yes/No

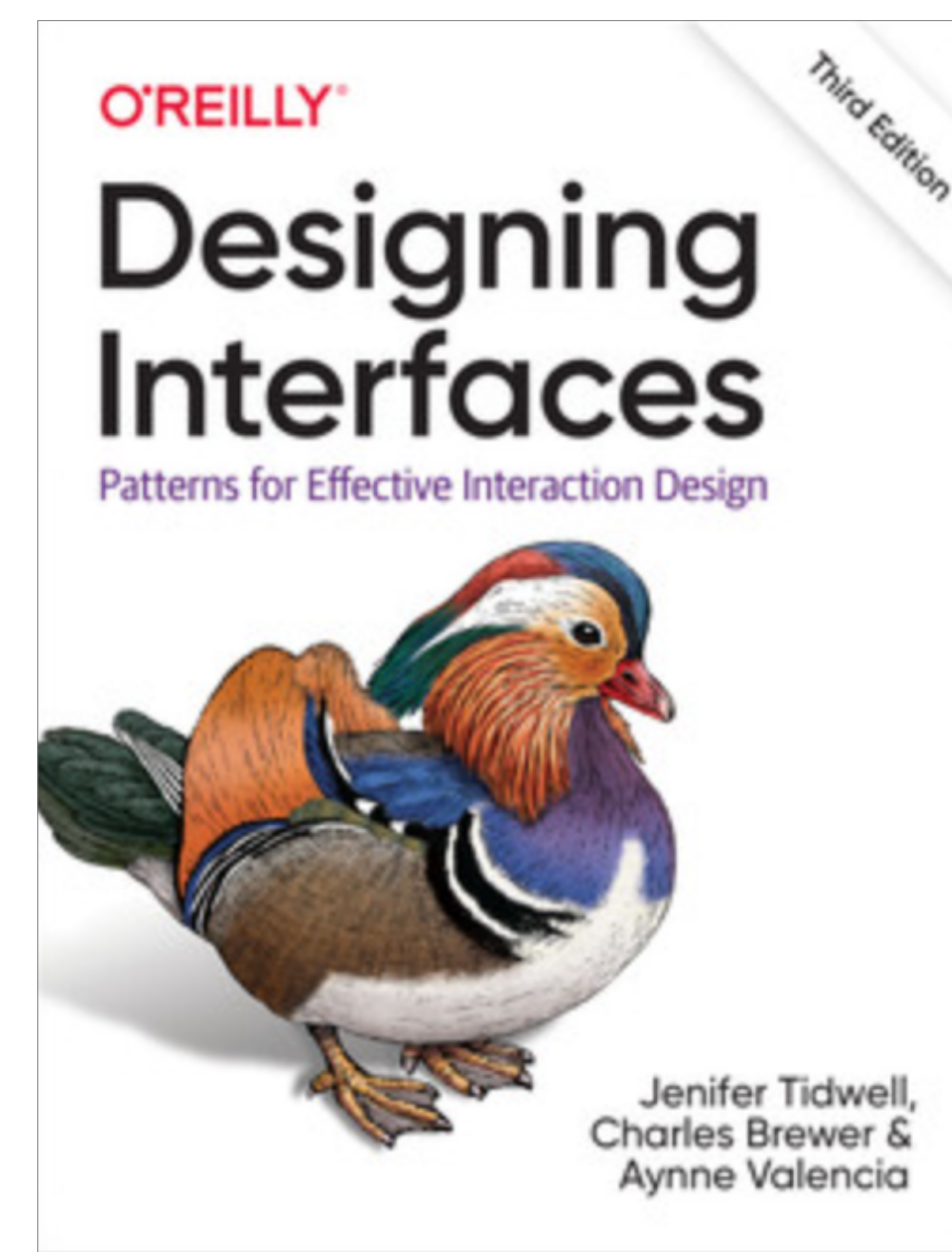


UI Design Patterns: coleções

- Catálogos
 - User Interface Design Patterns
 - UI Patterns
 - Android Patterns
 - Google Material Design Components
- Sites
 - uxlibrary.org
 - interaction-design.org

- Livros

106 patterns

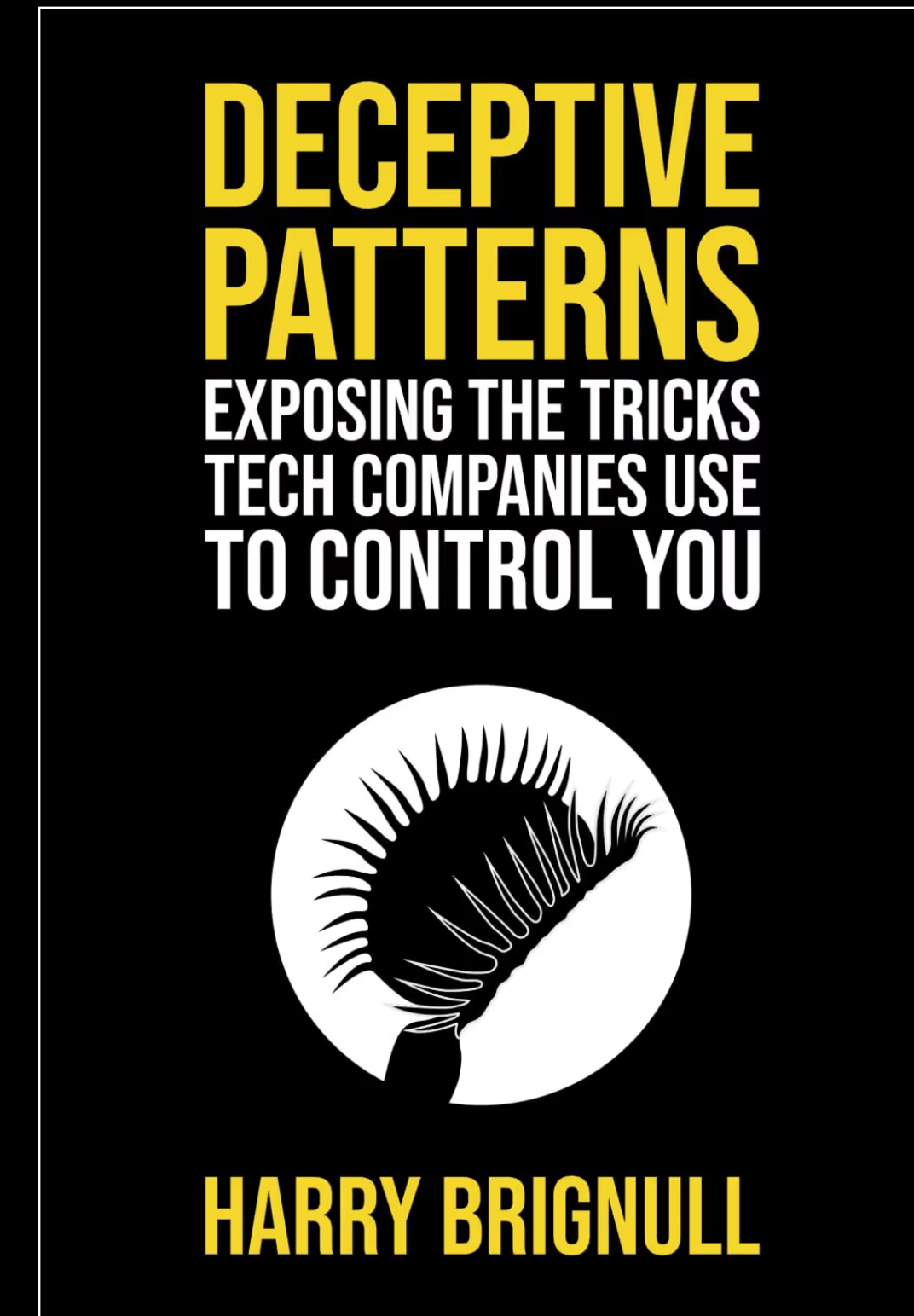


107 patterns



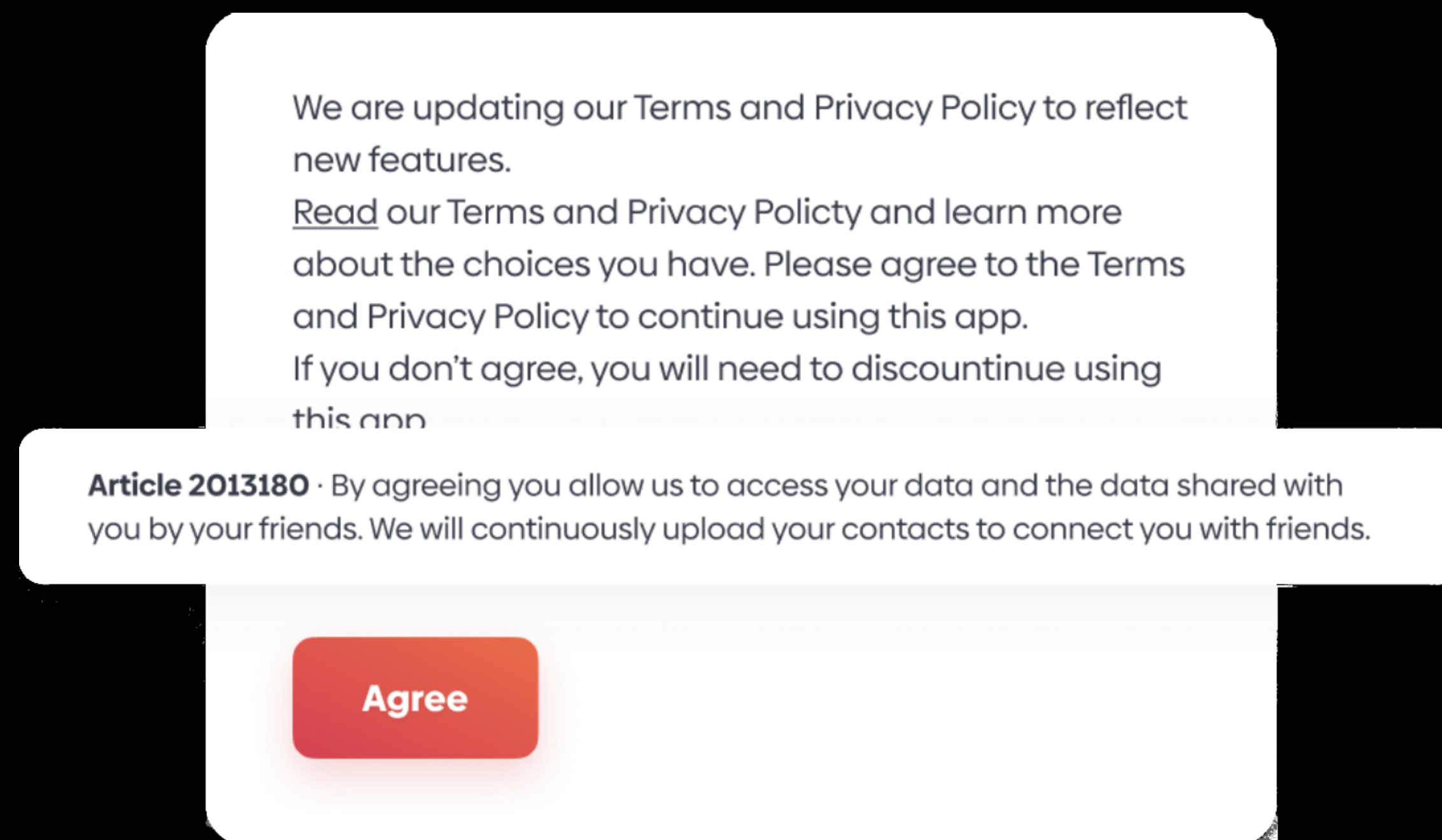
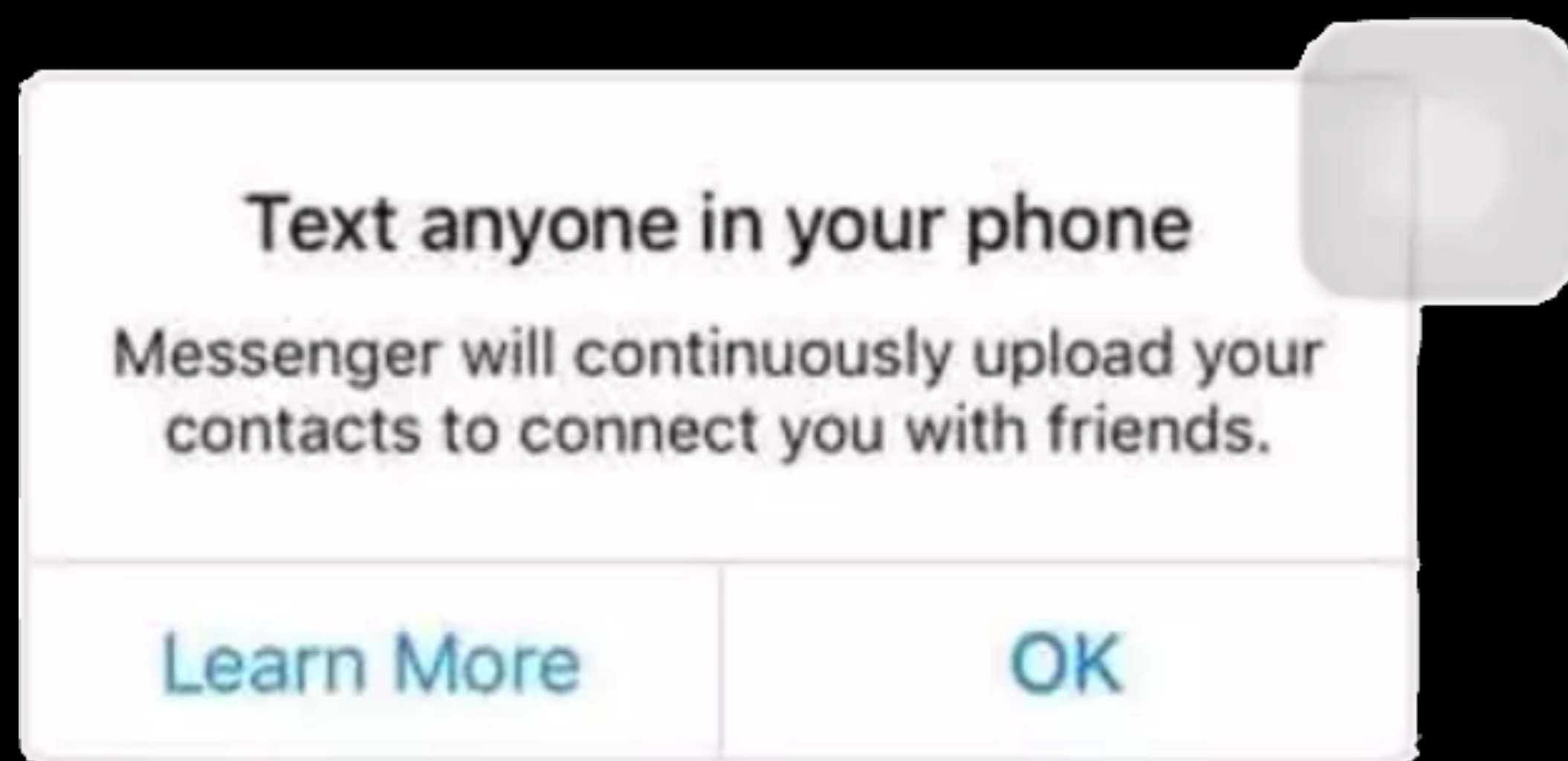
Dark Patterns (darkpatterns.org)

- “dirty tricks designers use to make people do stuff”
- 💀 Intencionais: manipular ou enganar o utilizador
- 💀 Exploram um bom conhecimento de psicologia humana
- 💀 Gravidade vai desde irritante a roubo
- 💀 Muitas vezes ilegais (<https://www.deceptive.design/laws>)
- 🇧🇷 Motivações: mais clicks, mais utilizadores, mais vendas
- ! Utilizadores podem evitarem cair neles
- ! Empresas podem ser forçadas a mudar as suas práticas



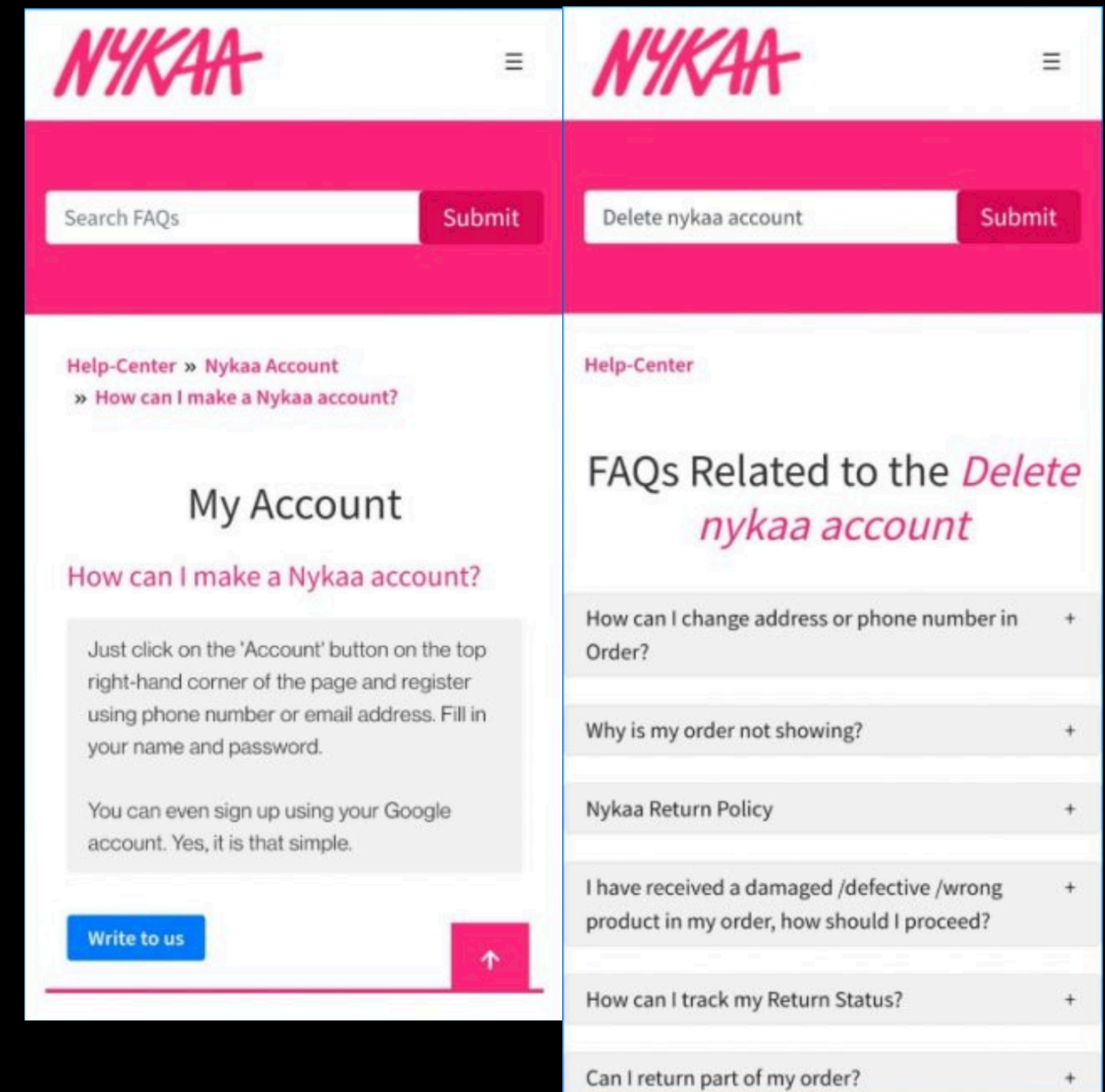
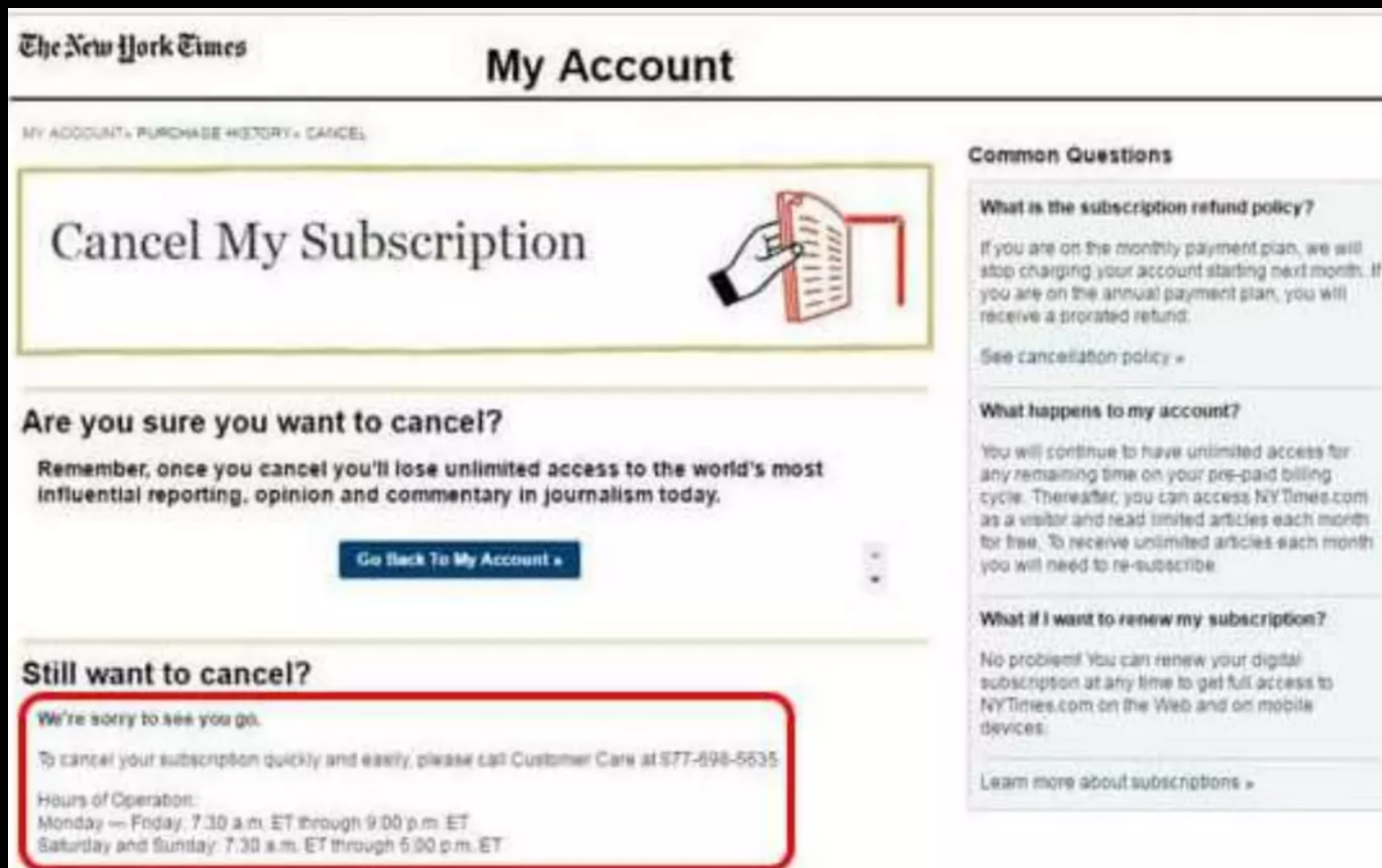
Exemplo: Forced action (“Privacy Zuckering”)

- Enganar utilizador a executar ação indesejada
- E.g., partilhar informação de forma não intencional



Exemplo: Hard to Cancel (“Roach Motel”)

- Fácil de entrar, difícil de sair
- E.g., subscribe / unsubscribe



Exemplo: Hidden subscription (“Forced Continuity”)

- Subscriver o utilizador sem o seu conhecimento claro ou consentimento explícito
- E.g., cancelar a qualquer altura durante o “free period”

Card Details

Why do we need your card details?
Your card is used to verify your identity. Don't worry, your card will NOT be charged for membership during your free 30 day trial and there is no obligation to continue with the service after the trial period.

If you choose to stay as a member after your free 30 day trial your card will be charged a monthly membership fee of £14.99.

Card type * Select



If you have a Visa or MasterCard, you can select this option to see your credit report instantly online, and if you have a Maestro card you may be able to get access instantly also (all subject to identity verification).

Card number *

Expiry date * Month Year

Security number * 
The last 3 digits on the signature strip on the back of your card

DEPARTURE • Iberia Check-in baggage included!

09:05 — 1h 50' — **10:55** i
Orly (ORY) — direct — Palma de Mallorca (PMI)
Paris — Palma de Mallorca

RETURN • Multiple airlines Hand luggage

23:50 — 10h 25' — **10:15⁺¹** i
Palma de Mallorca (PMI) — 1 stop — Orly (ORY)
Palma de Mallorca — Paris

Prime price
30-day free trial

Only 4 tickets left!

~~€443.48~~ **€389.09**
Prime fare per passenger

Select

Non discounted fare: €443.48 ←...

Exemplo: Hidden Costs

- Custos escondidos na fase final do processo, depois de o utilizador estar investido
- E.g., “facility charge”, “convenience charge”, “order progressing fee”

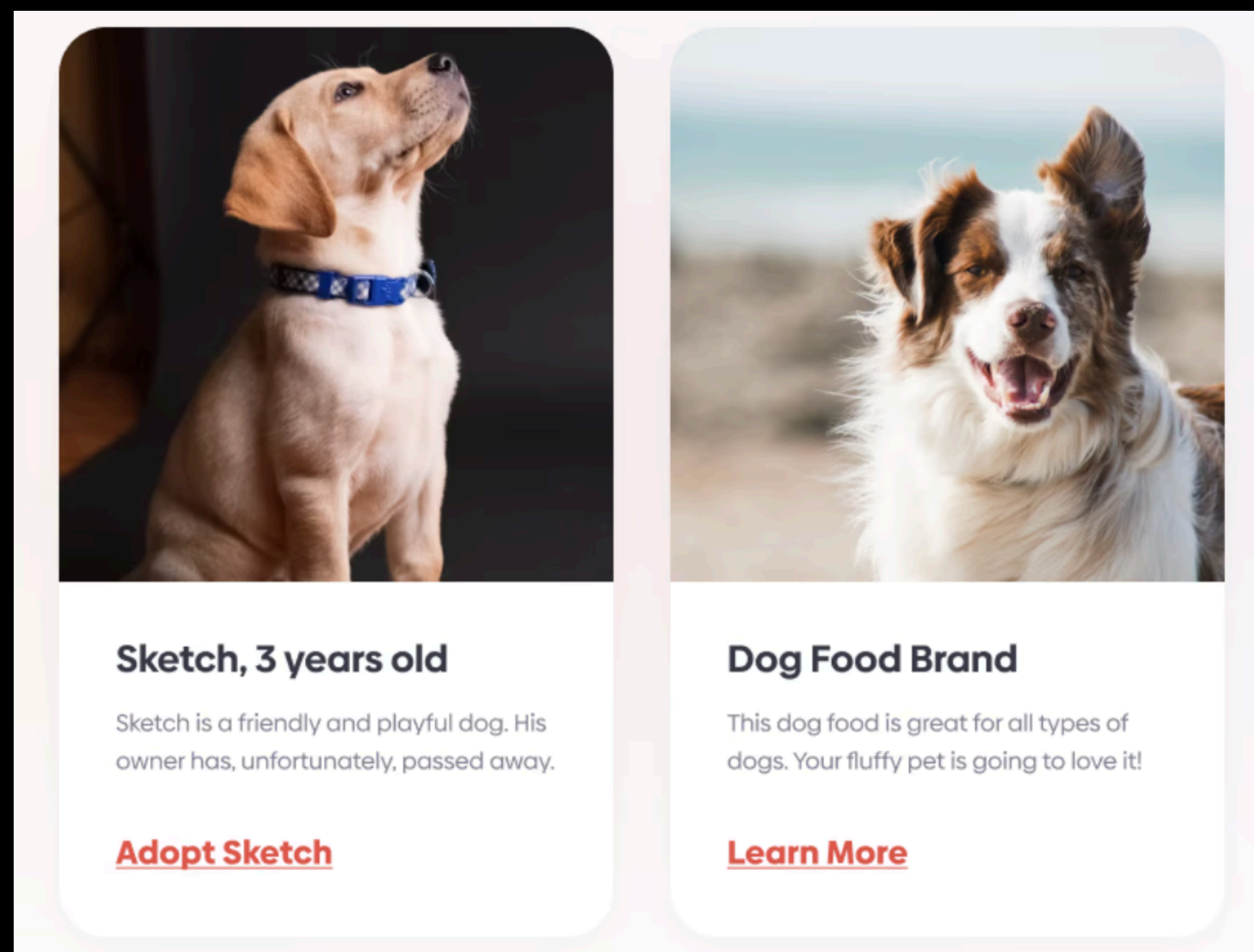
Type	Full Price Ticket
Ticket Price	CA \$47.00 x 2
Facility Charge	CA \$2.00 x 2
Convenience Charge	CA \$3.75 x 2
SUBTOTAL CA \$105.50	
Tickets/Items	CA \$105.50
Order Processing Fee	CA \$2.50
Regular Mail	No Charge
TOTAL CHARGES CA \$108.00	

1. Towards the start of the user’s journey on stubhub.com, they are shown a price.

112	
Row Y	
You'll pay	
\$310 each	
Quantity 1 ticket	
2. The user proceeds through multiple steps in which they must enter their name, phone number, email and postal address. Only then are they shown the total price. In this case it is a 29% increase.	
Ticket Price	1 x US\$ 310.05
Service Fee	1 x US\$ 86.13
Fulfillment Fee	1 x US\$ 4.95
TOTAL PRICE	US\$ 401.13

Exemplo: Disguised Ads

- Disfarçar publicidade como elementos da interface
- Anti-“Aesthetic and Minimalist Design”



Exemplo: Trick Wording

- Utilizar linguagem enganadora para dissimular ações
- Aproveitar o facto de utilizadores estarem habituados a não ler em detalhe
- Tipicamente combinado com estética e componentes da interface

Search » Select » Services » Payment » Itinerary

Passenger Details - All passenger names must match those in the passport/accepted travel document

1 Title First name Last name 0.00 GBP

Beat the queues, buy priority boarding: Yes No 0.00 GBP

Buy AXA travel insurance View policy benefits Please select a country of residence 0.00 GBP

If you do not wish to buy insurance select **No Travel Insurance** in the drop down menu.

SMS Confirmation

Click Yes to receive a text message confirming your Reservation Number and flight details (Click for information)? Yes No 0.00 GBP

Your mobile phone number will be entered on the following page and will only be used to send important flight information.

Ryanair Approved Cabin Bag

Samsonite Yes No 0.00 GBP

The Samsonite Aspire cabin bag is available exclusively at Ryanair.com and is approved for carriage on Ryanair flights, subject to our cabin baggage weight and size restrictions detailed in the cabin bag specification below.

If you would like to purchase an approved Ryanair Cabin bag from Samsonite please click "Yes" (Cabin Bag specification)

Flights

Going Out: 11/10/2010 10:30hrs

East Midlands - Berlin

1 x Adult 10.99 GBP

Taxes/Fees 0.00 GBP

1 x Web Check in 5.00 GBP

Coming Back: 18/10/2010 13:45hrs

Berlin - East Midlands

1 x Adult 16.99 GBP

Taxes/Fees 0.00 GBP

1 x Web Check in 5.00 GBP

Total

Total Cost 37.98 GBP

Excluding administration fee (if applicable)

Search » Select » Services » Payment » Itinerary

Passenger Details - All passenger names must match those in the passport/accepted travel document

1 Title First name Last name 0.00 GBP

Beat the queues, buy priority boarding: Yes No 0.00 GBP

Buy AXA travel insurance View policy benefits Please select a country of residence 0.00 GBP

If you do not wish to buy insurance select **No Travel Insurance** in the drop down menu.

SMS Confirmation

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Flights

Going Out: 18/07/2010 16:45hrs

Aberdeen - Dublin

1 x Adult 79.99 GBP

Taxes/Fees 31.96 GBP

1 x Web Check in 5.00 GBP

Coming Back: 29/07/2010 16:50hrs

Dublin - Aberdeen

1 x Adult 29.99 GBP

Taxes/Fees 0.00 GBP

1 x Web Check in 5.00 GBP

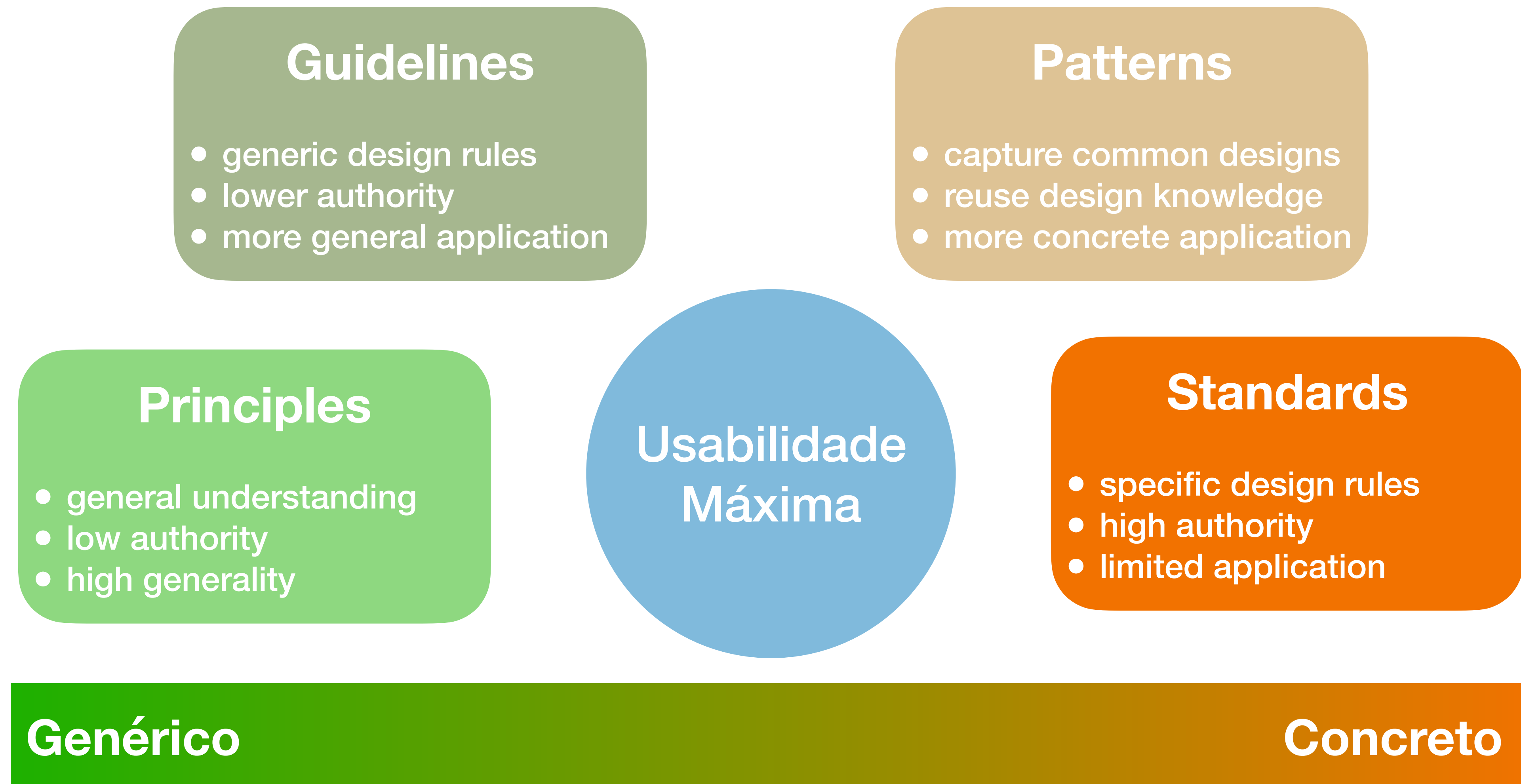
Total

Total Cost 151.94 GBP

Excluding administration fee (if applicable)

Sports Equipment/Musical Instruments/Infant Equipment

Desenhar para usabilidade máxima



Standards de usabilidade

- Sumariam e generalizam conhecimento existente numa comunidade ou área de aplicação
- + Utilizadores necessitam de menos treino
- + Developers podem reutilizar conhecimento existente e automatizar processos
- + Produto tem mais qualidade (eficaz, eficiente e acessível para utilizadores)
- + Manutenção é mais fácil quando existe consistência

Standards de usabilidade: Oficiais

- Definidos por corpos nacionais ou internacionais, para garantir “compliance” dentro de uma comunidade
- Assentes em fundamentos teóricos e para tecnologias estáveis
- Standards de hardware mais comuns do que standards de software
 - ARINC 661: definition of a Cockpit Display System
 - ISO 9241: ergonomics of Human System Interaction
 - 100 series: Software ergonomics
 - 300 series: Displays and display related hardware
 - EC Directive 90/270/EEC: minimum safety and health requirements for work with display screen equipment
 - IEEE 12207: addresses software life cycle processes, including usability engineering
 - IEC 62366: usability of Medical Devices

Standards de usabilidade: Corporativos

- Definidos por cada empresa, para consistência de produtos
- Tendem a ser standards de design

Apple's Human Interface Guidelines
(iOS and macOS)



<https://developer.apple.com/design/human-interface-guidelines>

Microsoft Fluent Design System
(web, iOS, Android and Windows)



<https://fluent2.microsoft.design/>

Material Design by Google
(Android and web)



<https://m3.material.io/>

Os 3 suportam Figma UI Design Kits