

Princípios de Usabilidade

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

Hugo Pacheco
hpacheco@di.uminho.pt

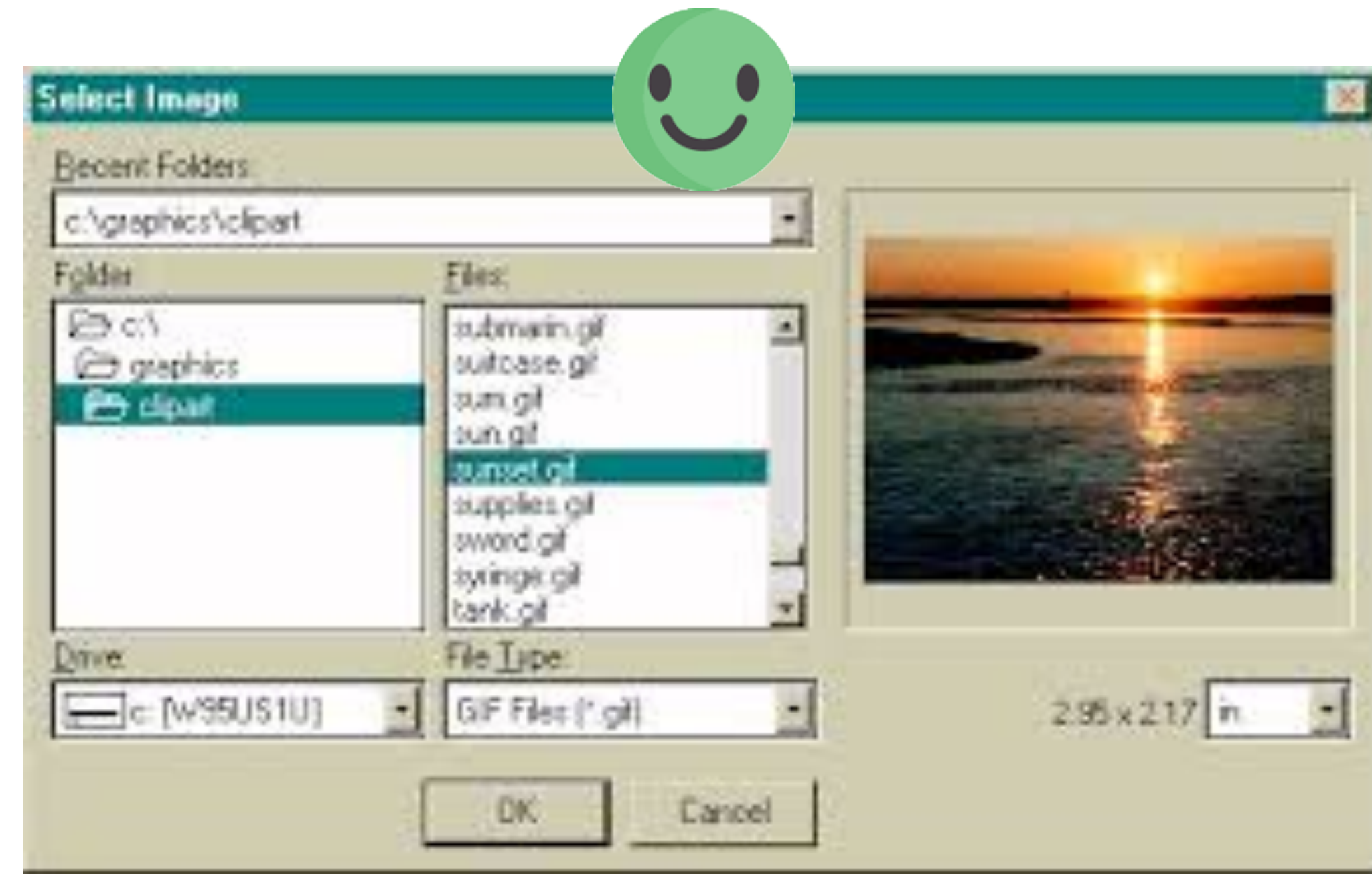
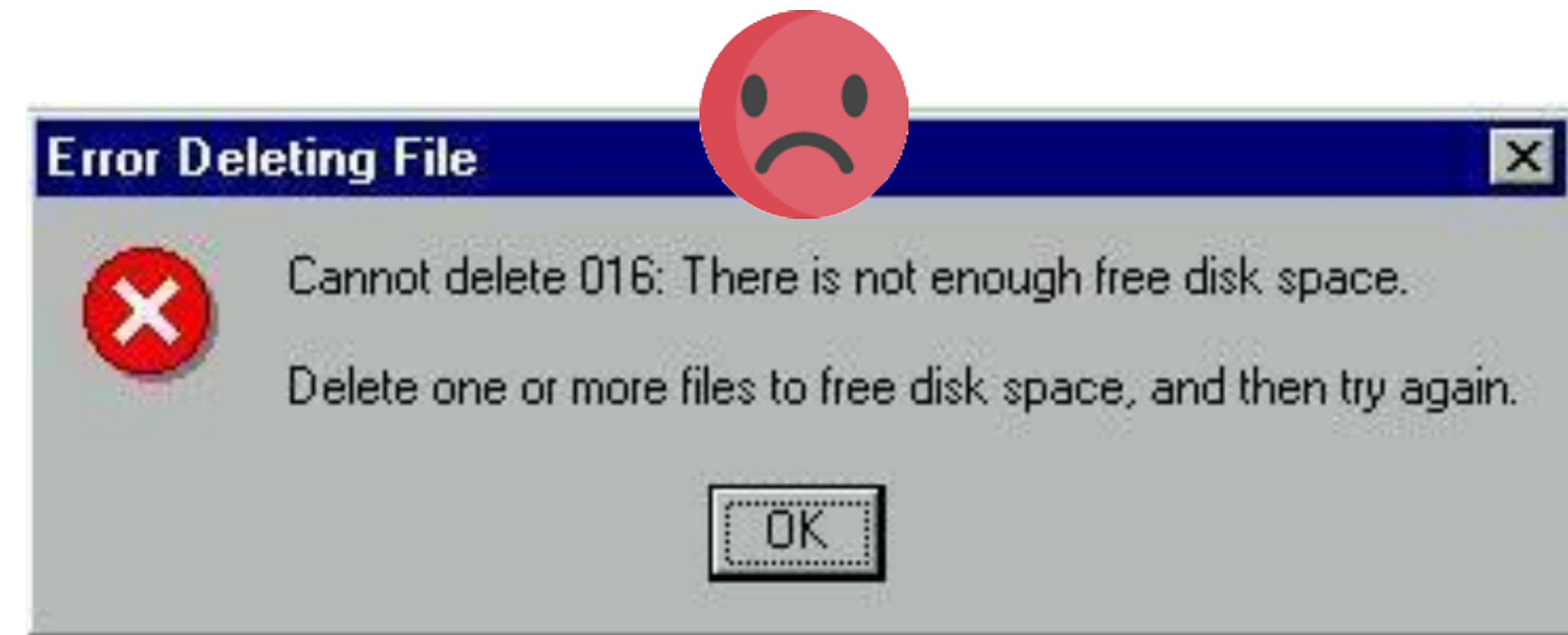
Usabilidade?

 The [Interface Hall of Shame](http://hallofshame.gp.co.at/mshame.htm) is an irreverent look at ineffective interface design. The site includes a collection of images from commercial, corporate, and shareware applications that illustrate how software should *not* be designed.

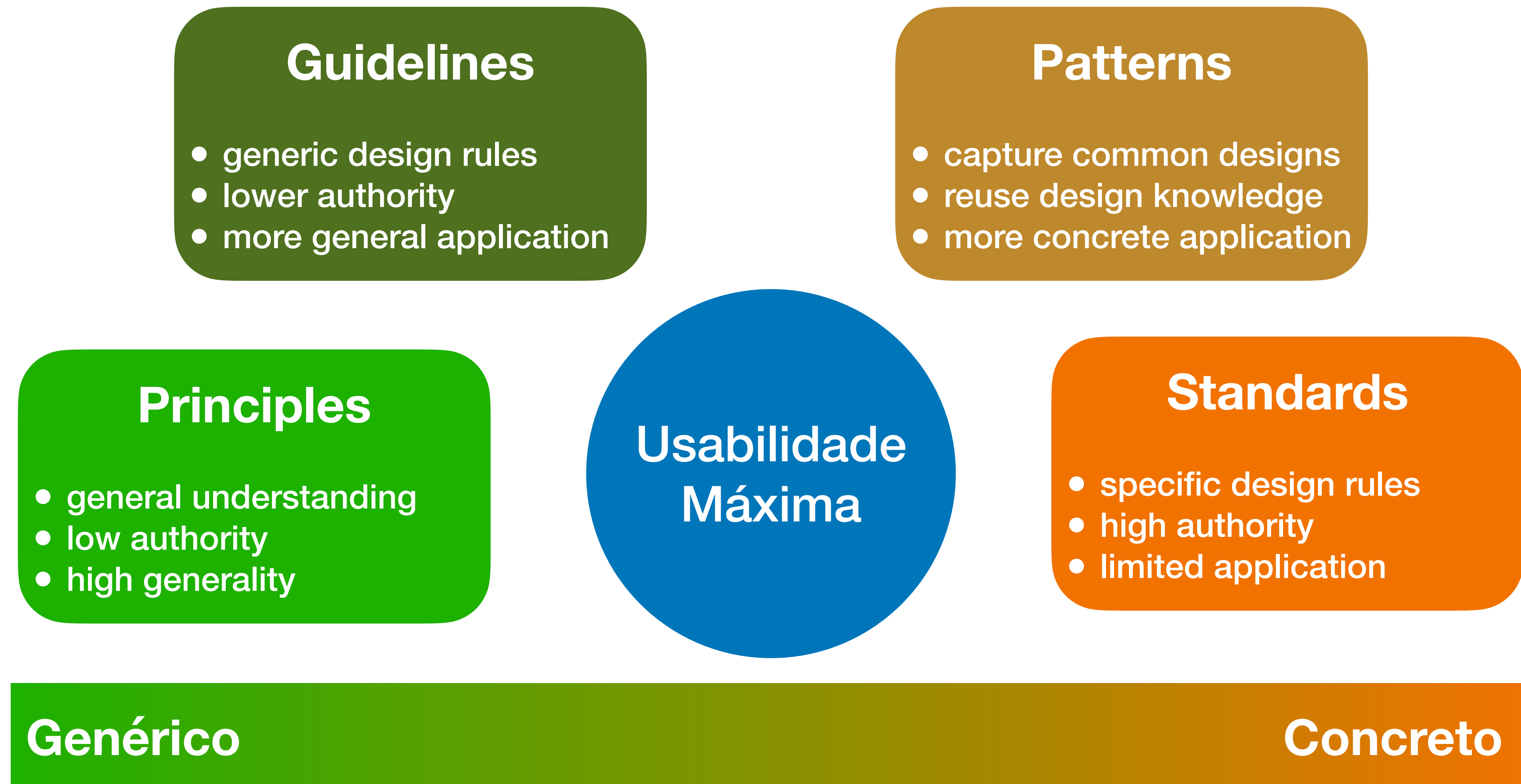
<http://hallofshame.gp.co.at/mshame.htm>

 The [Interface Hall of Fame](http://hallofshame.gp.co.at/mfame.htm) is a collection of images that demonstrate interface design solutions that are both creative *and* effective.

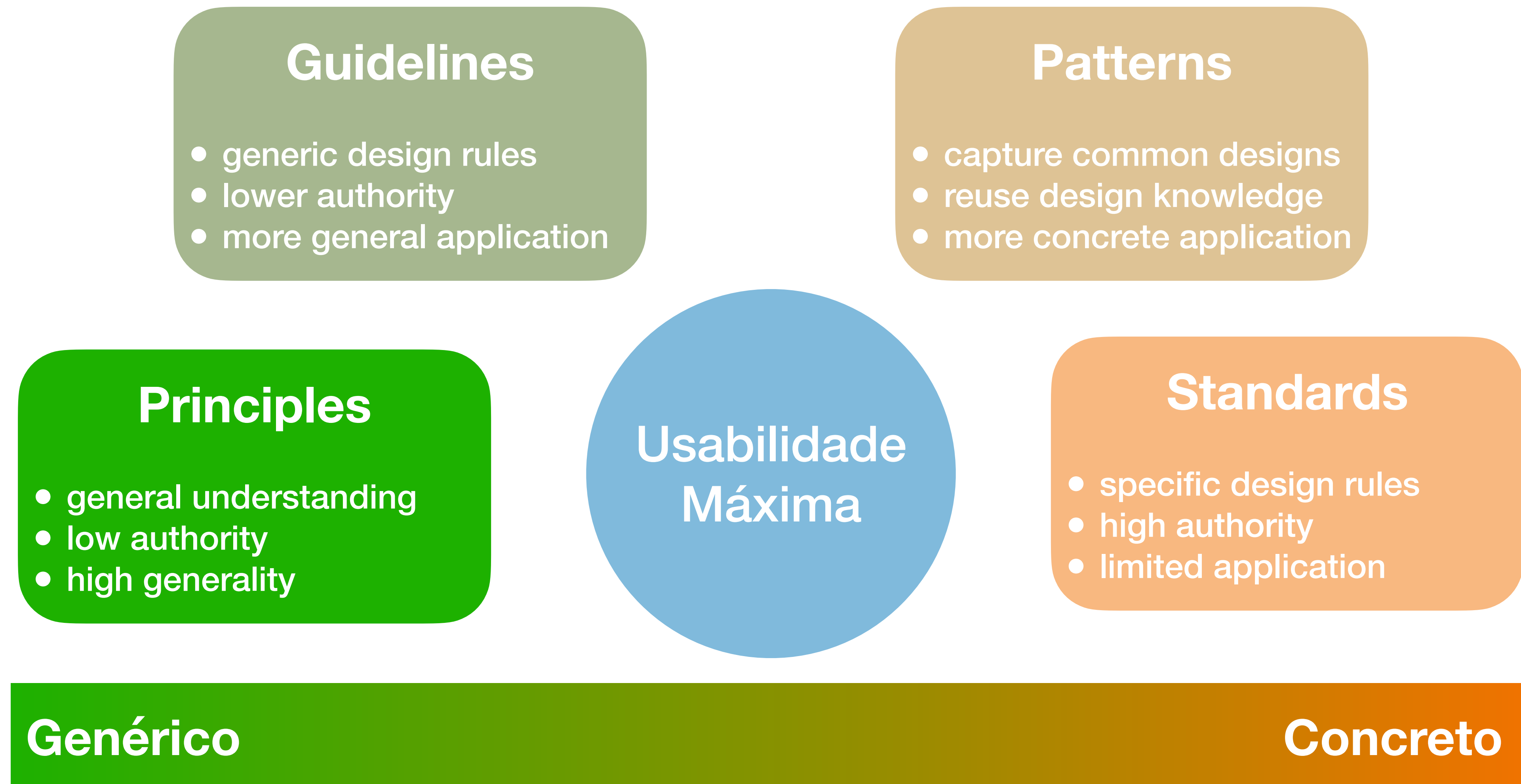
<http://hallofshame.gp.co.at/mfame.htm>



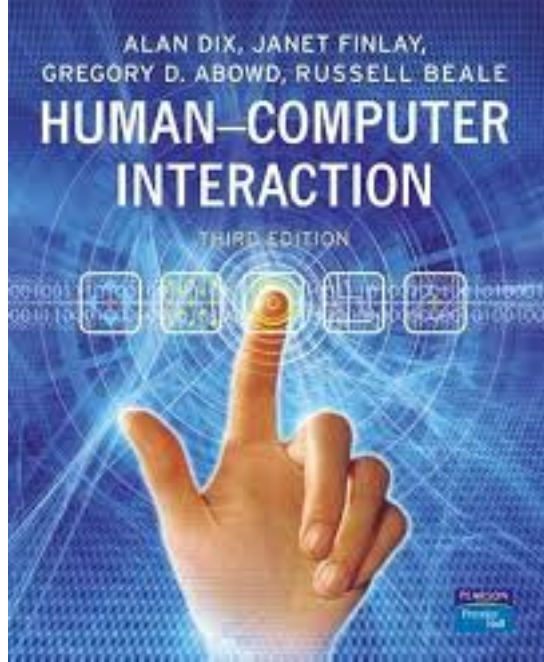
Desenhar para usabilidade máxima



Desenhar para usabilidade máxima

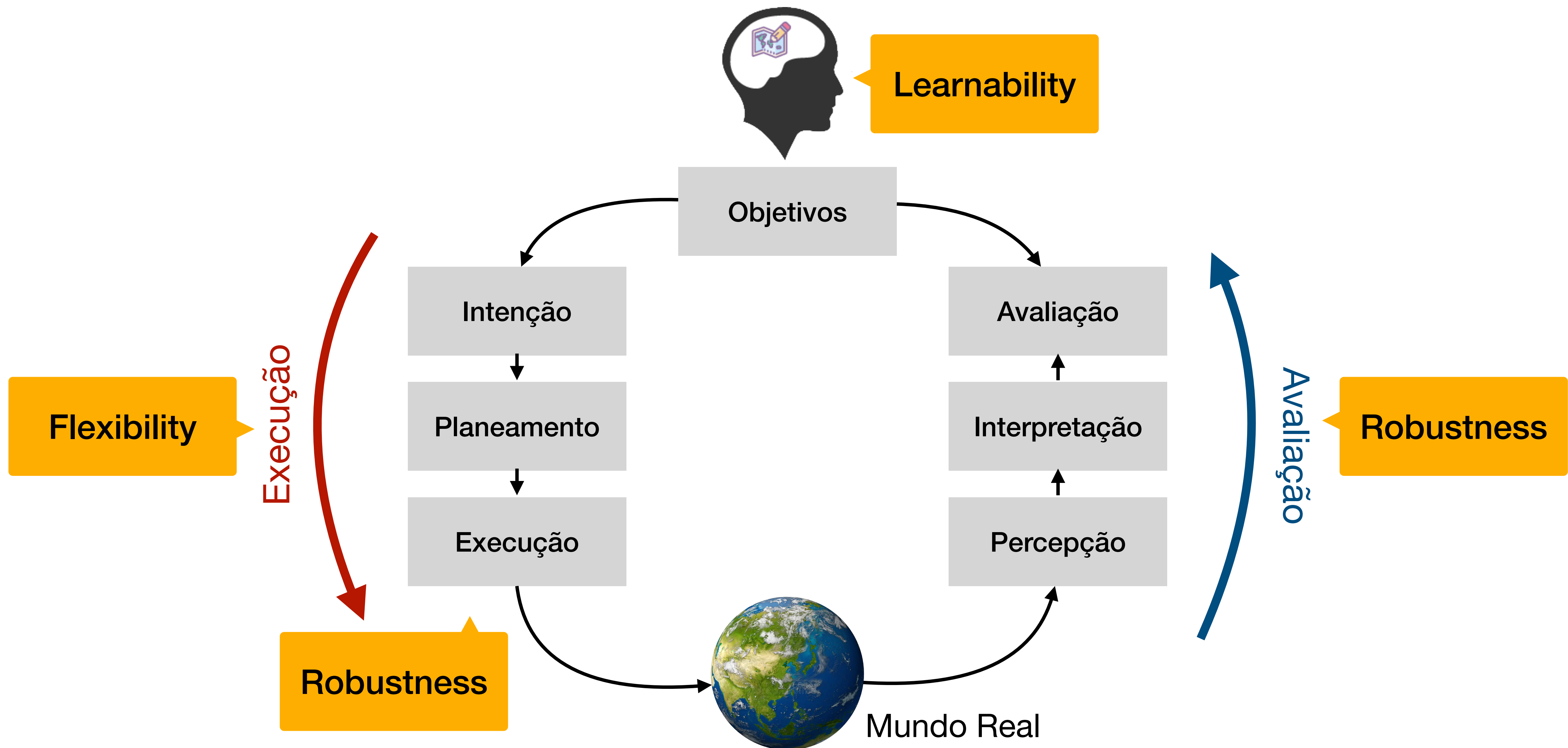


Princípios de usabilidade



- **Learnability** (a interface é fácil de utilizar?)
 - “the ease with which new users can begin effective interaction and achieve maximal performance”
- **Flexibility** (a interface é adaptável ao utilizador?)
 - “the multiplicity of ways the user and system exchange information”
- **Robustness** (o uso induz poucos erros?)
 - “the level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour”

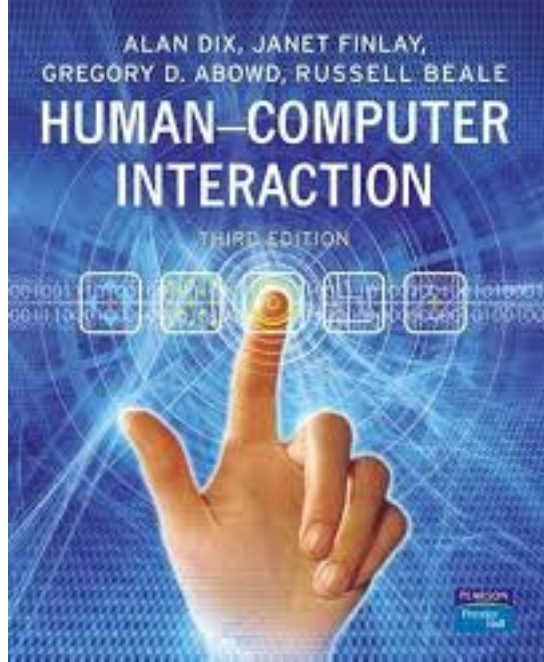
Princípios de usabilidade



Princípios de usabilidade

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

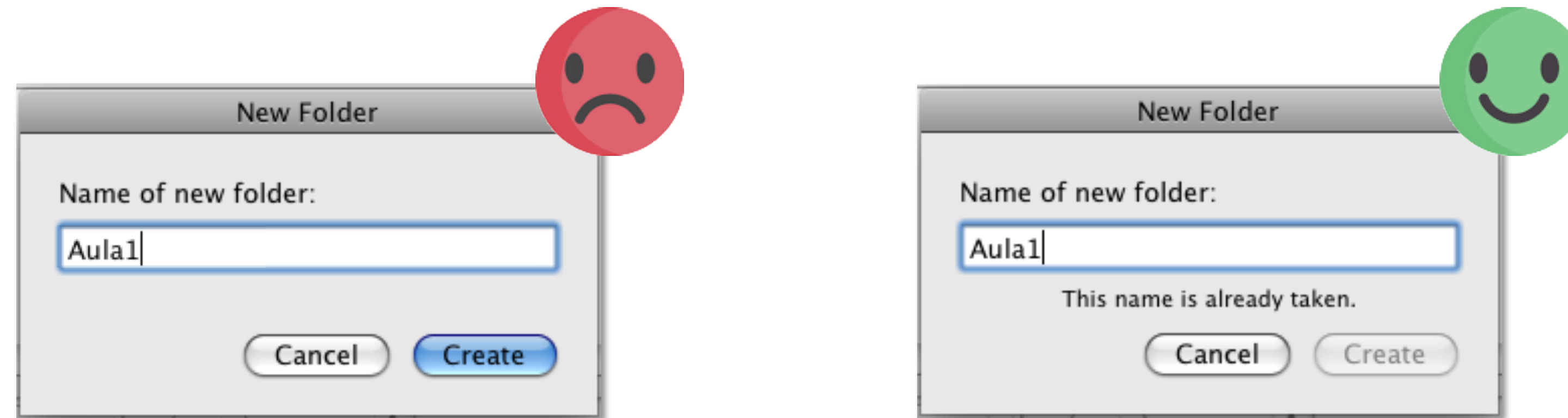
Princípios de usabilidade



- **Learnability** (a interface é fácil de utilizar?)
 - “the ease with which new users can begin effective interaction and achieve maximal performance”
- **Flexibility** (a interface é adaptável ao utilizador?)
 - “the multiplicity of ways the user and system exchange information”
- **Robustness** (o uso induz poucos erros?)
 - “the level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour”

Learnability #1: Predictability

- Capacidade de determinar o efeito de ações no sistema
 - E.g., não permitir ações que iriam falhar

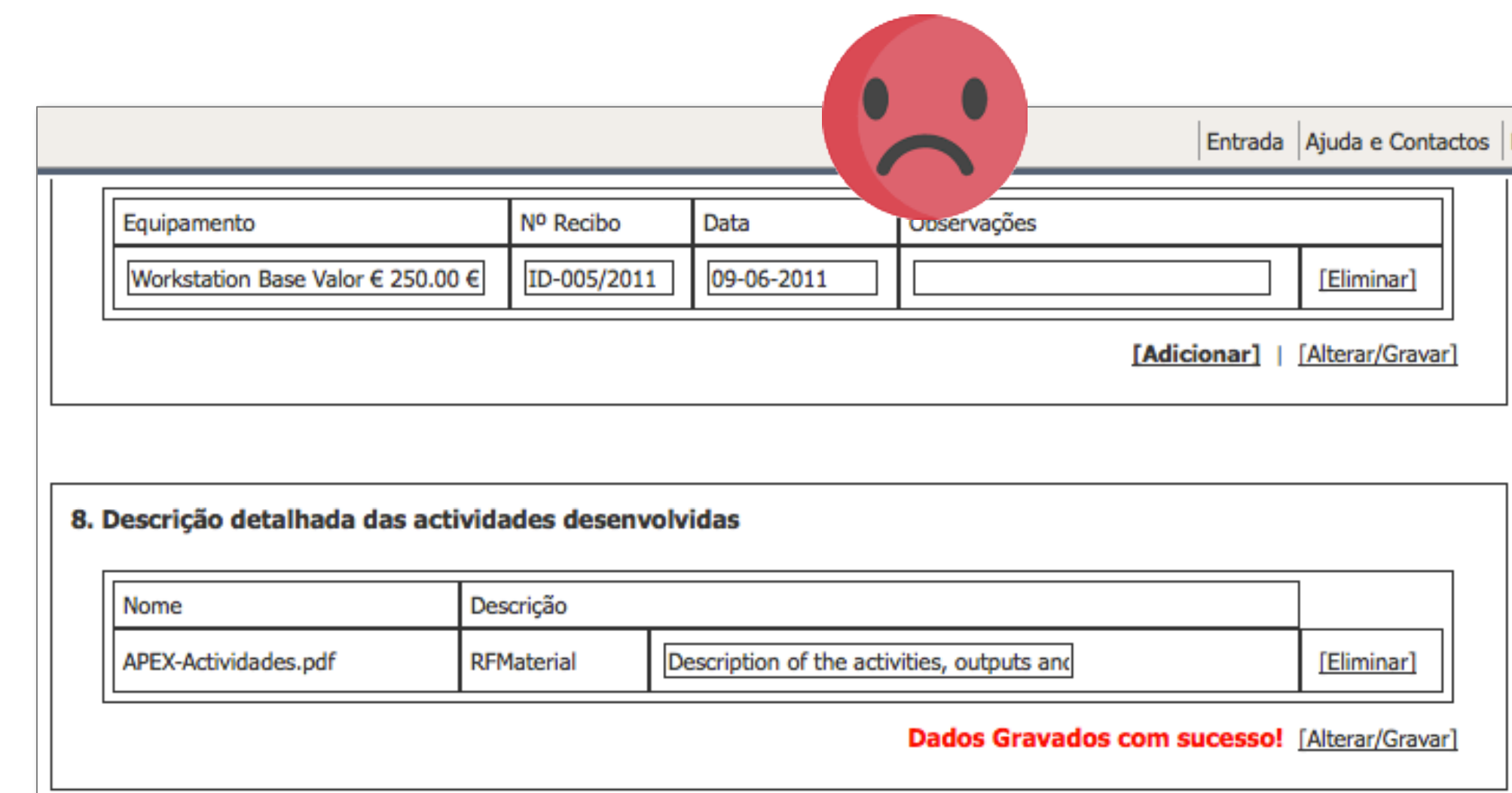
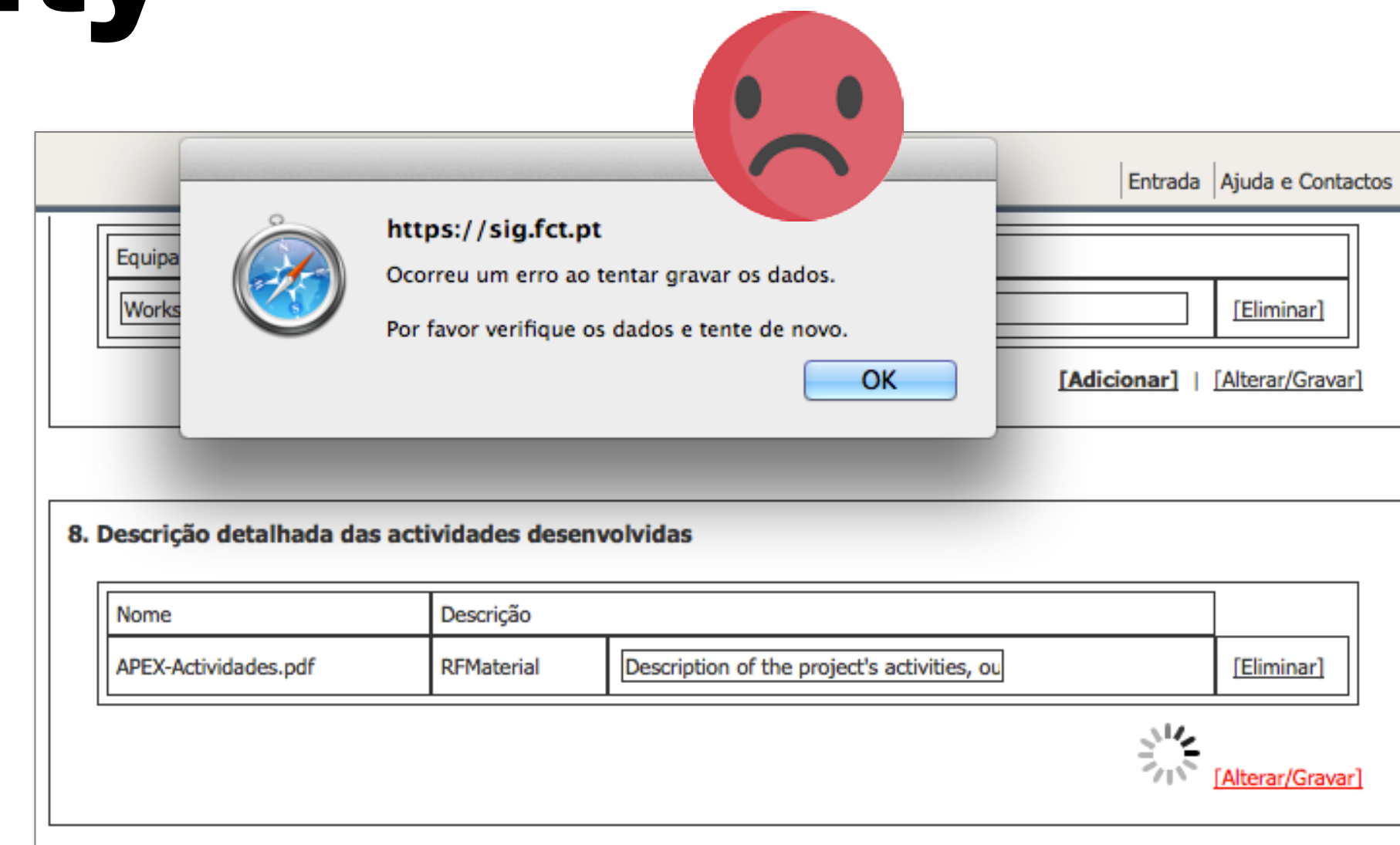
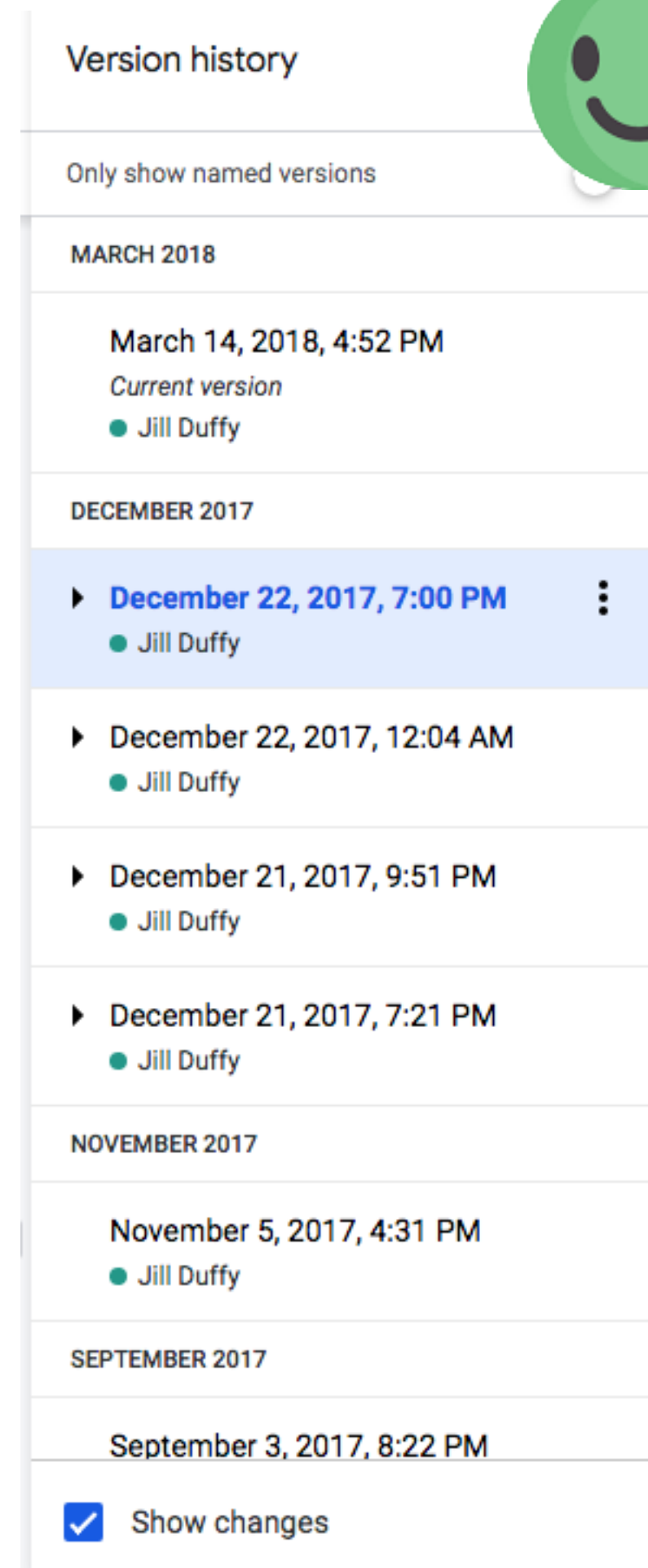
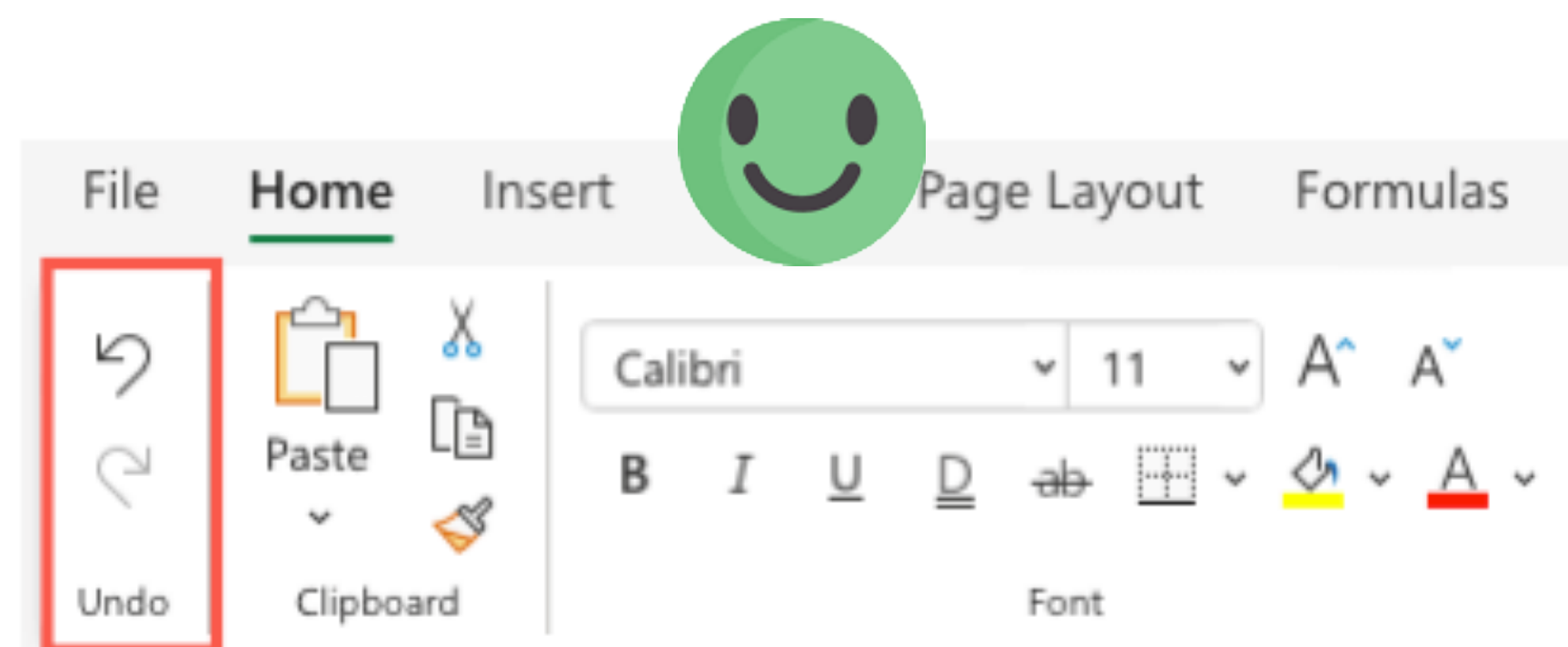


- E.g, efeito de ações imediatamente visível



Learnability #2: Synthesizability

- Capacidade de determinar o efeito de ações passadas no estado atual
- E.g., fornecer feedback consistente com o modelo mental
- E.g., undo e revision history



Learnability #3: Familiarity

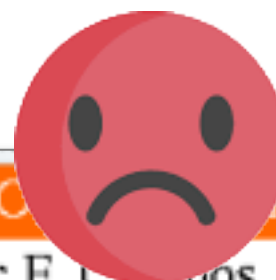
- Utilidade de conhecimento anterior sobre o mundo ou outros sistemas
 - E.g., calendários
 - E.g., calculadoras



 imprimir
Nome: José Francisco Creissac Freitas Campos

30/03/2015 - 02/04/2015

	segunda-feira	terça-feira	quarta-feira
14:00	Programação Orientada aos Objetos [EEUM_G - DI-1.04]	Sistemas Interativos [EEUM_G - DI-0.05]	
15:00	PL2	Sistemas Interativos [EEUM_G - DI-0.05]	
16:00		TP1	
17:00			
18:00	Programação Orientada aos Objetos [EEUM_G - DI-0.11]	Programação Orientada aos Objetos [EEUM_G - DI-0.11]	
19:00	PL6	PL5	



Docente : José Francisco Creissac F. Campos

Disciplina	Dia da Semana	Ano lectivo	Horas	Tipo aula
530807 - Desenvolvimento de Sistemas Informação	ter	02/03	11h-13h	teórica
530807 - Desenvolvimento de Sistemas Informação	ter	02/03	18h-20h	teórica-prática
7008N8 - Desenvolvimento de Sistemas Informação	ter	02/03	11h-13h	teórica
530405 - Paradigmas da Programação IV	qua	02/03	09h-11h	teórica-prática
530405 - Paradigmas da Programação IV	qui	02/03	09h-11h	teórica-prática
530405 - Paradigmas da Programação IV	qui	02/03	15h-17h	teórica-prática
001011 - Interação Humano-Computador	sab	02/03	11h-13h	teórica

 imprimir

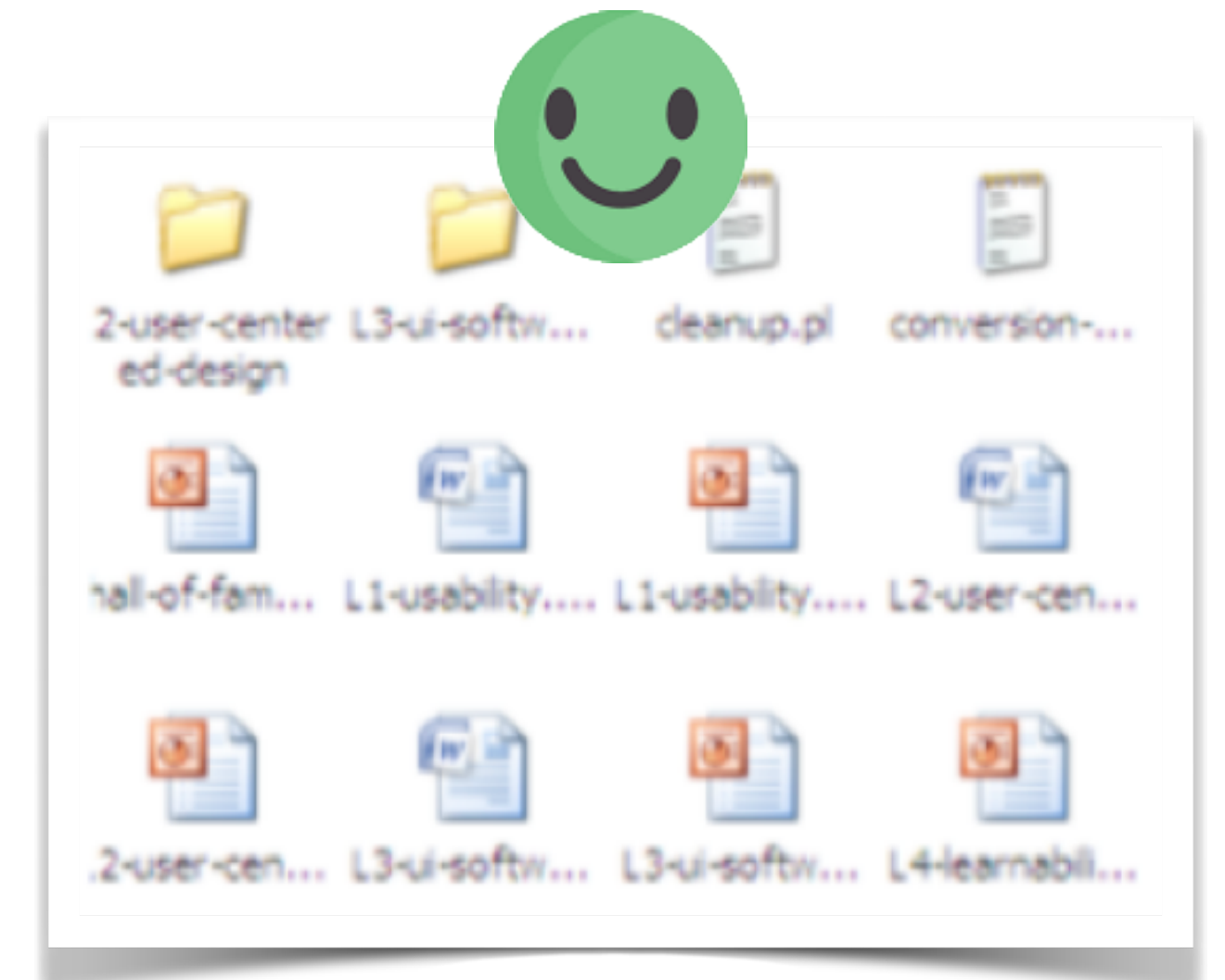


Metáforas

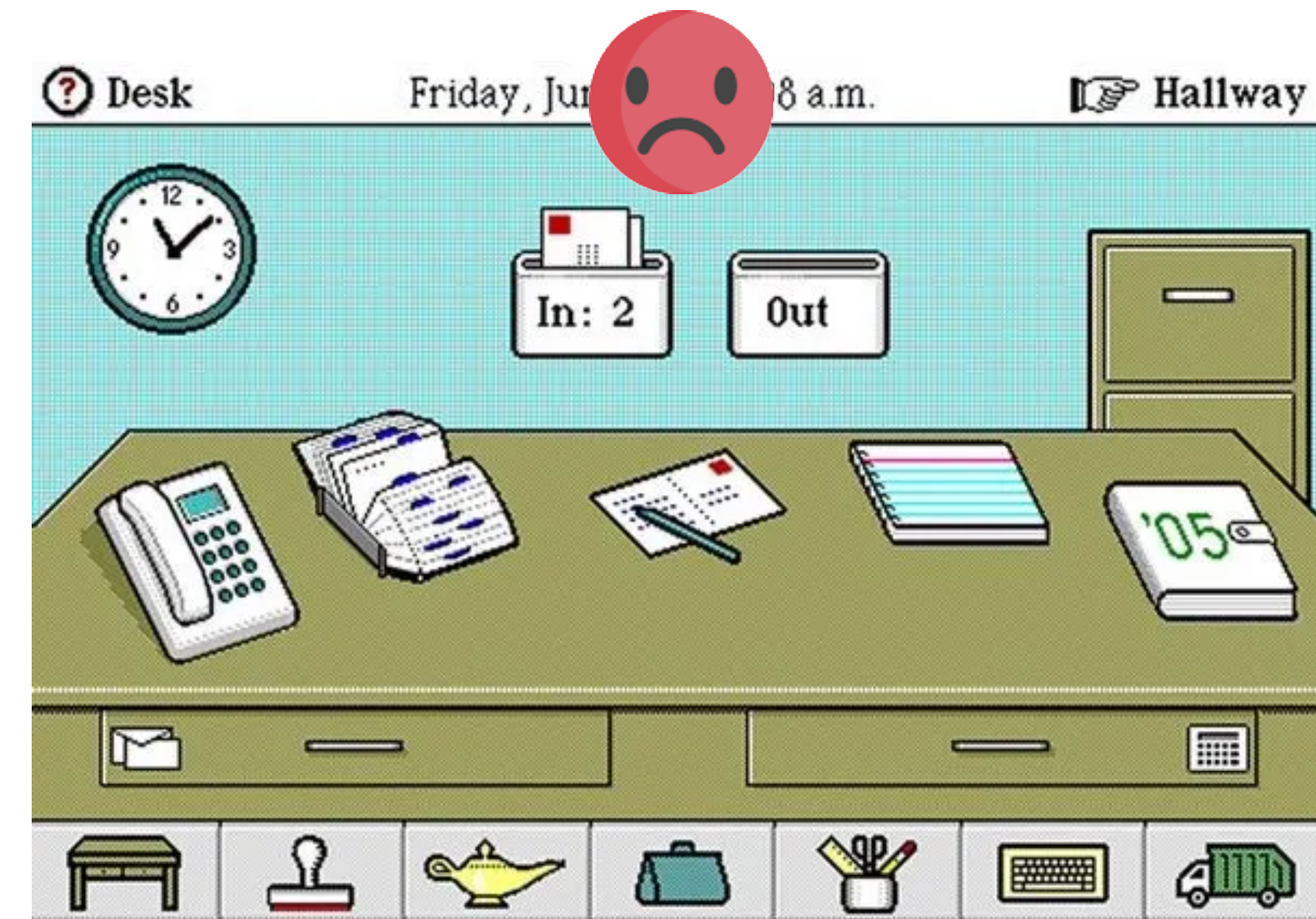
- Usar conceitos familiares para ajudar os utilizadores a compreender o funcionamento do sistema
- + Contribui diretamente para o modelo mental do utilizador
- + Fácil de memorizar
- Difícil de encontrar para designers
- Pode ser enganador, descontextualizado ou limitador
- Acaba sempre por se quebrar



Trash



Desktop



Learnability #4: Generalizability

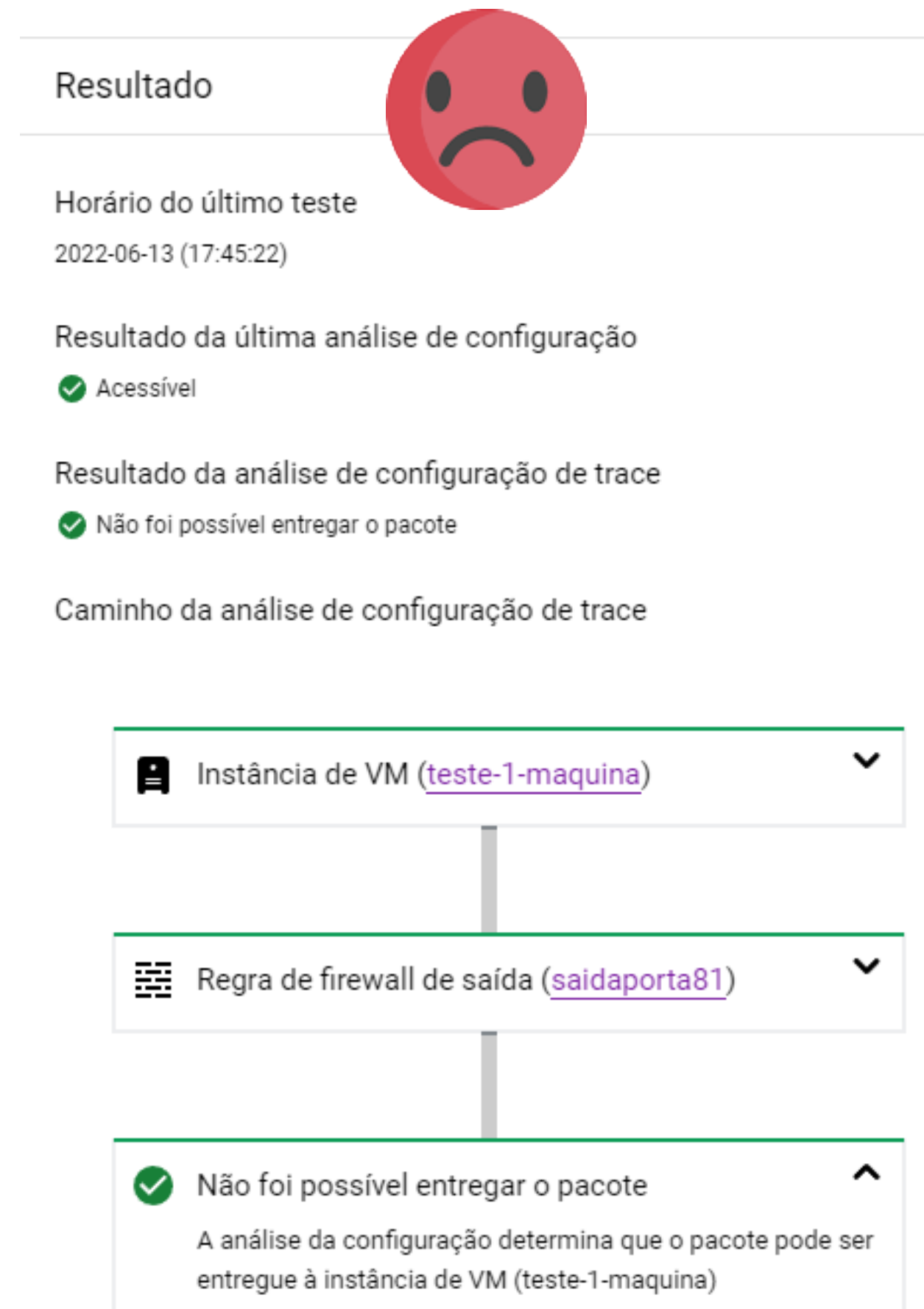
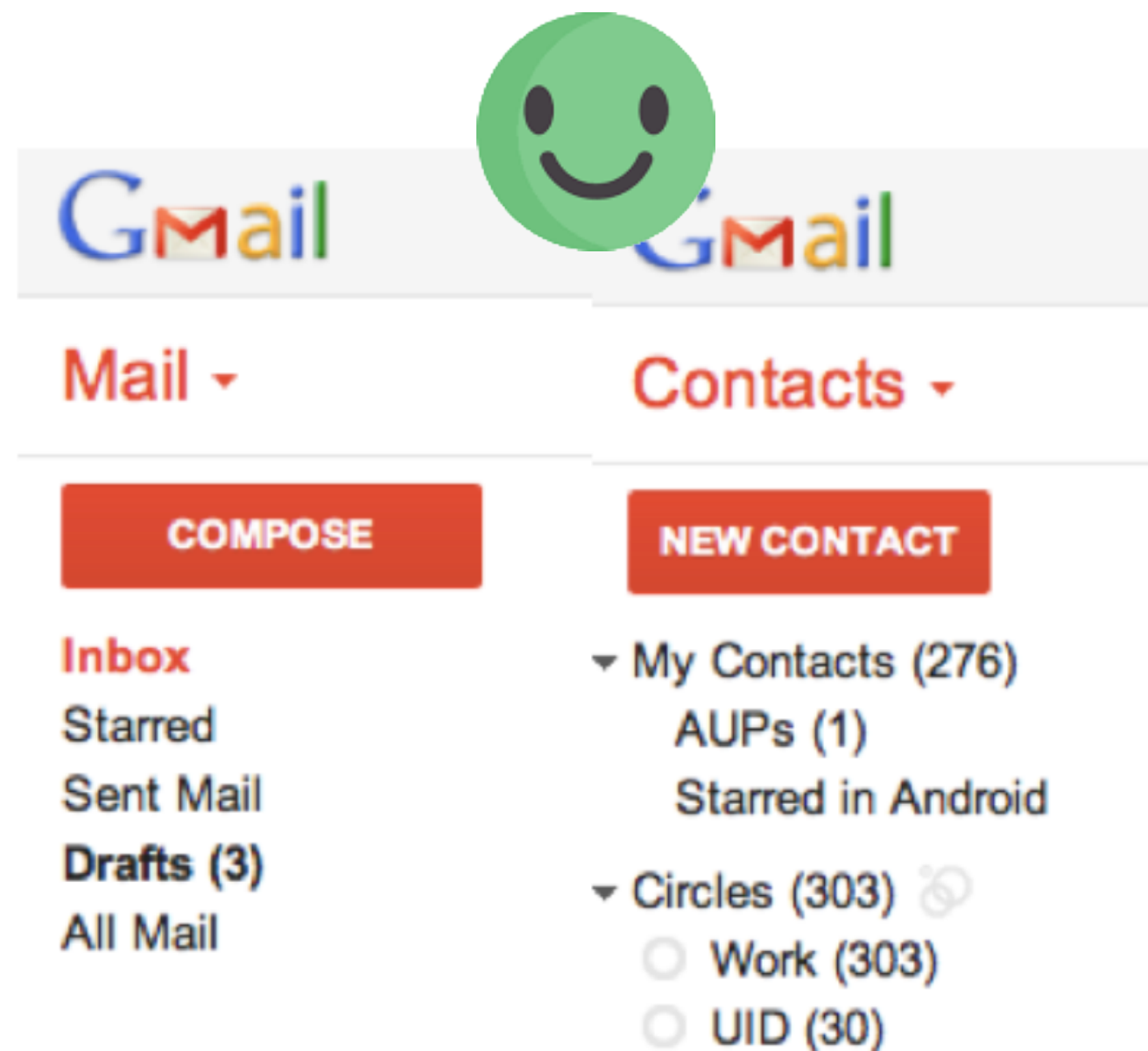
- Capacidade de estender a interação a novas situações
 - E.g., shared clipboard (entre SOs)



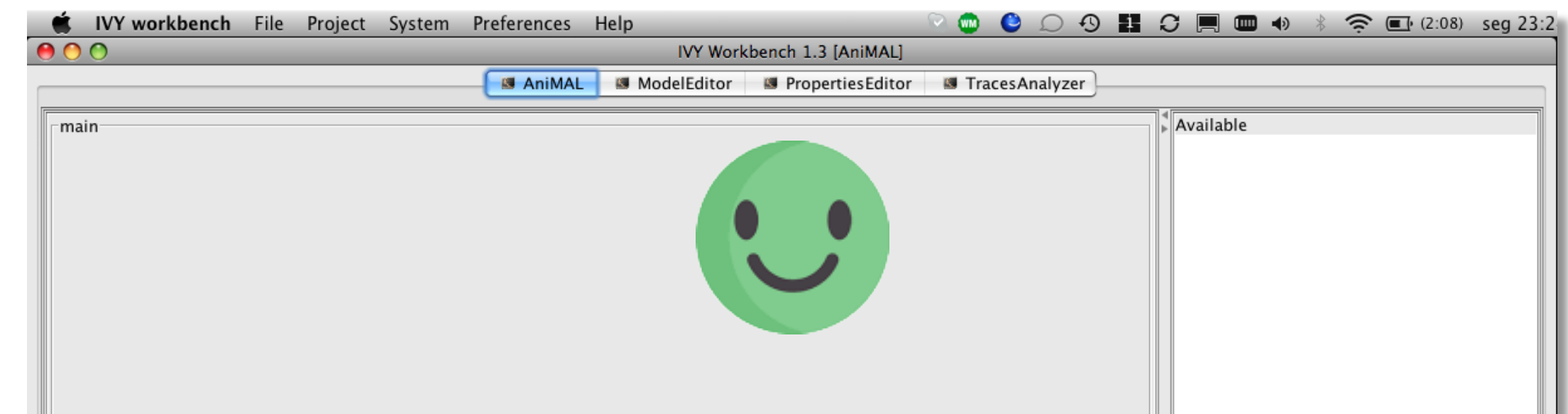
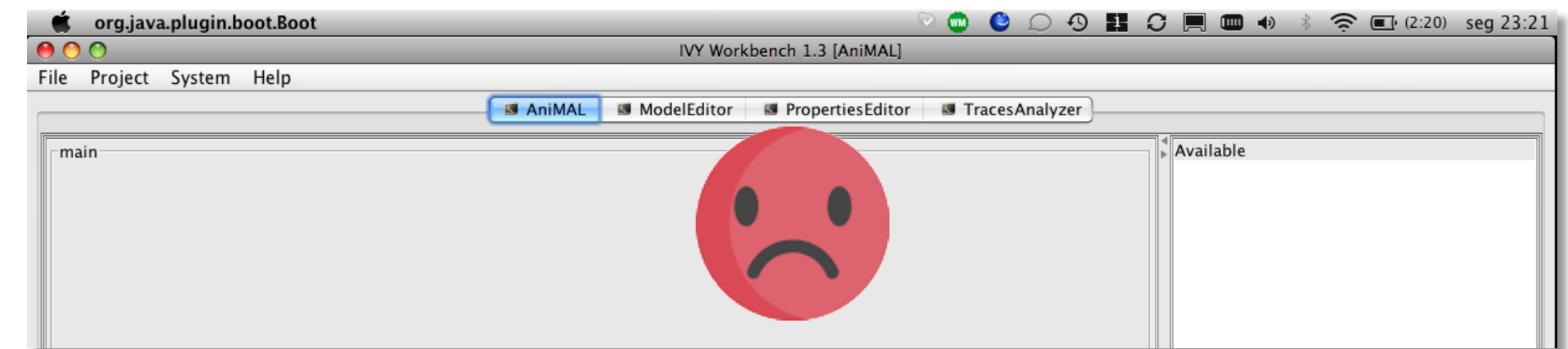
Learnability #5: Consistency

- Comportamentos similares/diferentes em situações ou objetivos similares/diferentes

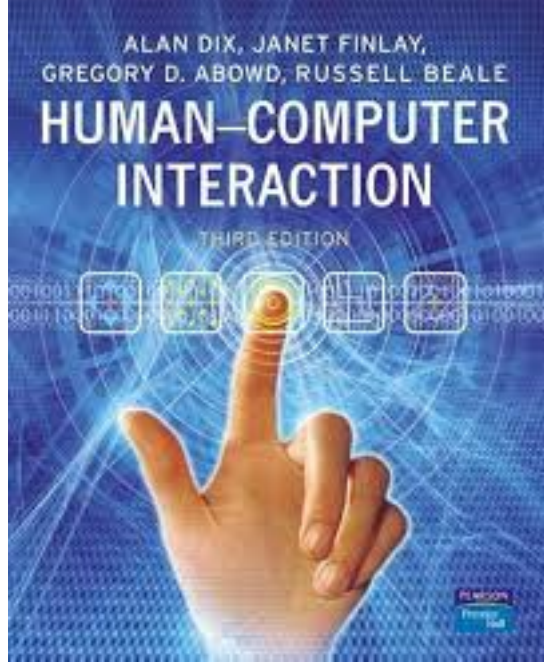
- E.g., interna



- E.g., externa



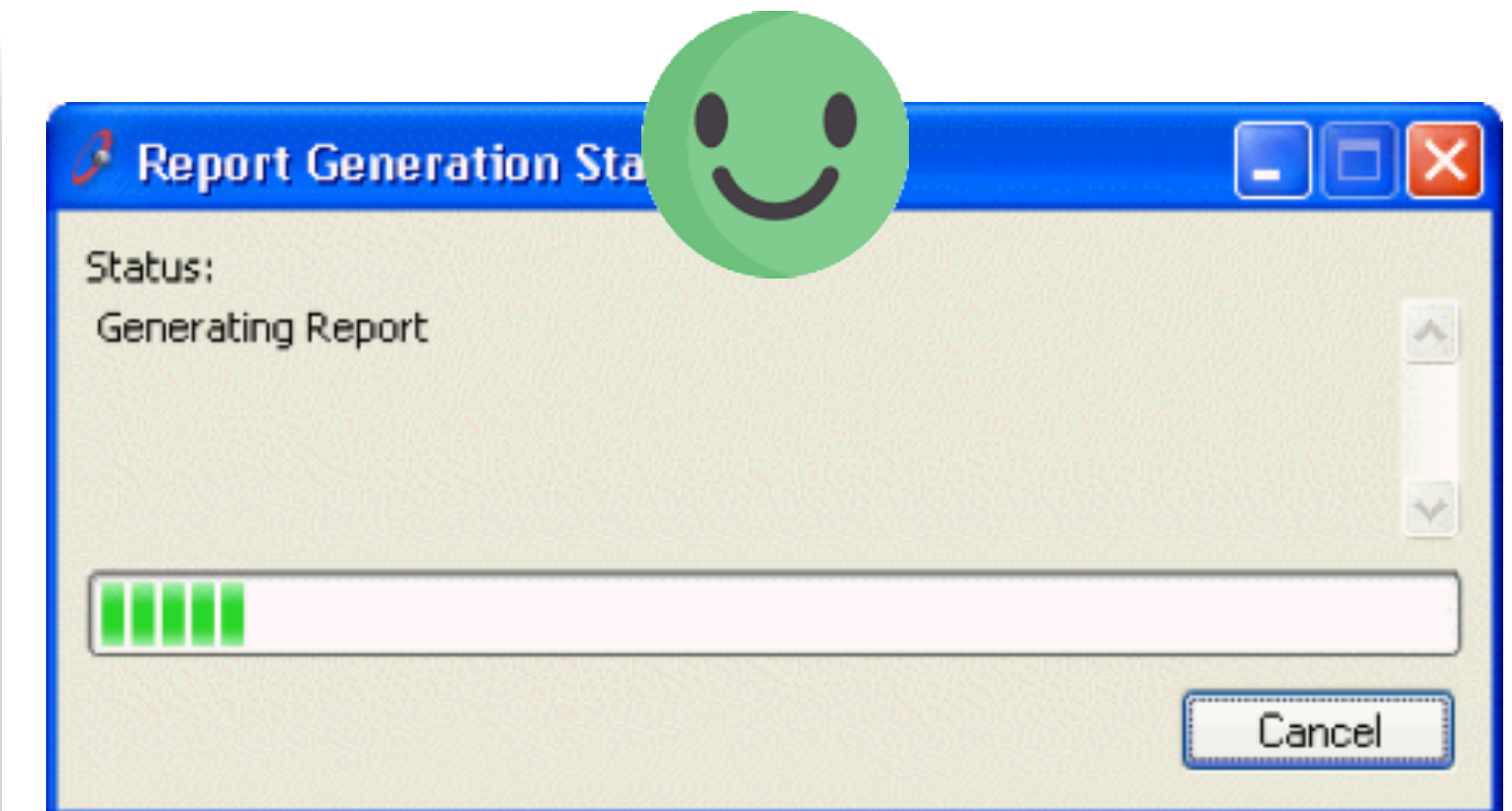
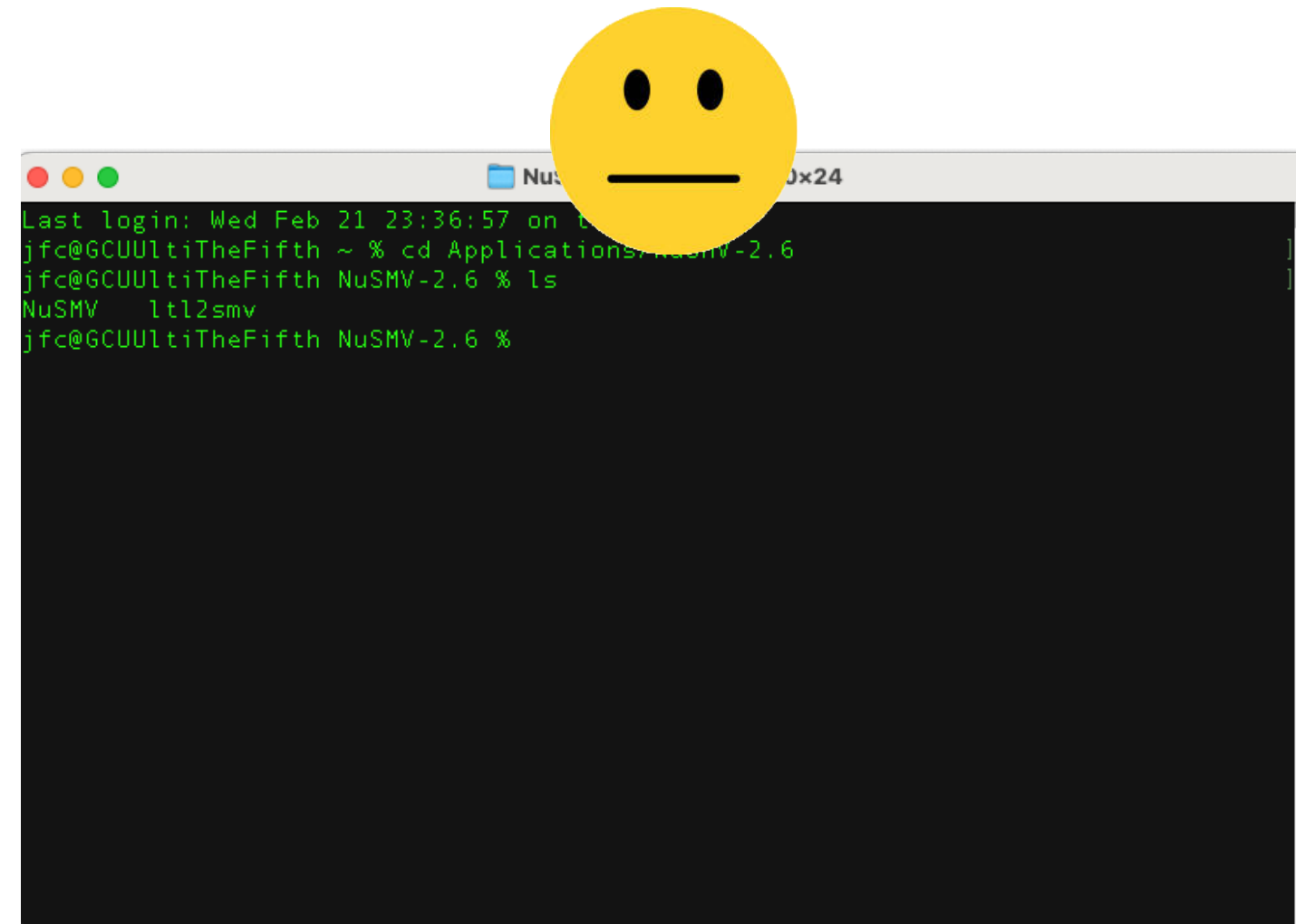
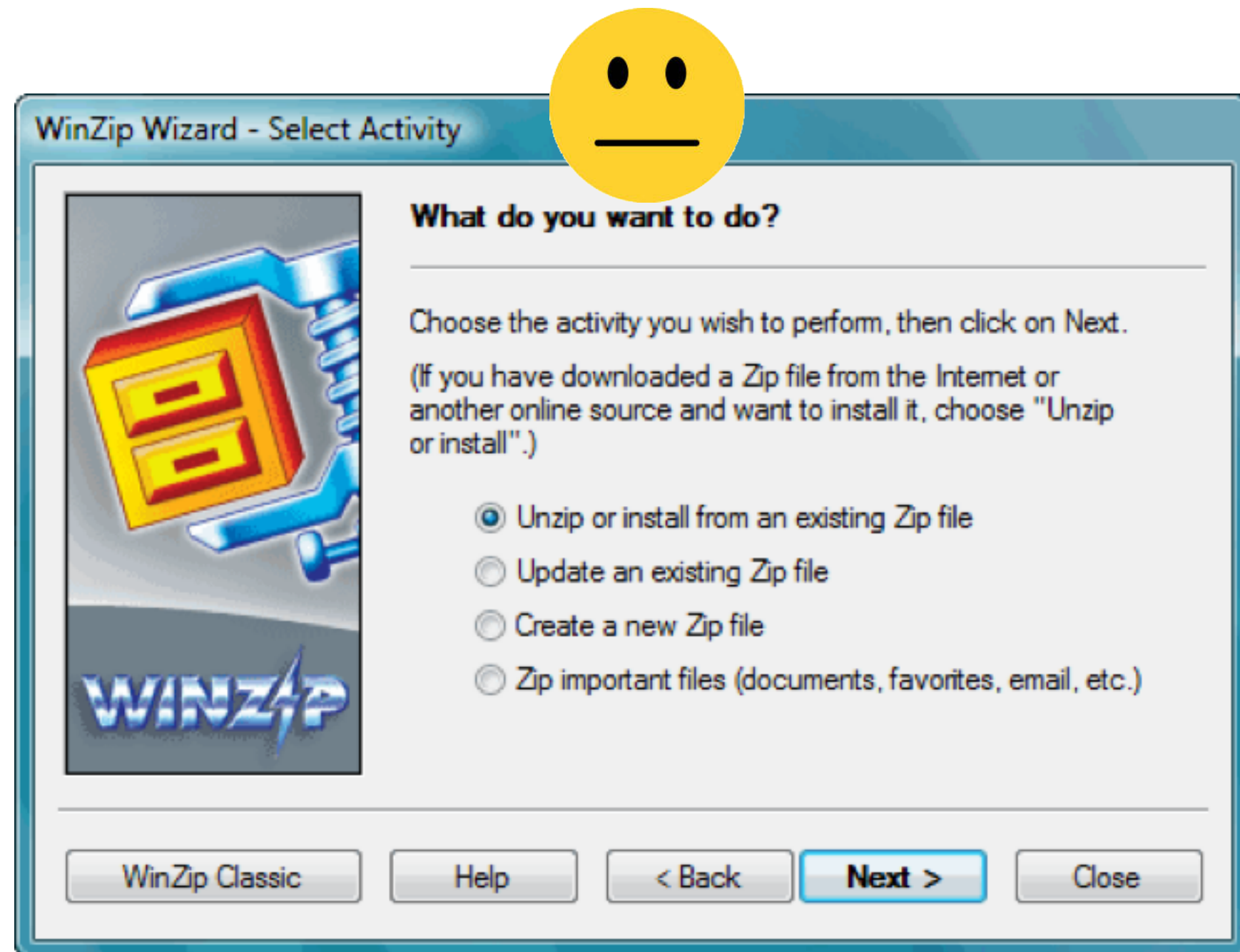
Princípios de usabilidade



- **Learnability** (a interface é fácil de utilizar?)
 - “the ease with which new users can begin effective interaction and achieve maximal performance”
- **Flexibility** (a interface é adaptável ao utilizador?)
 - “the multiplicity of ways the user and system exchange information”
- **Robustness** (o uso induz poucos erros?)
 - “the level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour”

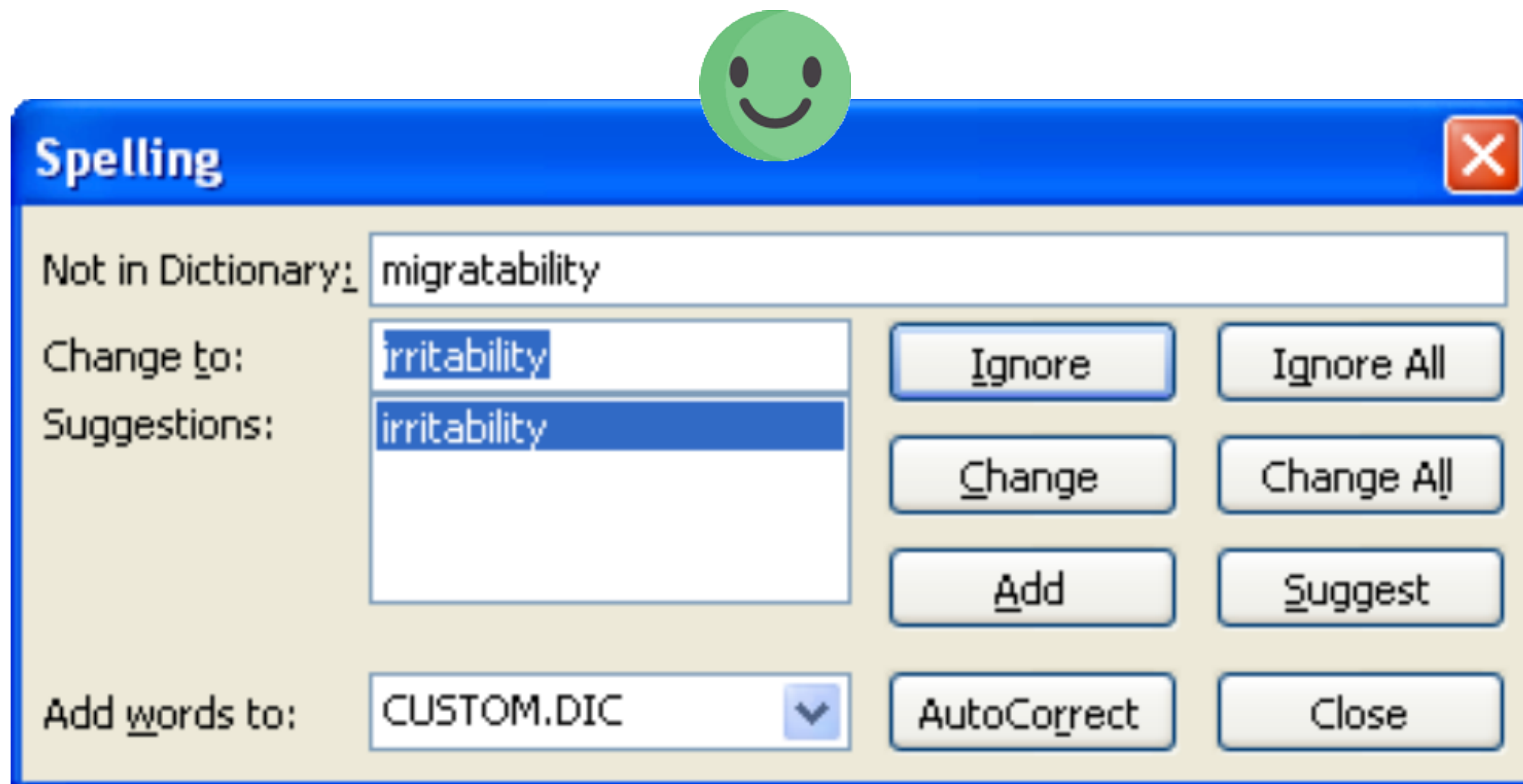
Flexibility #1: Dialogue initiative

- Maximizar o (sentimento de) controle do utilizador
 - E.g., do sistema (menos flexibilidade)
 - E.g., do utilizador (mais flexibilidade)



Flexibility #2: Task migratability

- Alternar responsabilidade de controle entre utilizador e sistema
 - E.g., spell checking dictionary
 - E.g., auto pilot



Flexibility #3: Substitutivity

- Suportar valores equivalentes como permutáveis
- Tipicamente inputs

The diagram illustrates the concept of substitutivity in task scheduling by showing five equivalent 'Action' windows. Each window represents a task with the following common attributes:

- Project: Aulas : POO
- Context: Mac
- Estimated Time: 1 hour
- Start: None
- Completed: None
- Added: 2009/05/06 12:30
- Changed: 2009/05/13 11:16
- Repeat Every: 1 weeks
- Repeat from: Assigned date
- Next Start: None
- Next Due: 2009/05/22 17:00

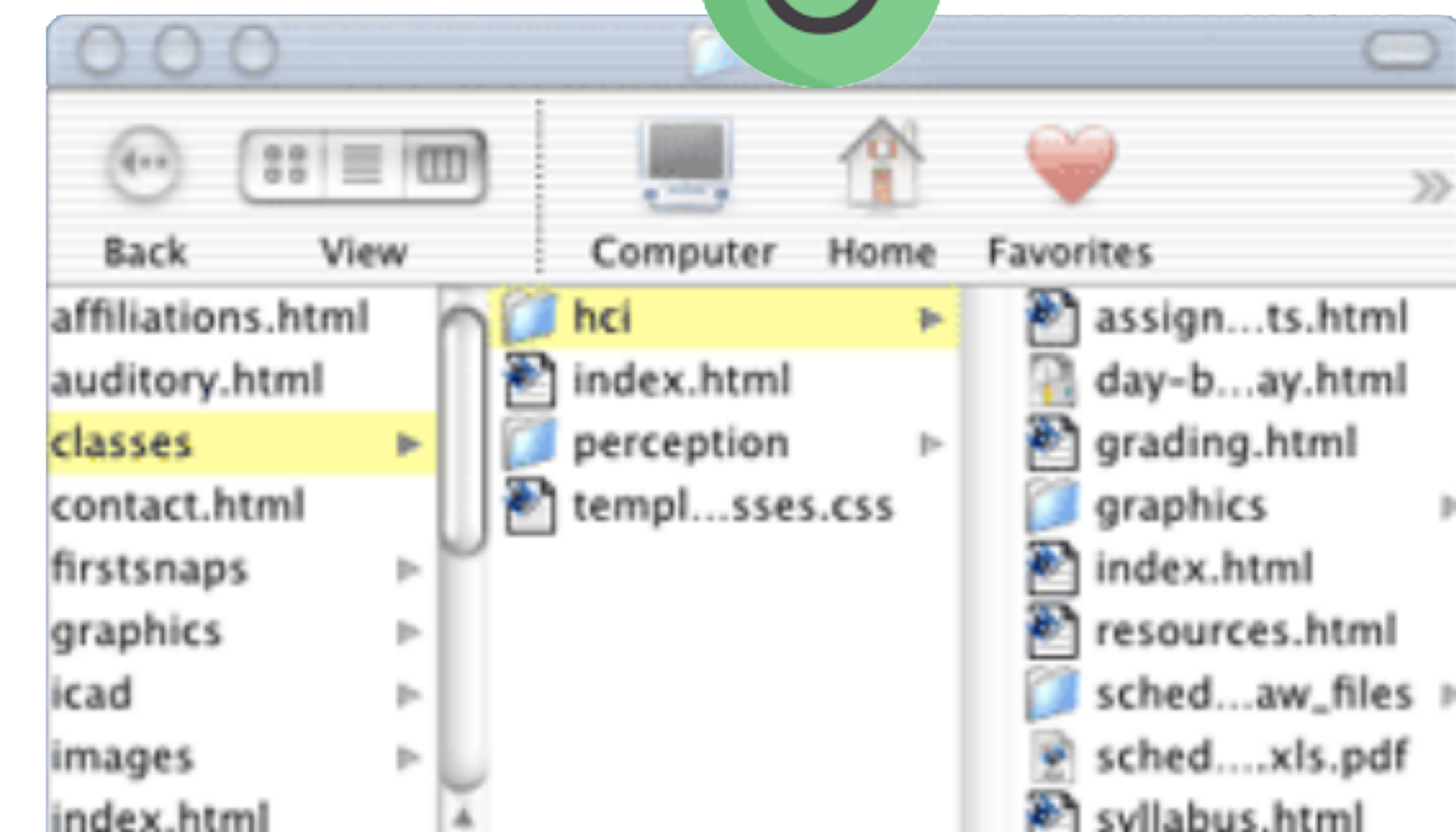
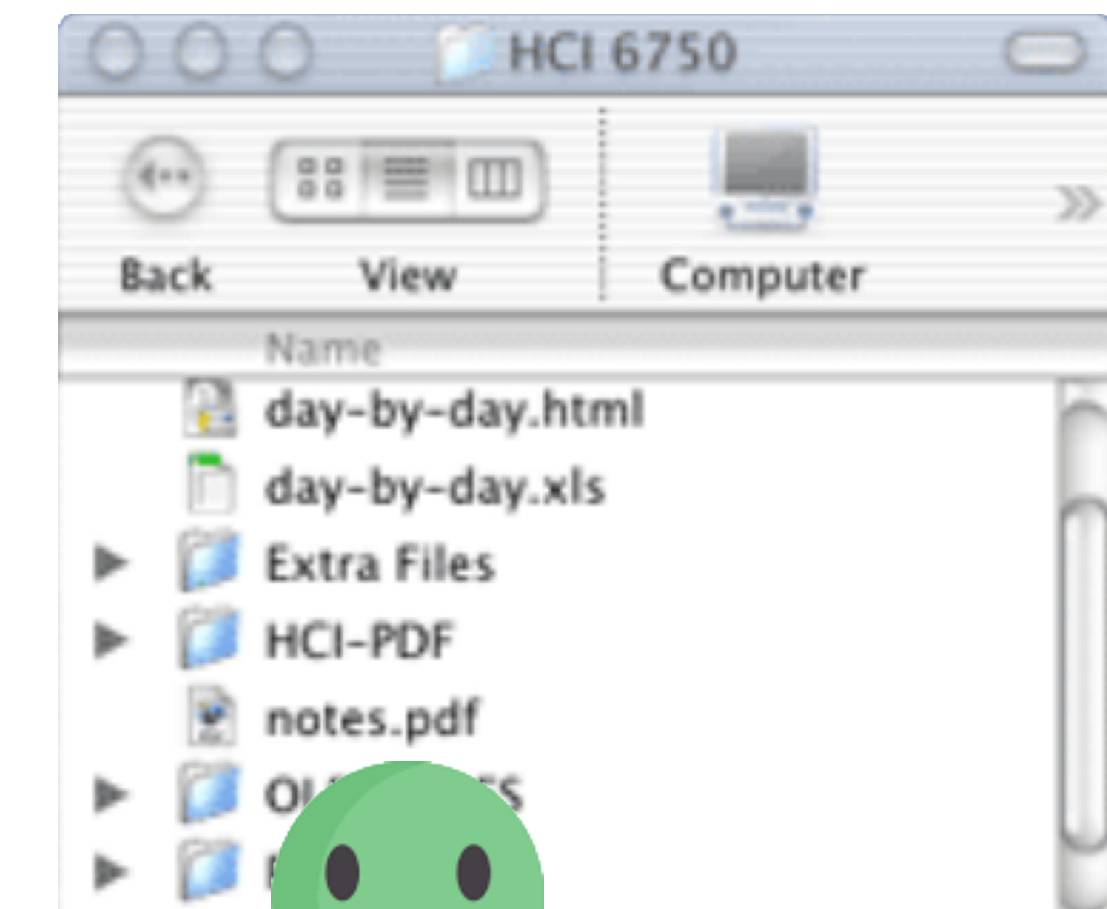
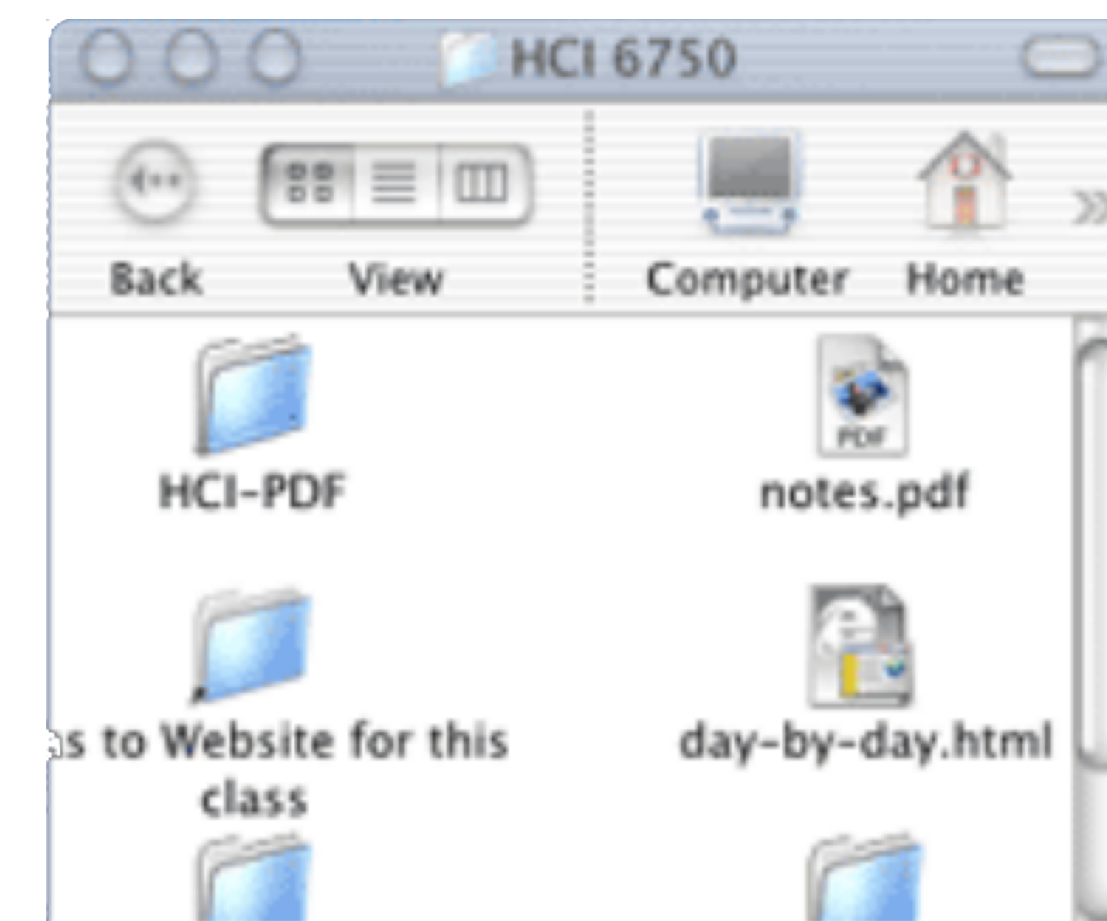
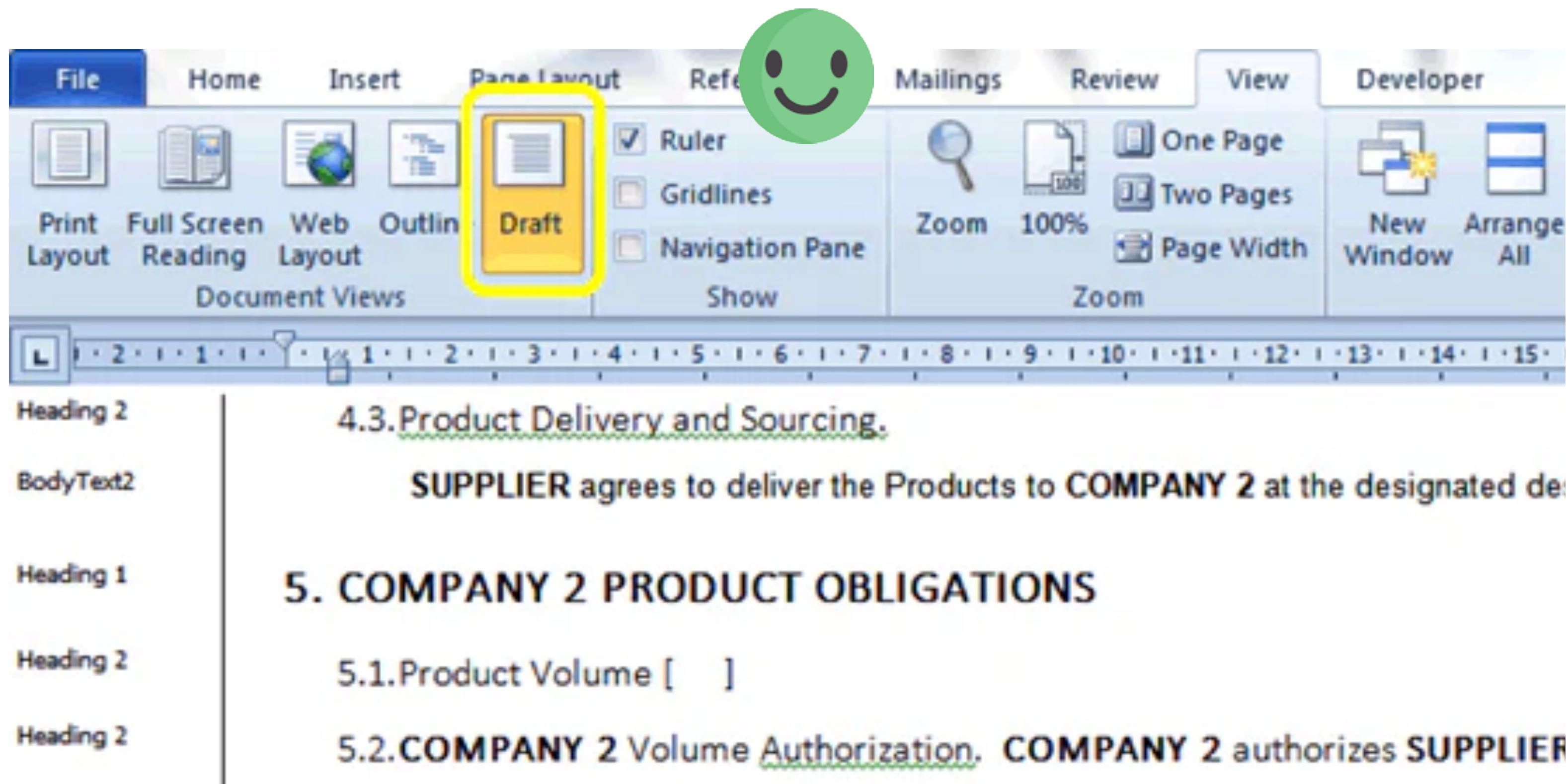
The 'Due' field is highlighted in each window, showing different but equivalent inputs:

- Window 1: 2009/05/15 17:00
- Window 2: 2009/05/15 17:00 (with a calendar popup for May 2009 showing the date 15th)
- Window 3: next friday (with a green smiley face icon above it)
- Window 4: 1 week
- Window 5: 1w

Double-headed arrows connect the windows, indicating that these different inputs are treated as equivalent and result in the same 'Next Due' date of 2009/05/22 17:00.

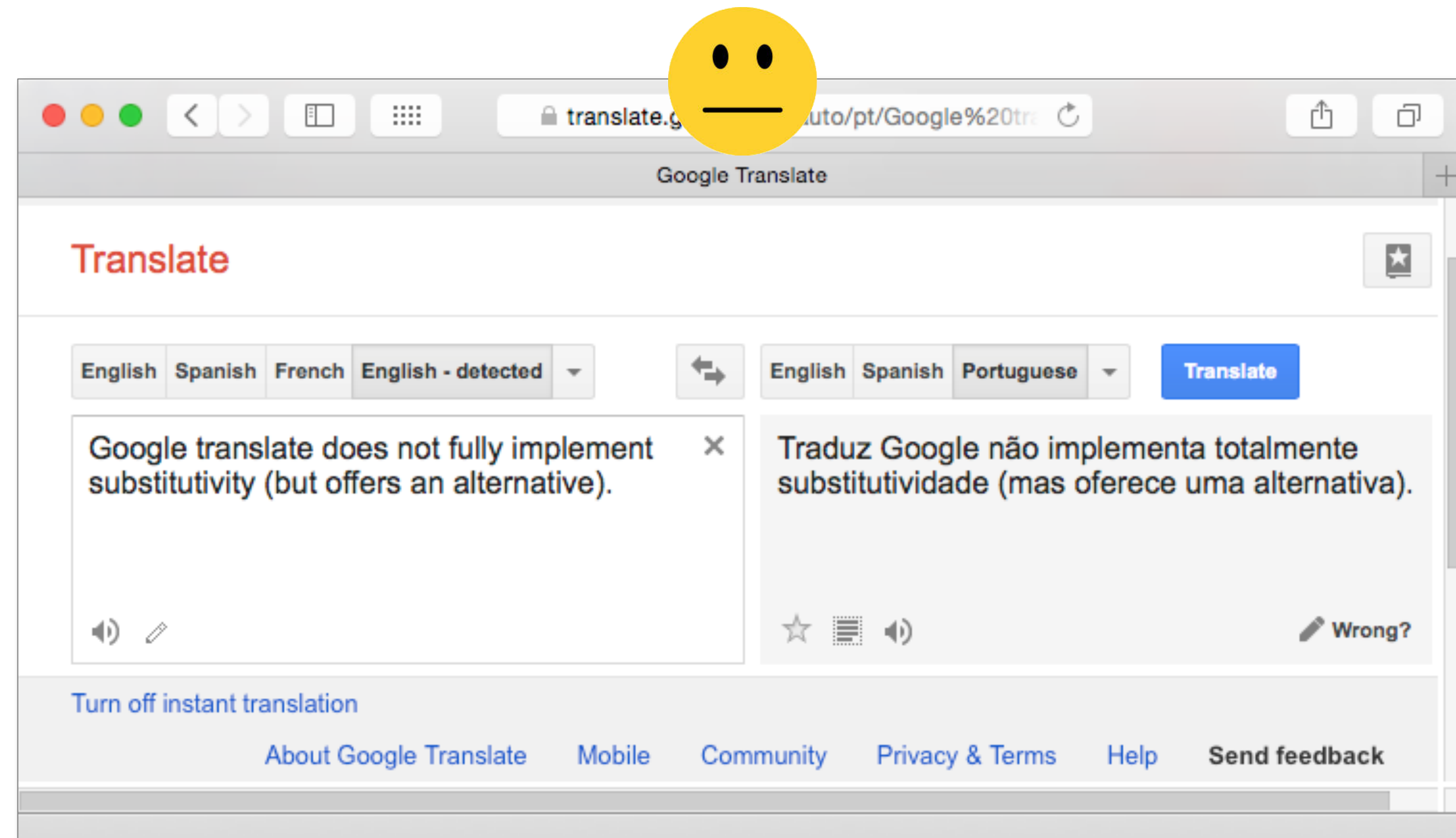
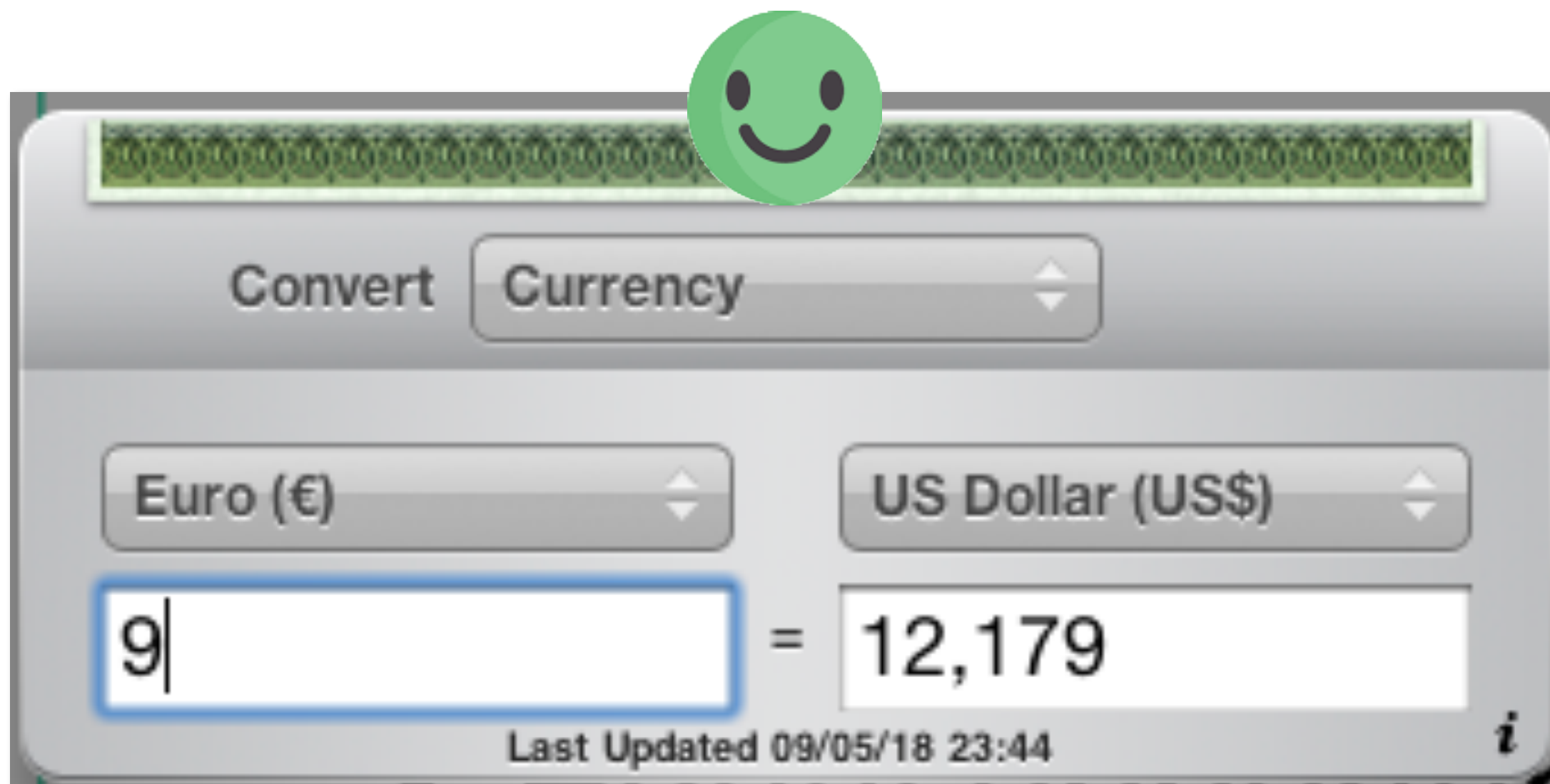
Flexibility #3: Substitutivity

- Suportar valores equivalentes como permutáveis
- “Representation multiplicity” (ao nível do output)



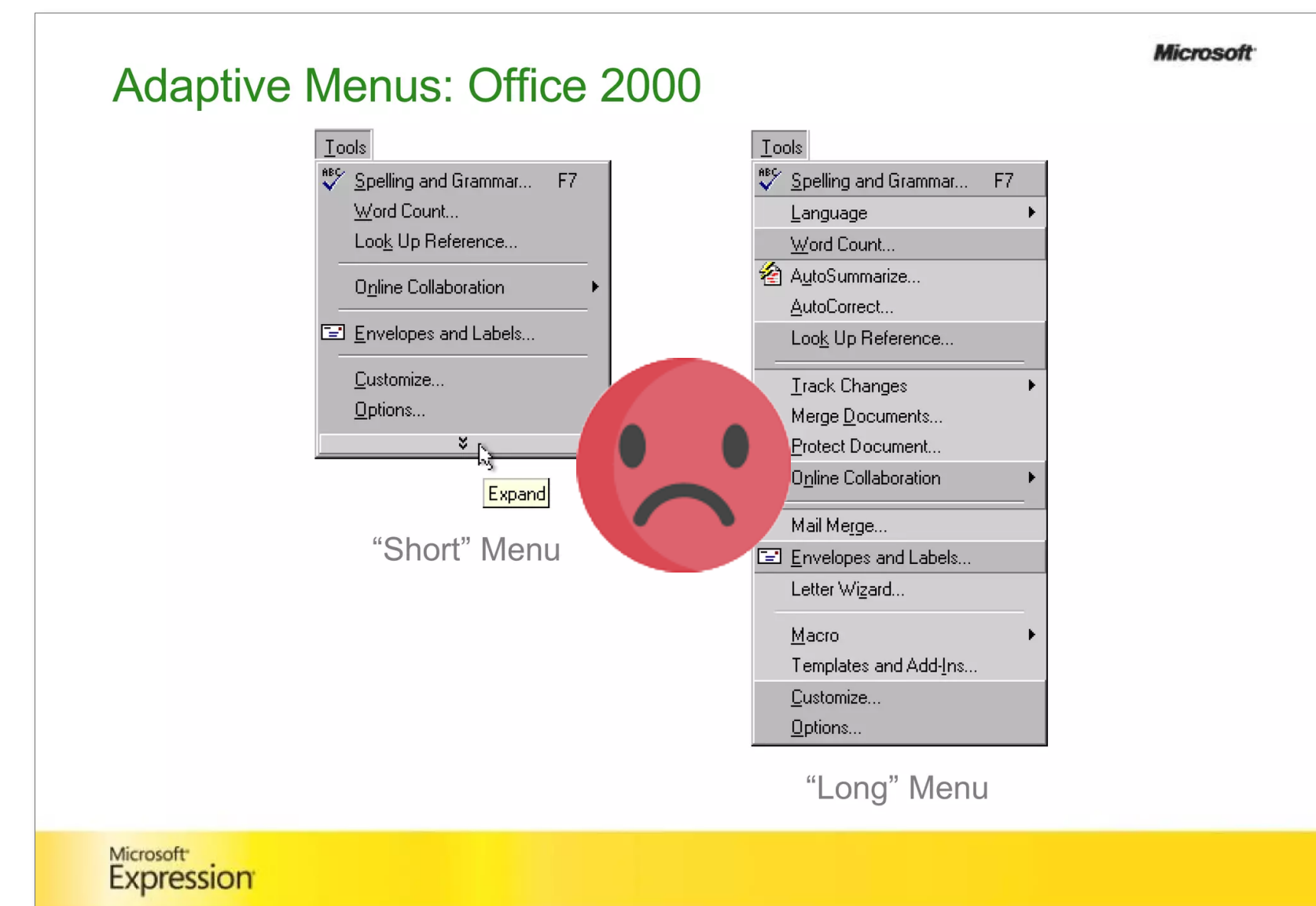
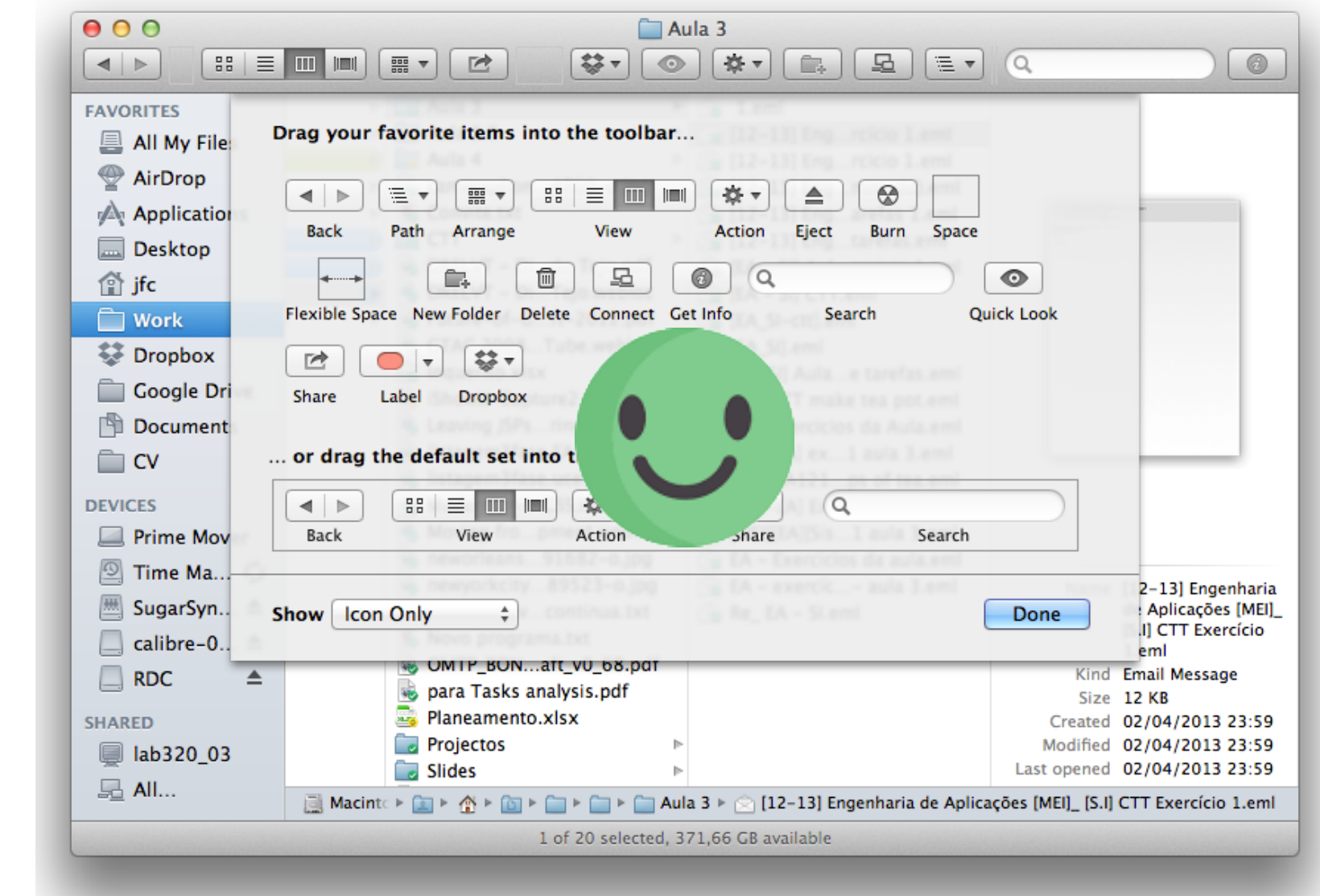
Flexibility #3: Substitutivity

- Suportar valores equivalentes como permutáveis
- “Equal opportunity” (sem distinção entre input e output)



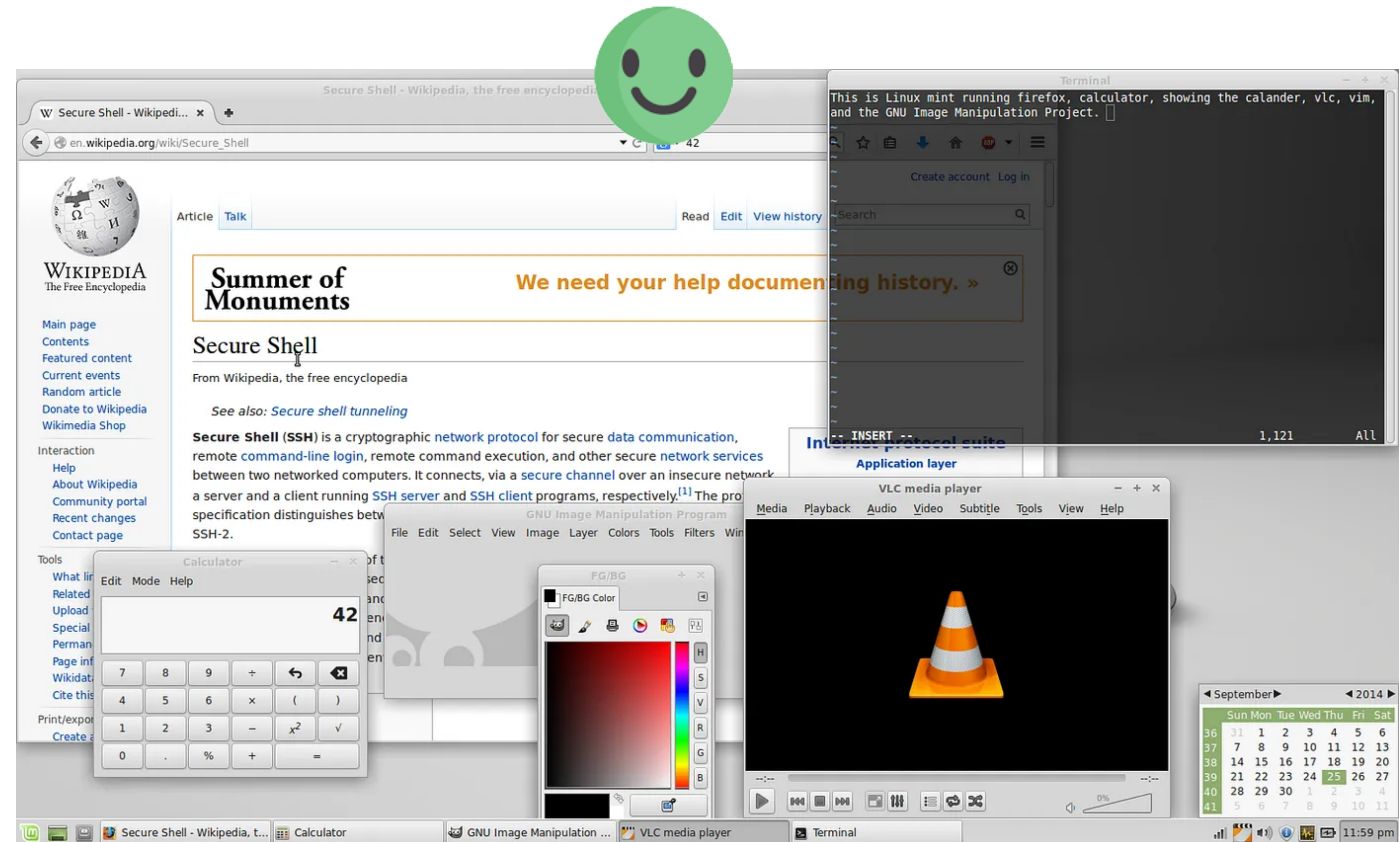
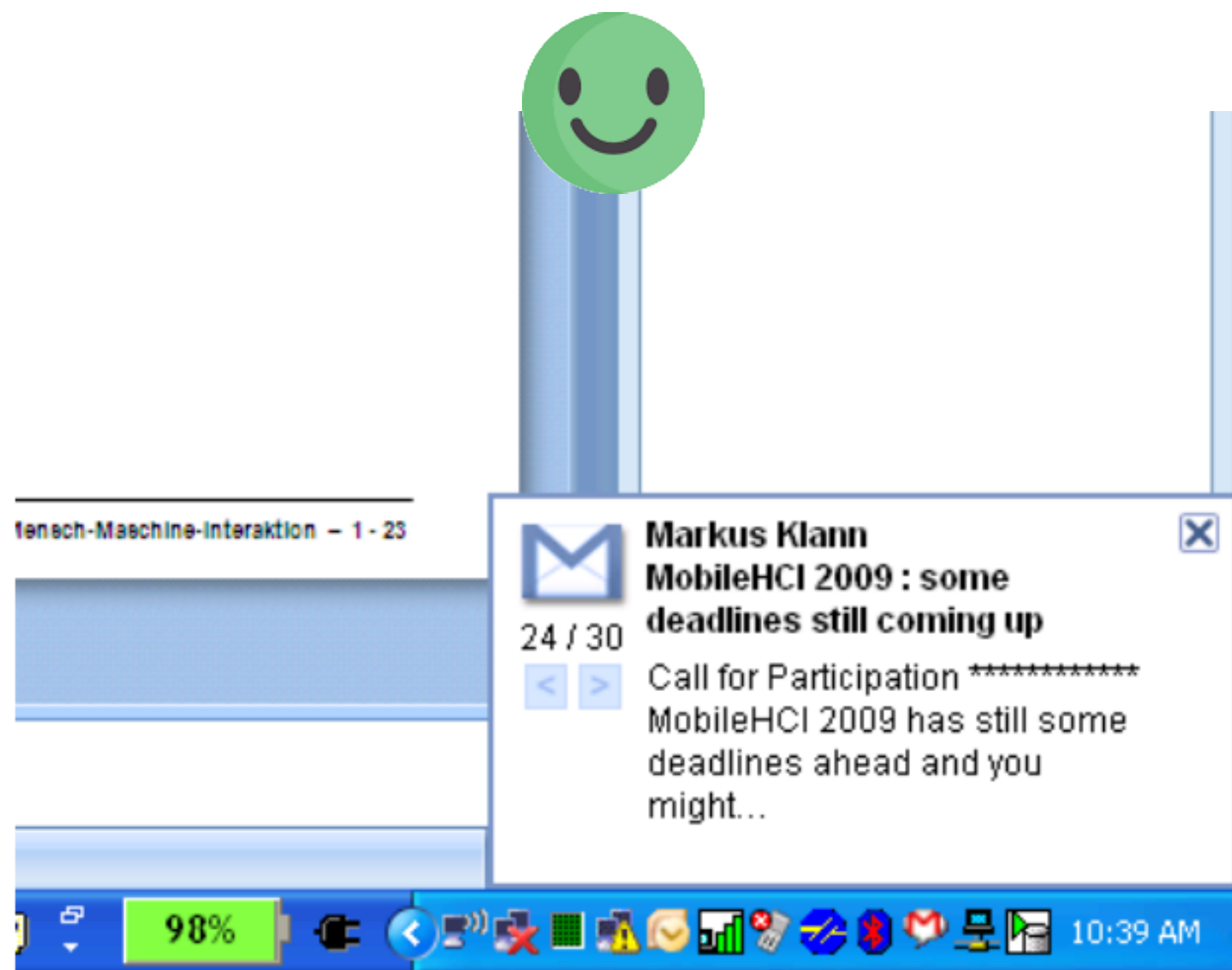
Flexibility #4: Customizability

- Facilidade de customização do interface
 - “Adaptability” (pelo utilizador)
- “Adaptivity” (automaticamente pelo sistema)

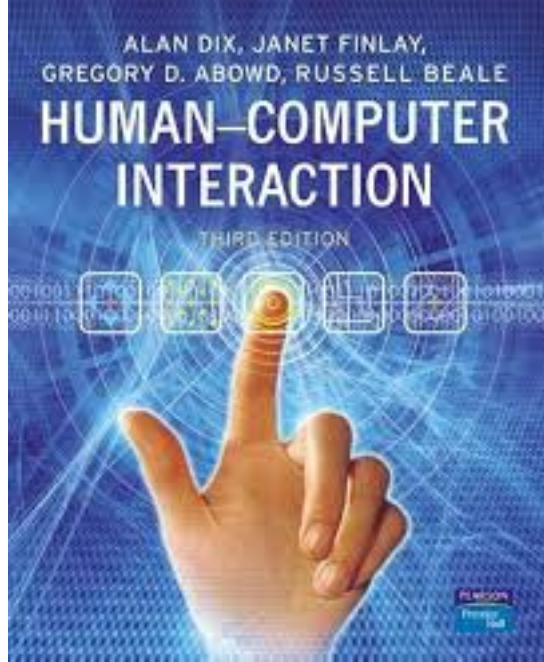


Flexibility #5: Multithreading

- Suportar interação com o utilizador para várias tarefas em simultâneo
- E.g., WIMP + window systems



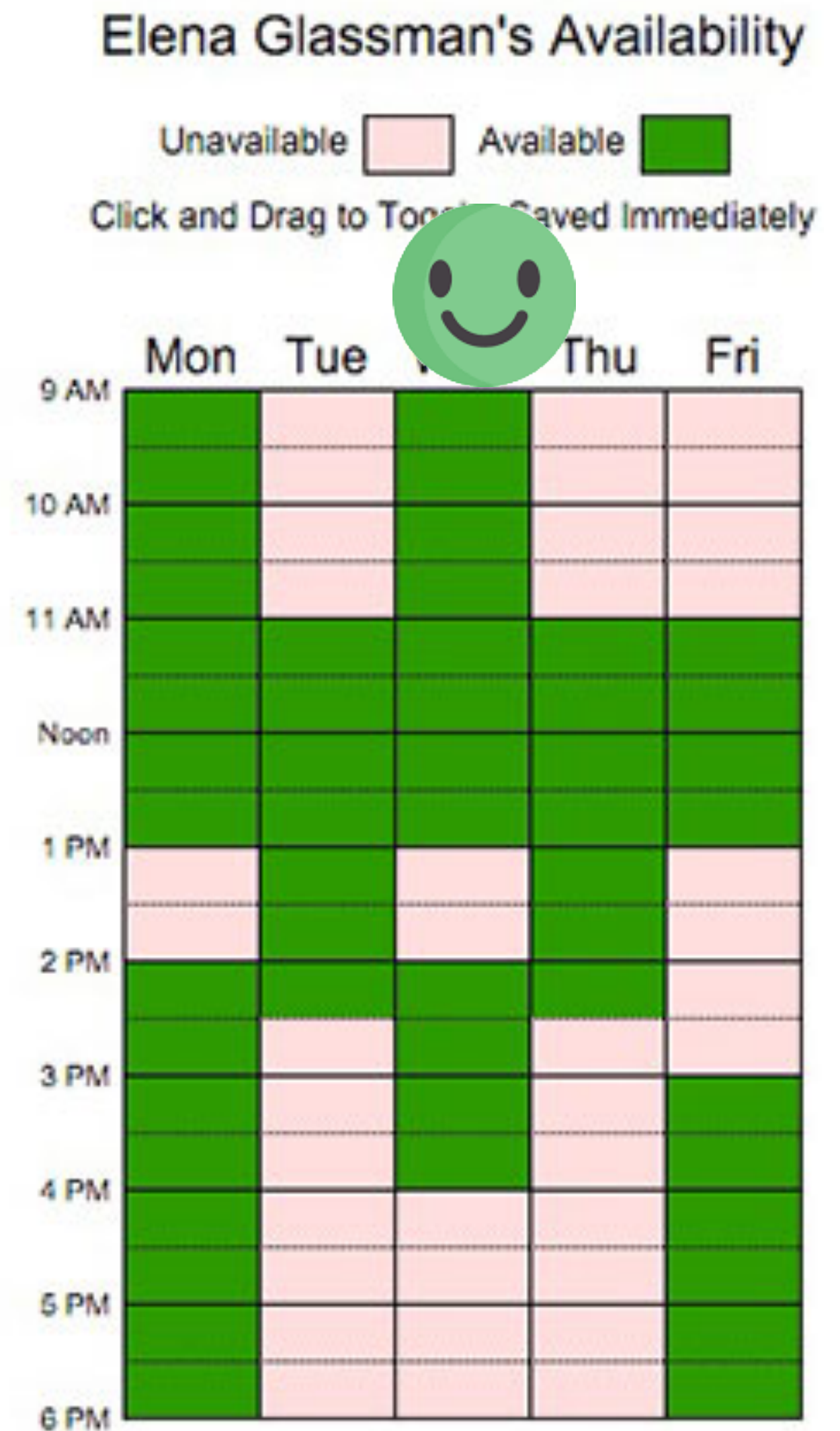
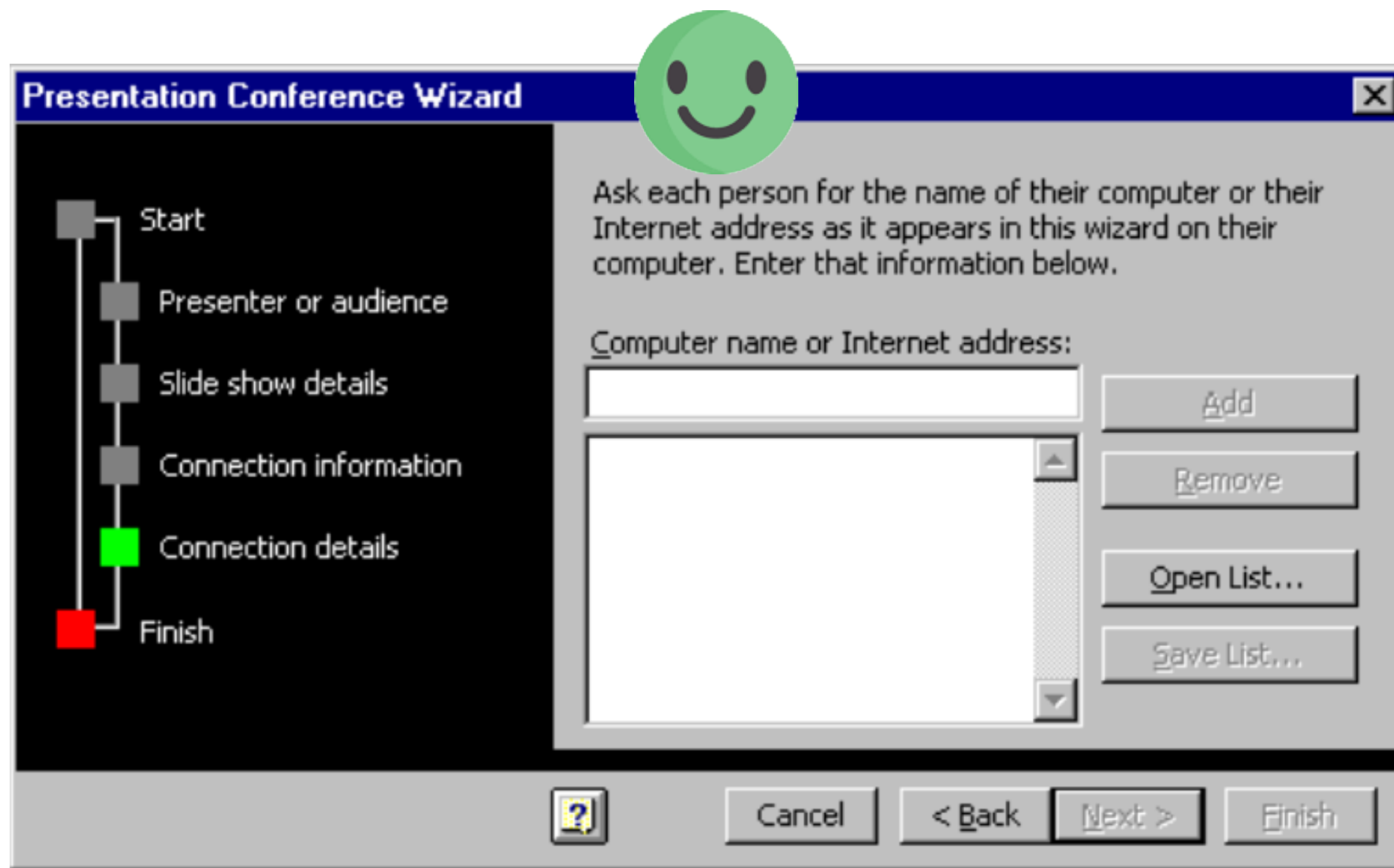
Princípios de usabilidade



- **Learnability** (a interface é fácil de utilizar?)
 - “the ease with which new users can begin effective interaction and achieve maximal performance”
- **Flexibility** (a interface é adaptável ao utilizador?)
 - “the multiplicity of ways the user and system exchange information”
- **Robustness** (o uso induz poucos erros?)
 - “the level of support provided to the user in determining successful achievement and assessment of goal-directed behaviour”

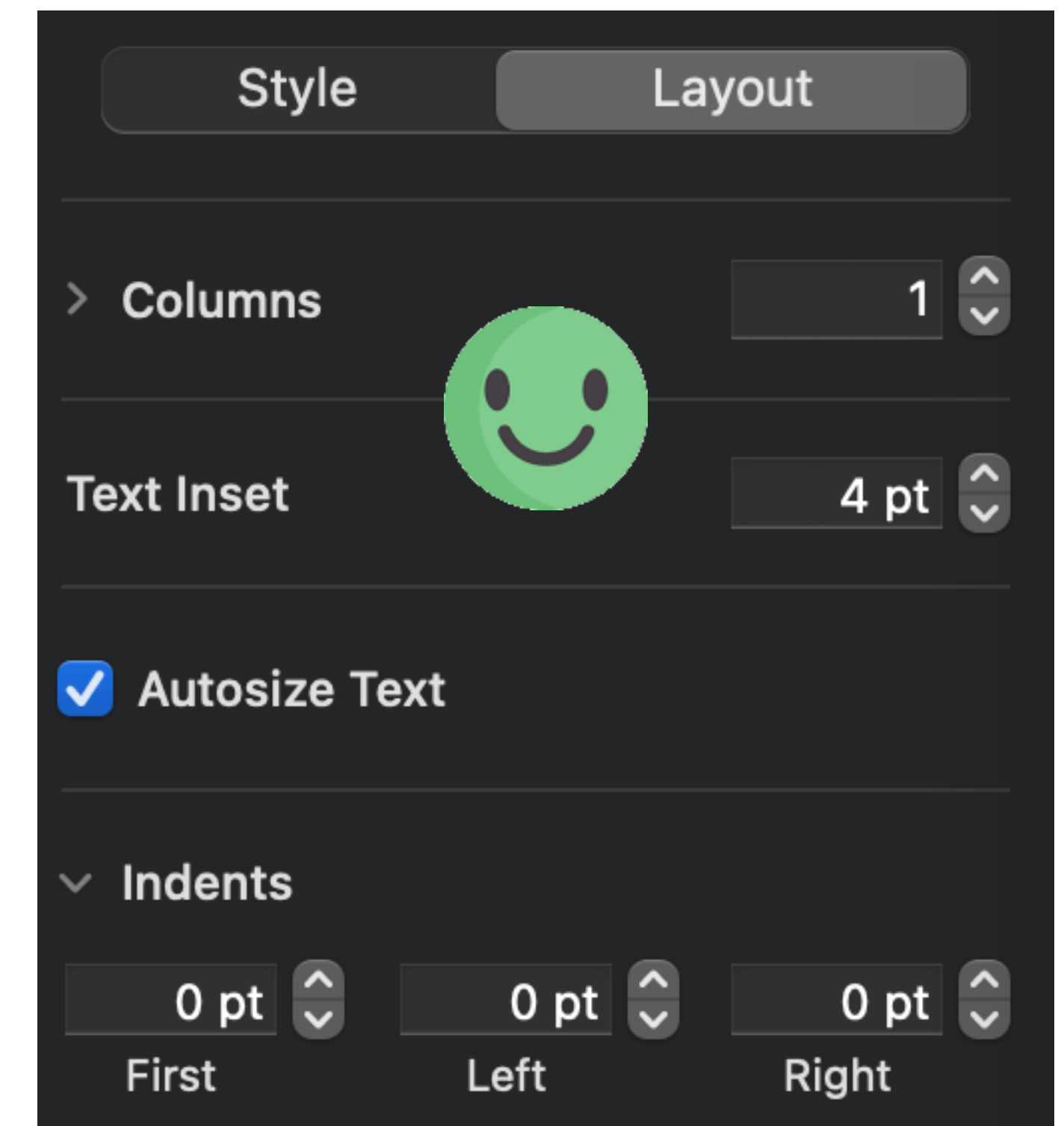
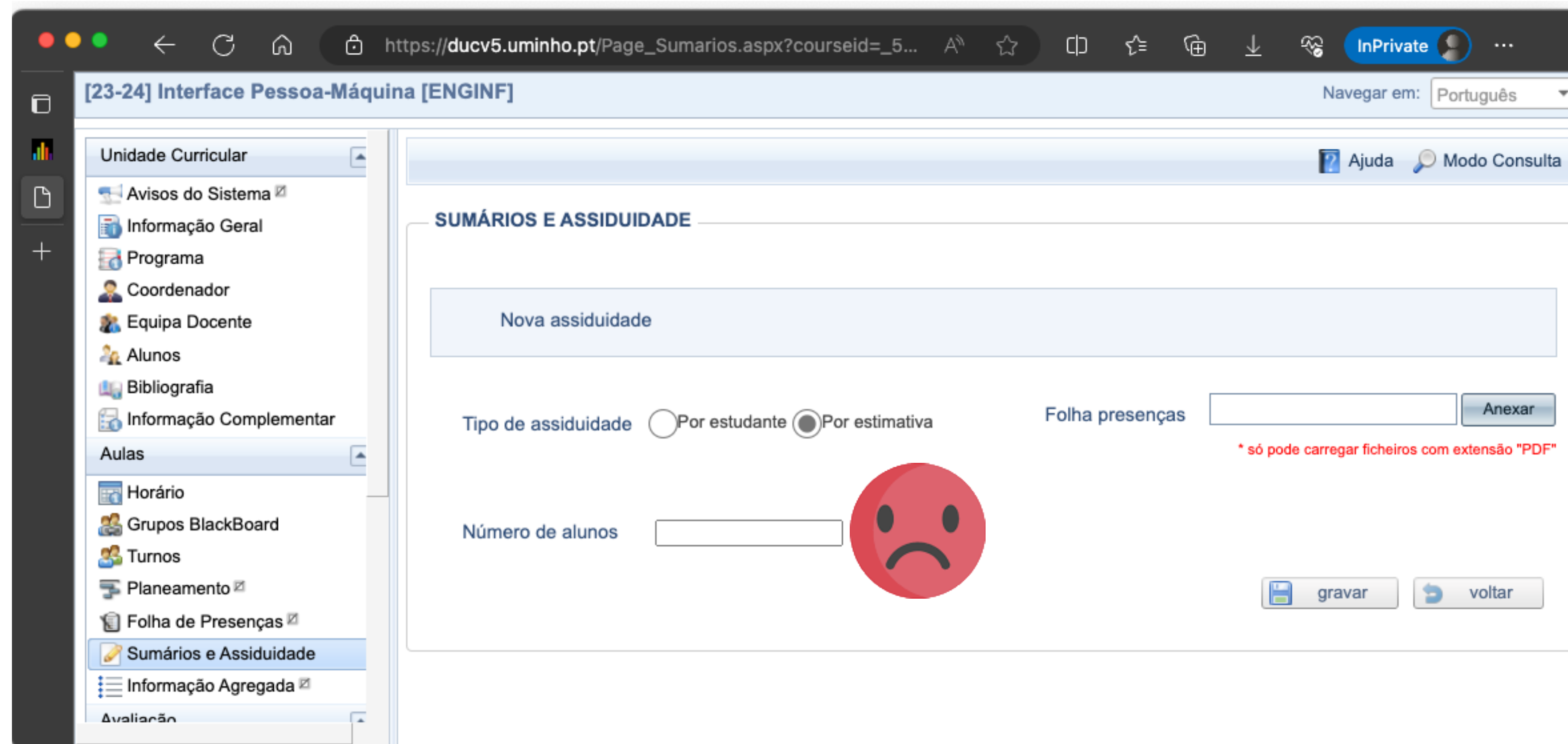
Robustness #1: Observability

- Capacidade de compreender o estado interno do sistema
 - “Browsability” (explorar o estado atual)



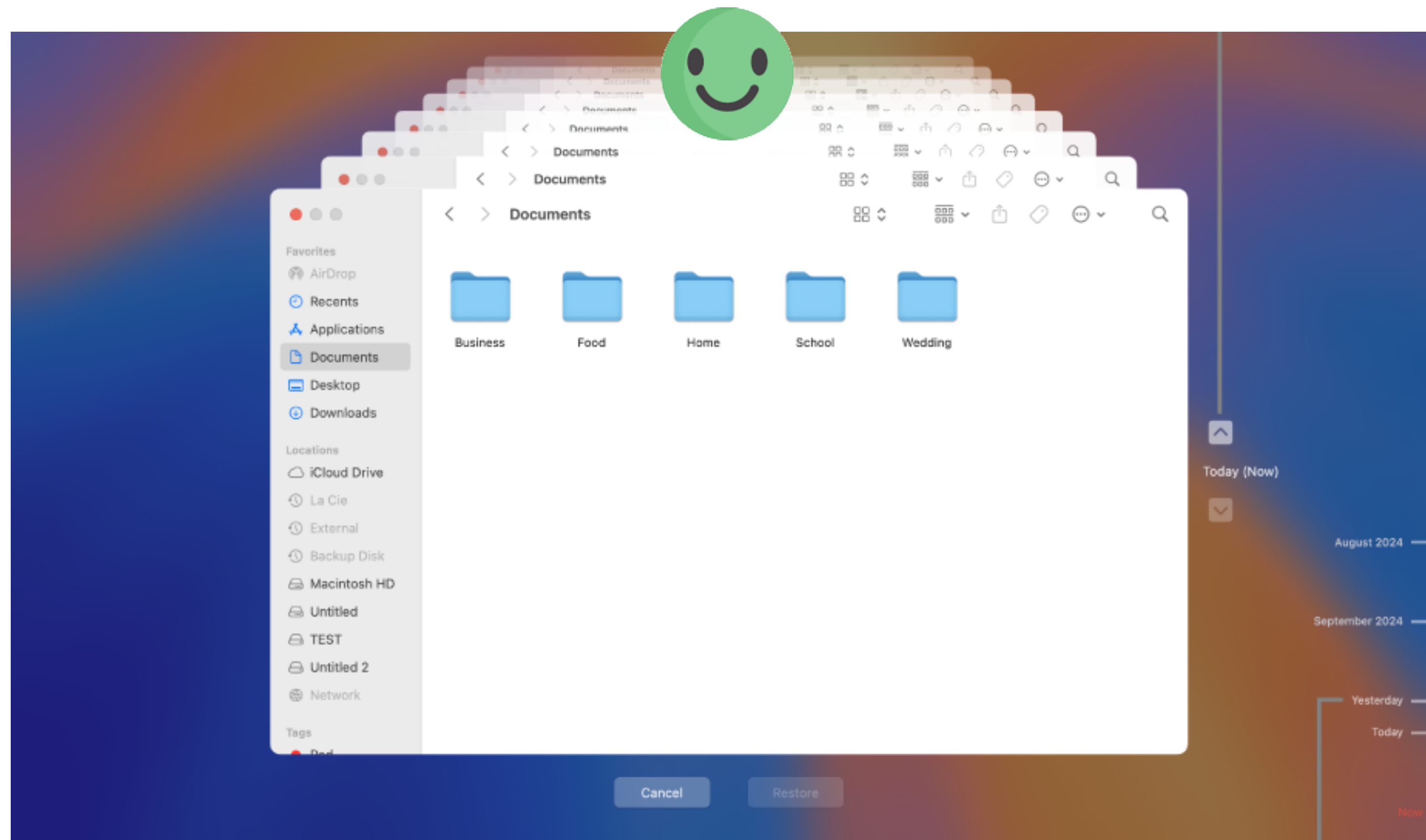
Robustness #1: Observability

- Capacidade de compreender o estado interno do sistema
 - “Defaults” (e.g. como forma de recordação passiva)



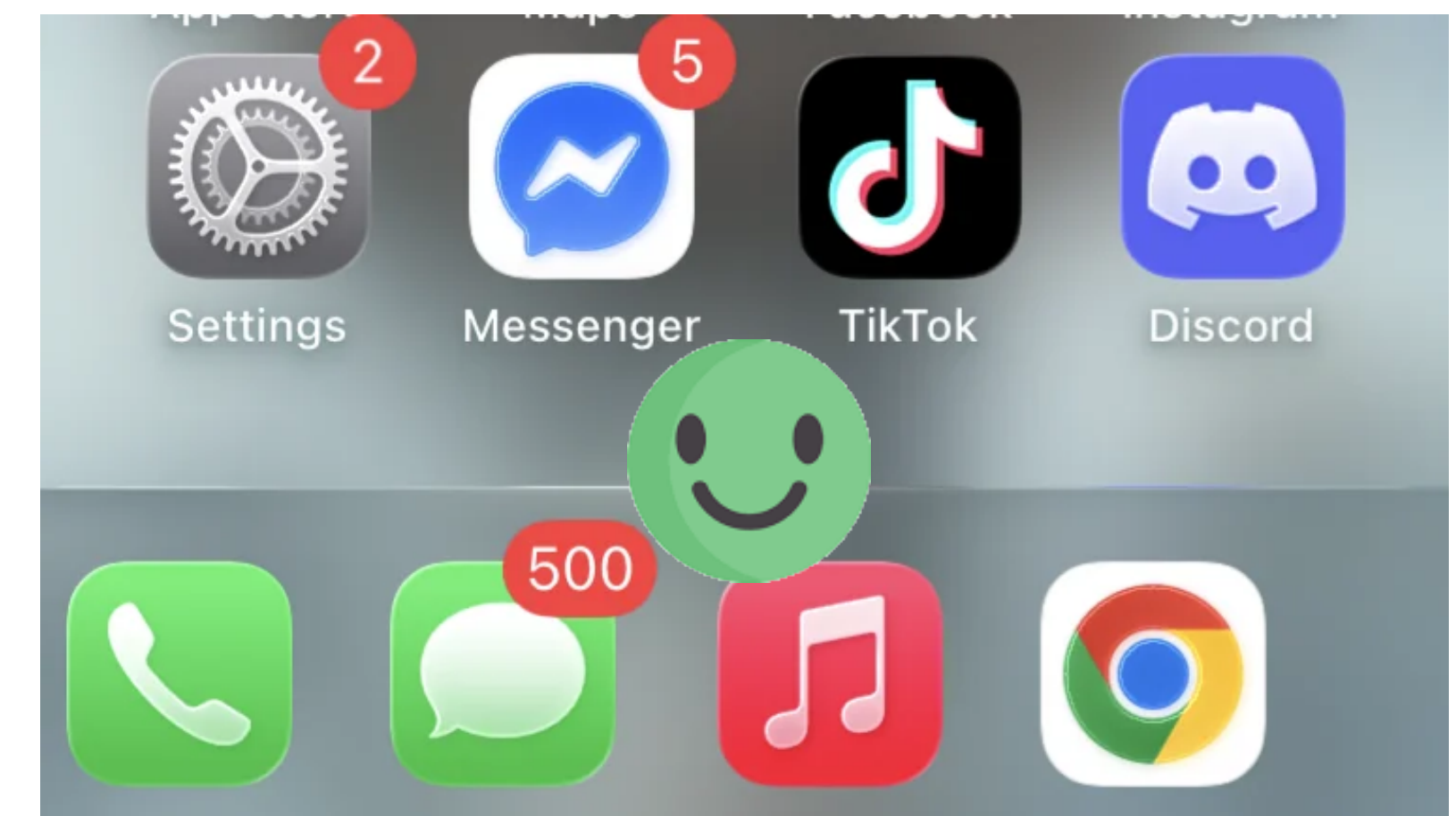
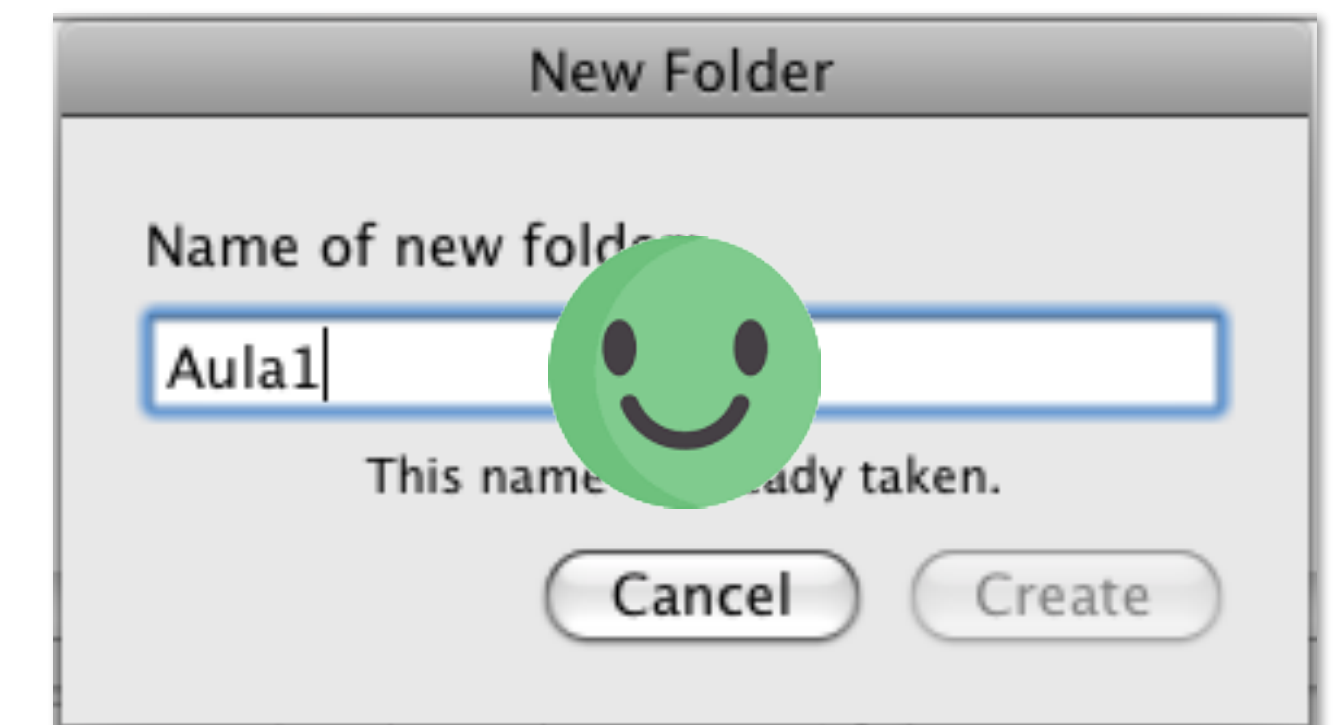
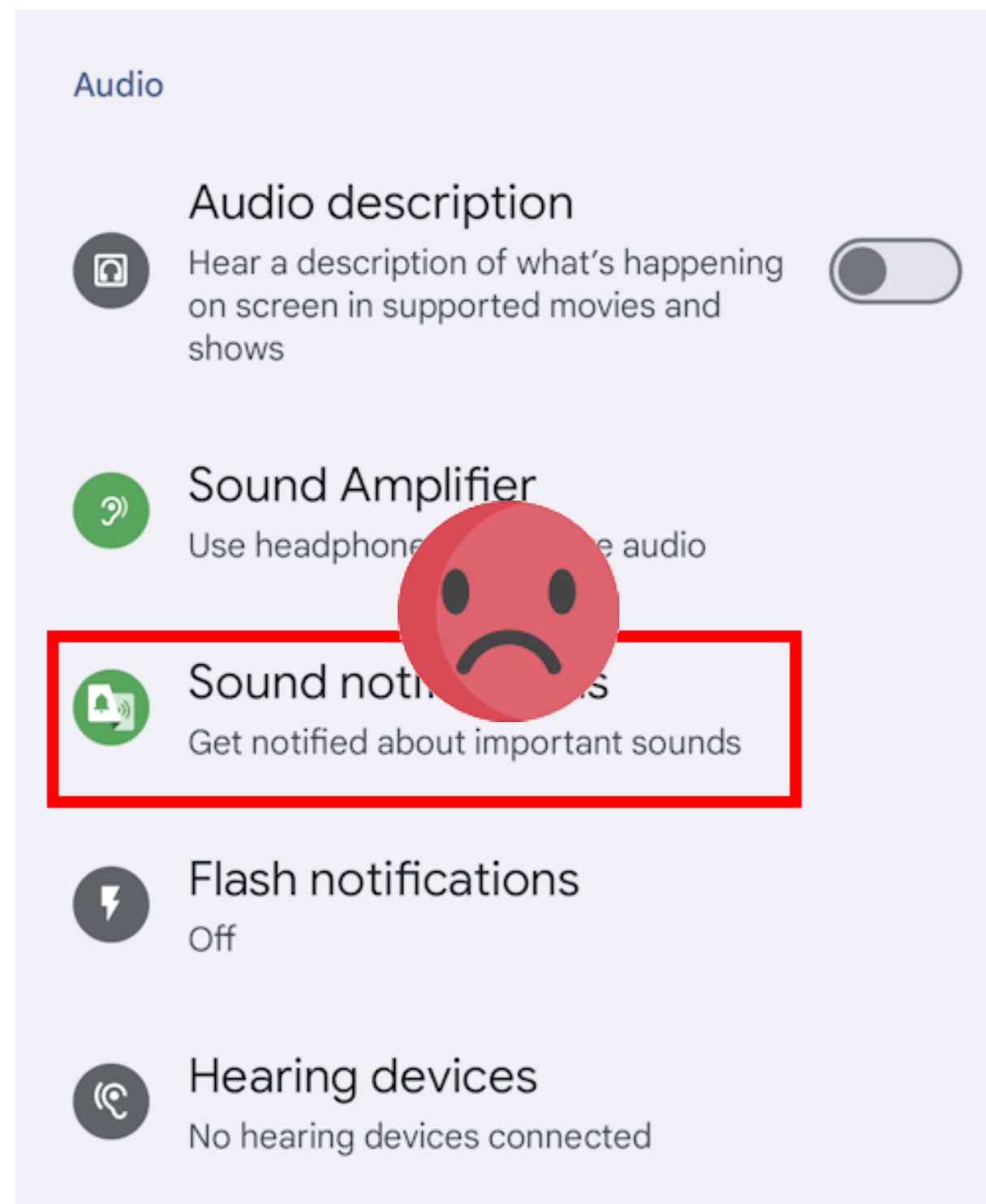
Robustness #1: Observability

- Capacidade de compreender o estado interno do sistema
 - “Reachability” (navegar estados observáveis)



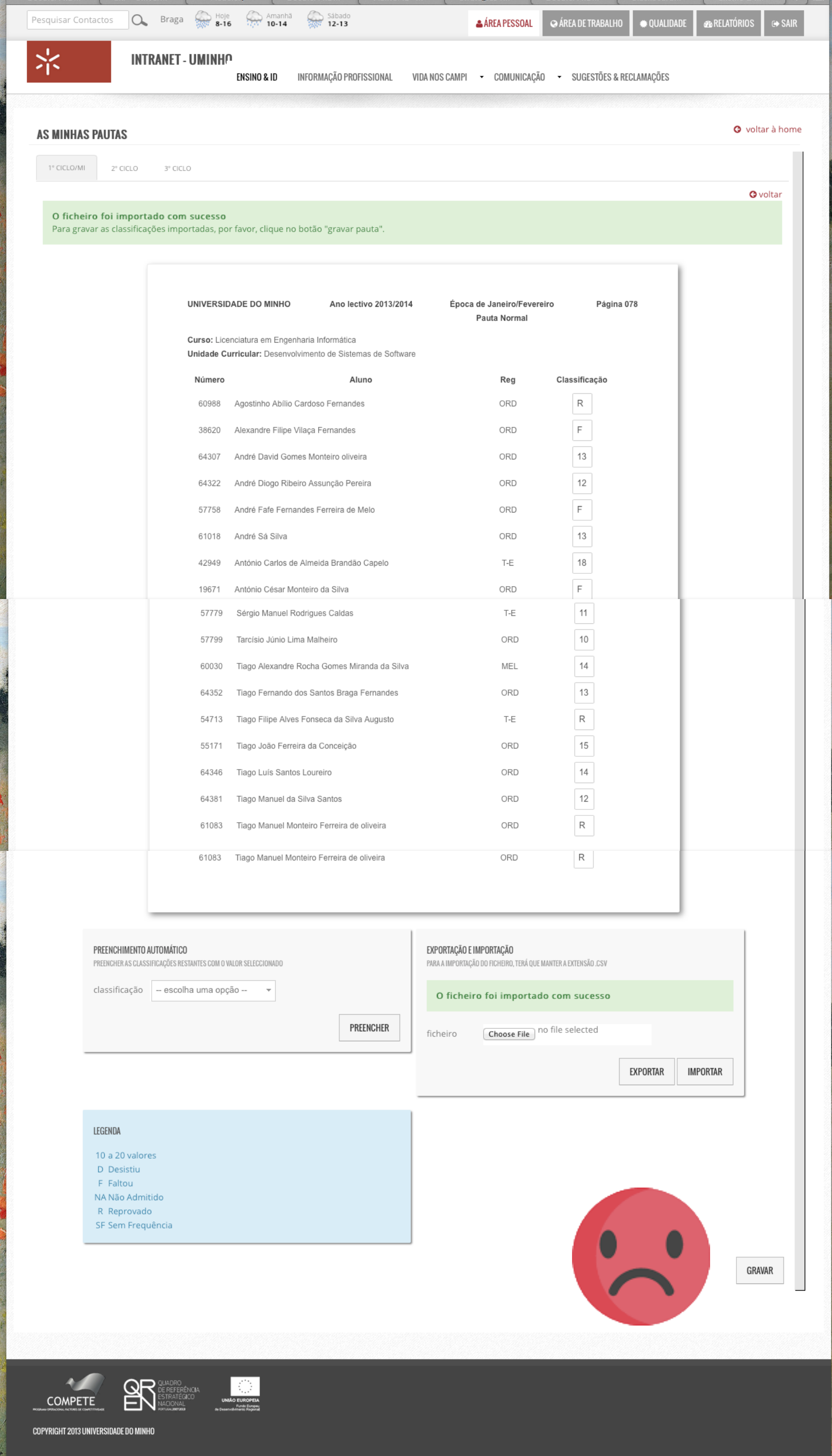
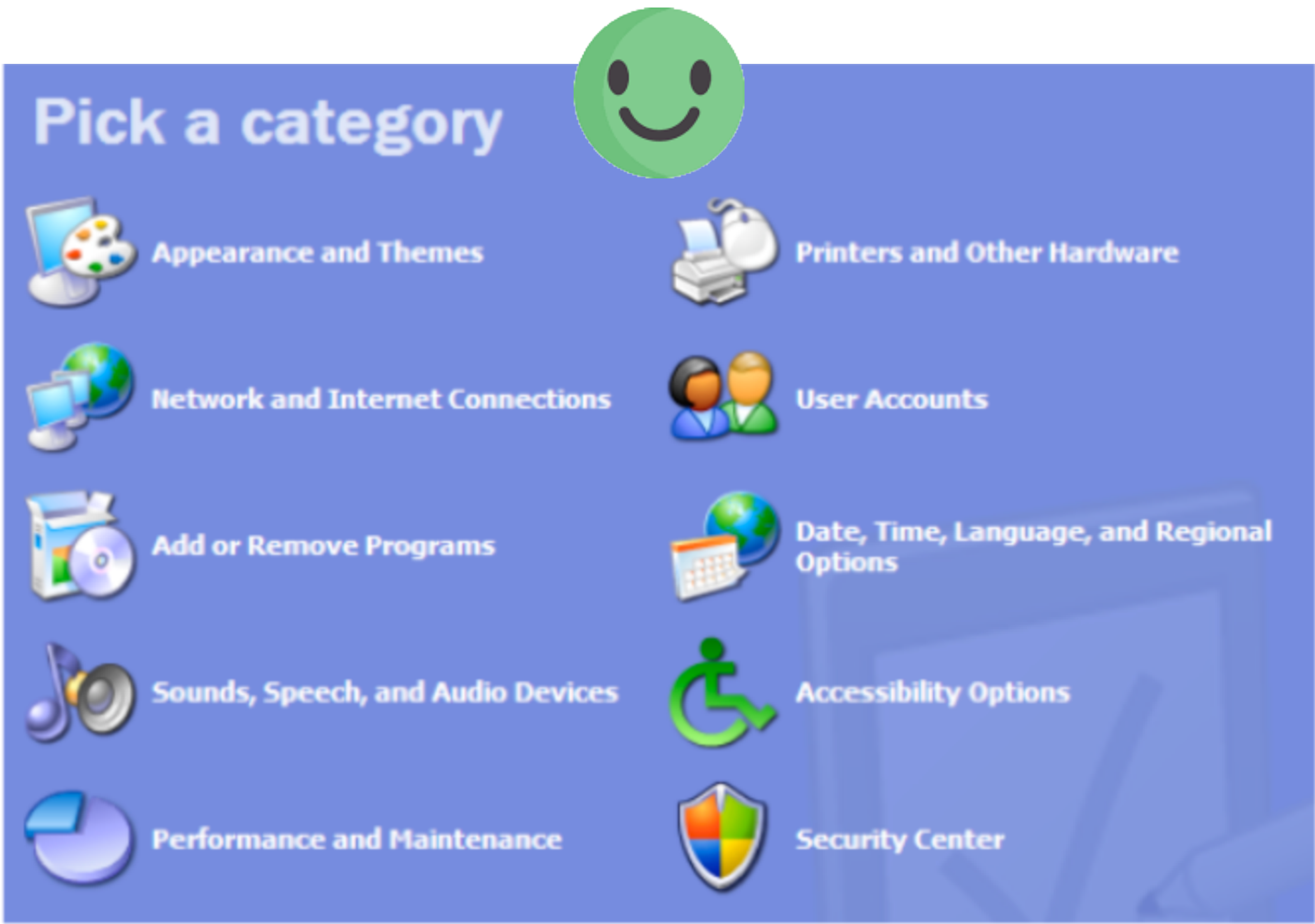
Robustness #1: Observability

- Capacidade de compreender o estado interno do sistema
 - “Persistence” (e.g., longevidade de notificações)



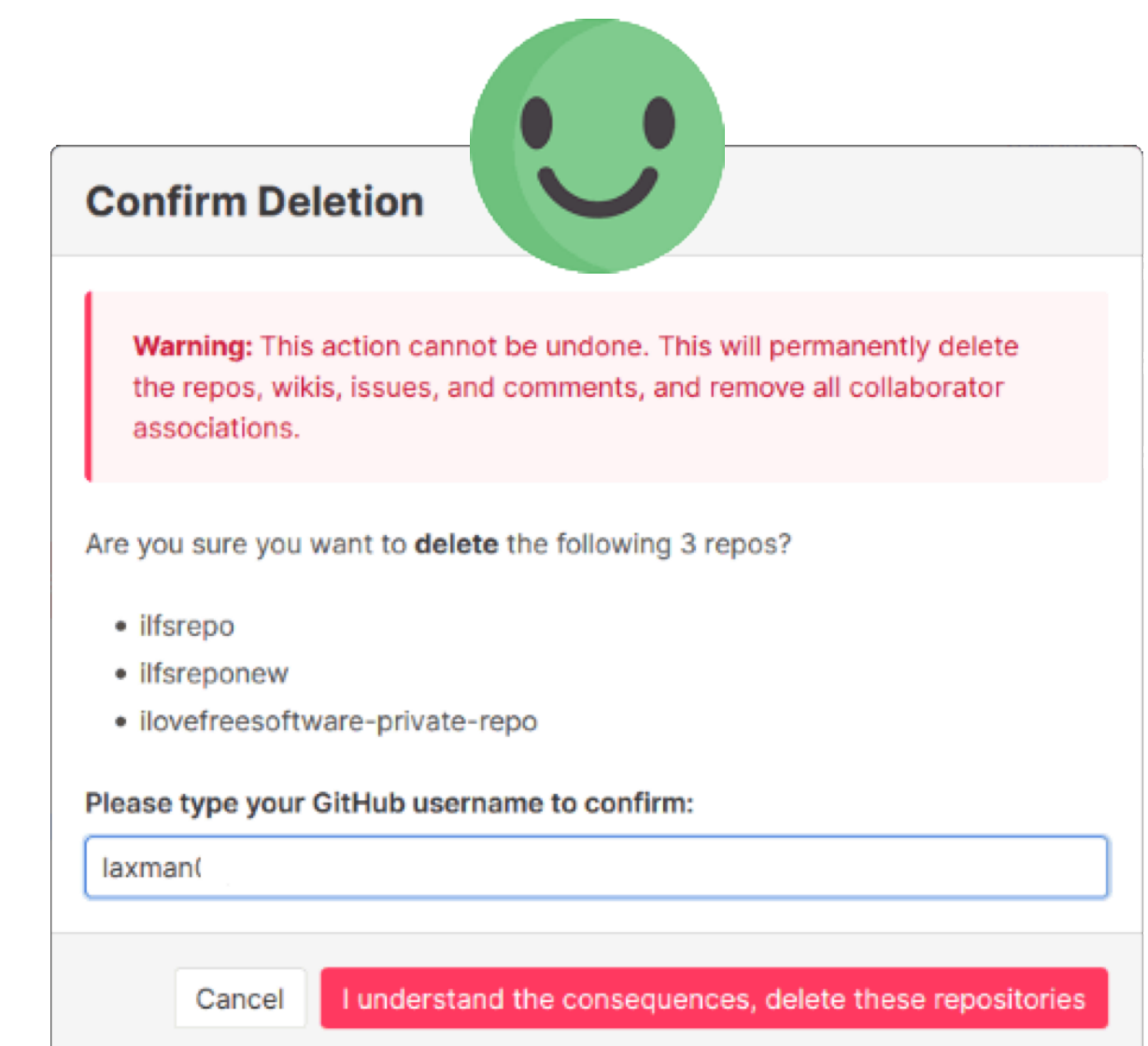
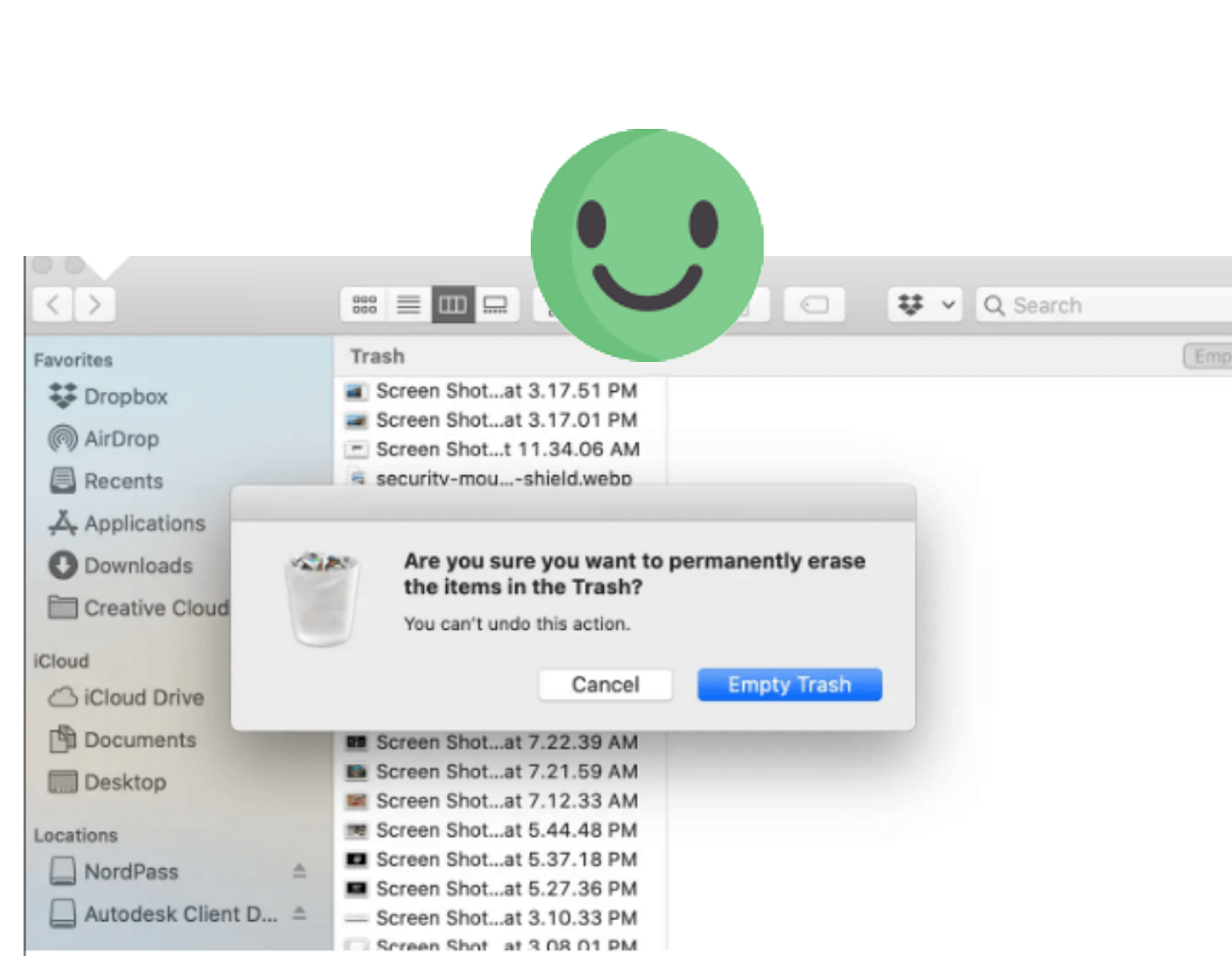
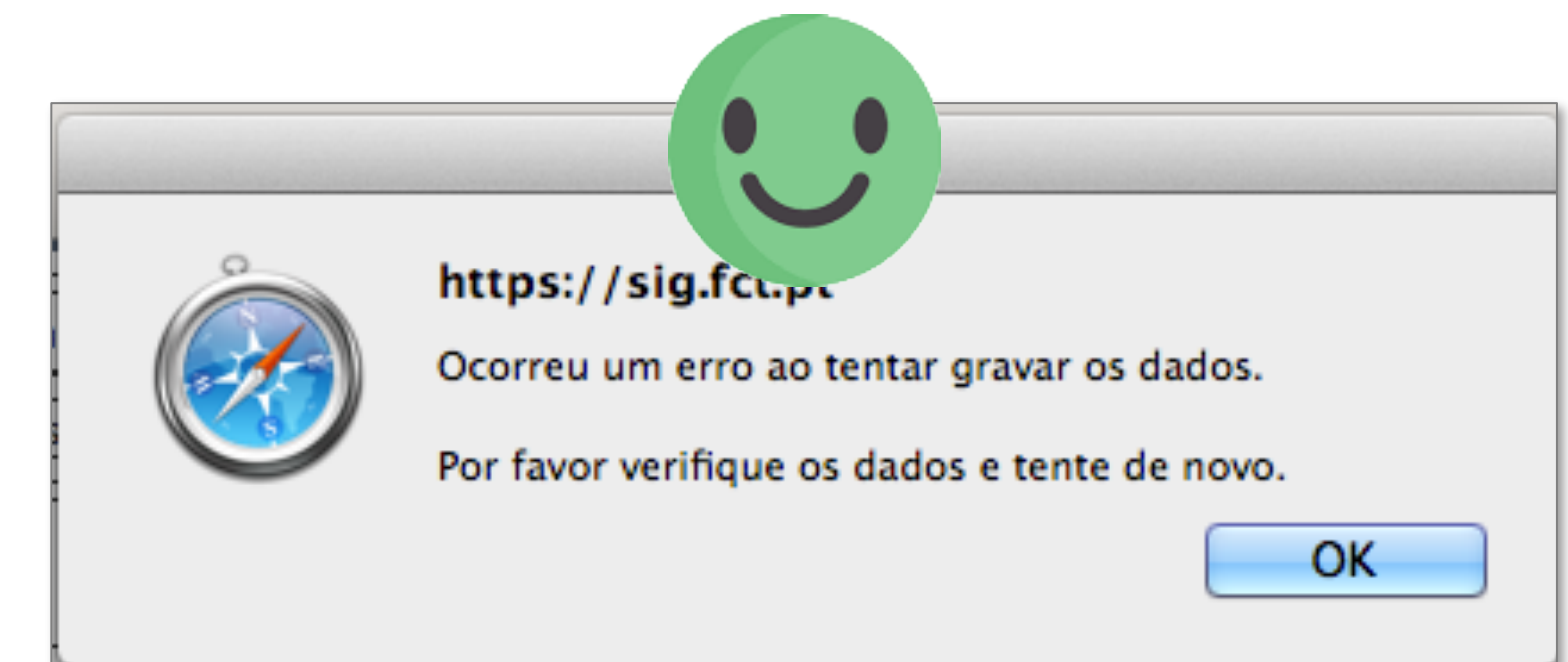
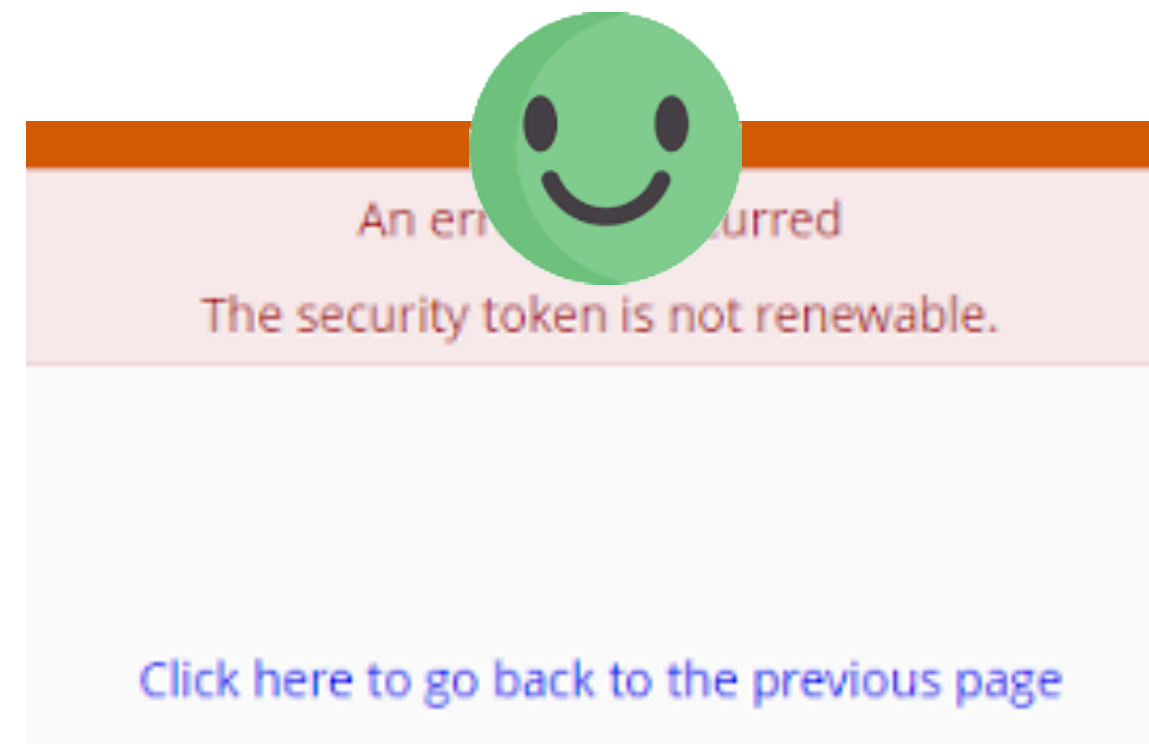
Robustness #1: Observability

- Capacidade de compreender o estado interno do sistema
- “Operation visibility” (c.f. perceived affordances)



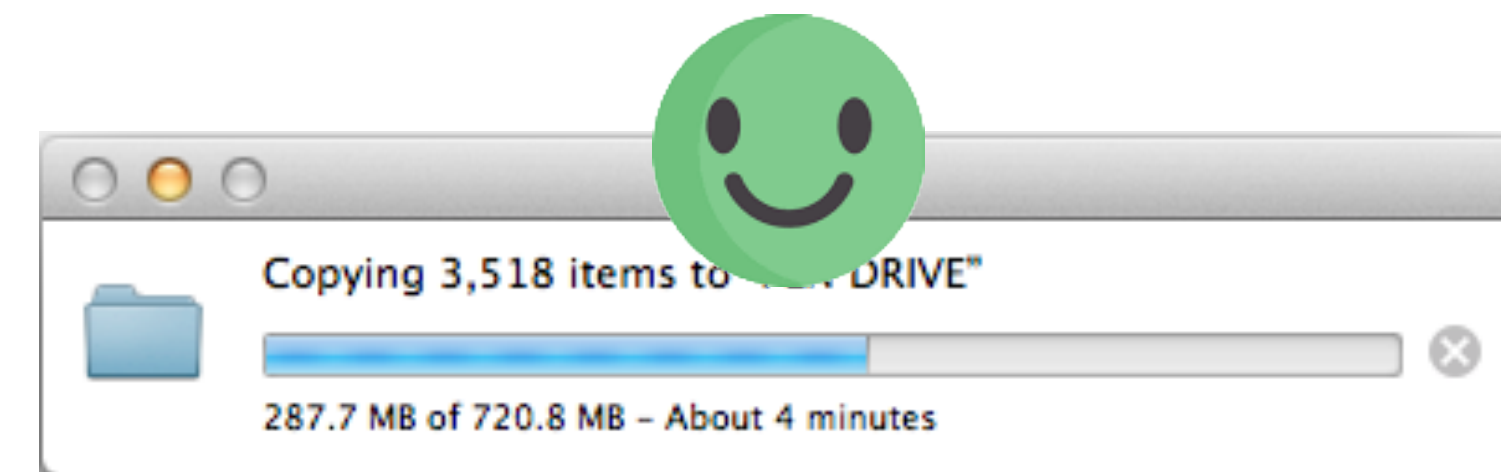
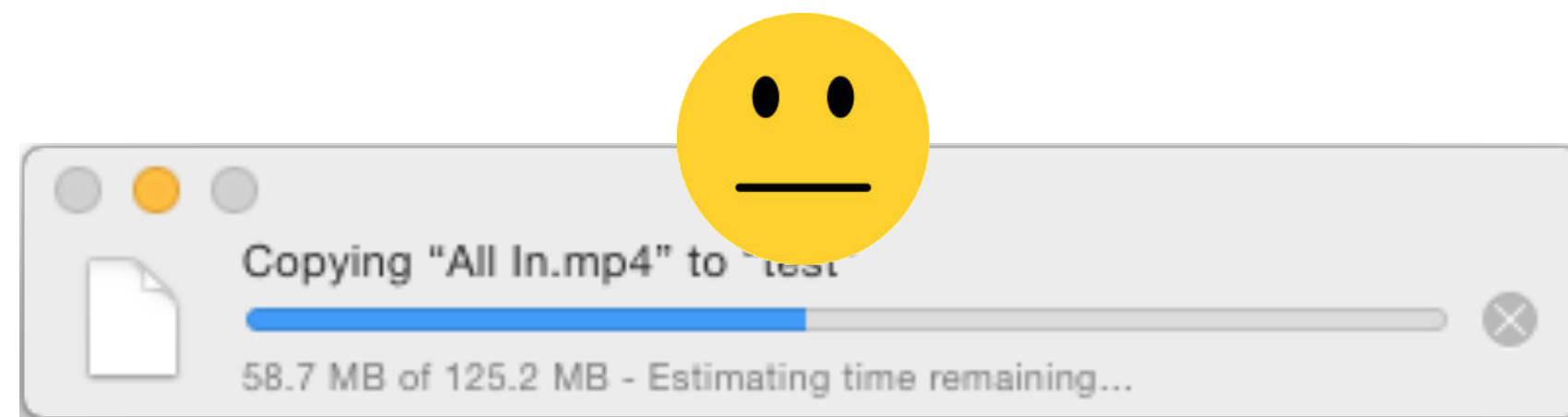
Robustness #2: Recoverability

- Habilidade dos utilizadores executarem ações corretivas
 - “Backward recovery”
(voltar a estado anterior)
 - “Forward recovery”
(registar erro e avançar)
- “Commensurate effort”
 - dificuldade de executar ação deve ser proporcional à dificuldade de recuperar

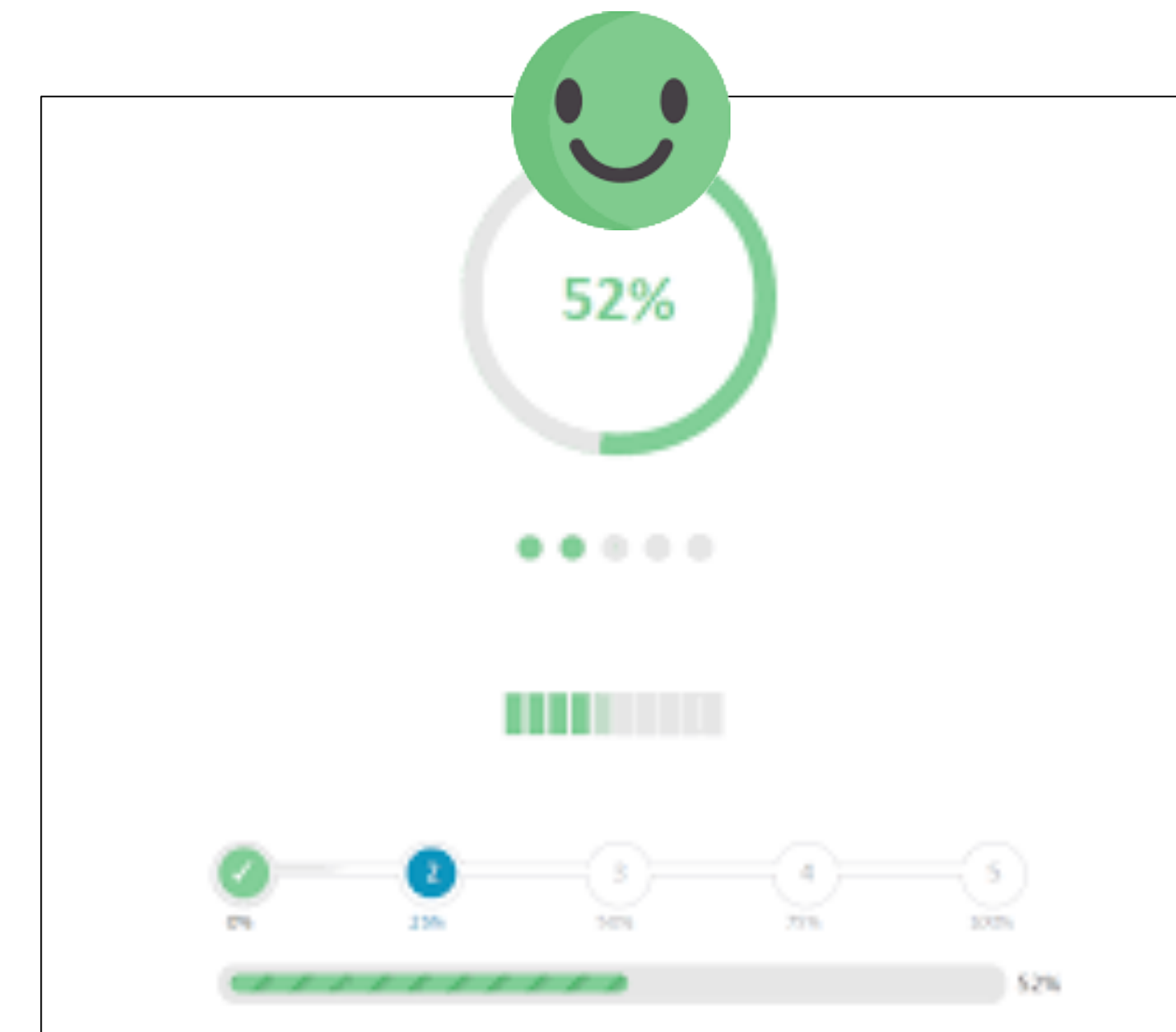
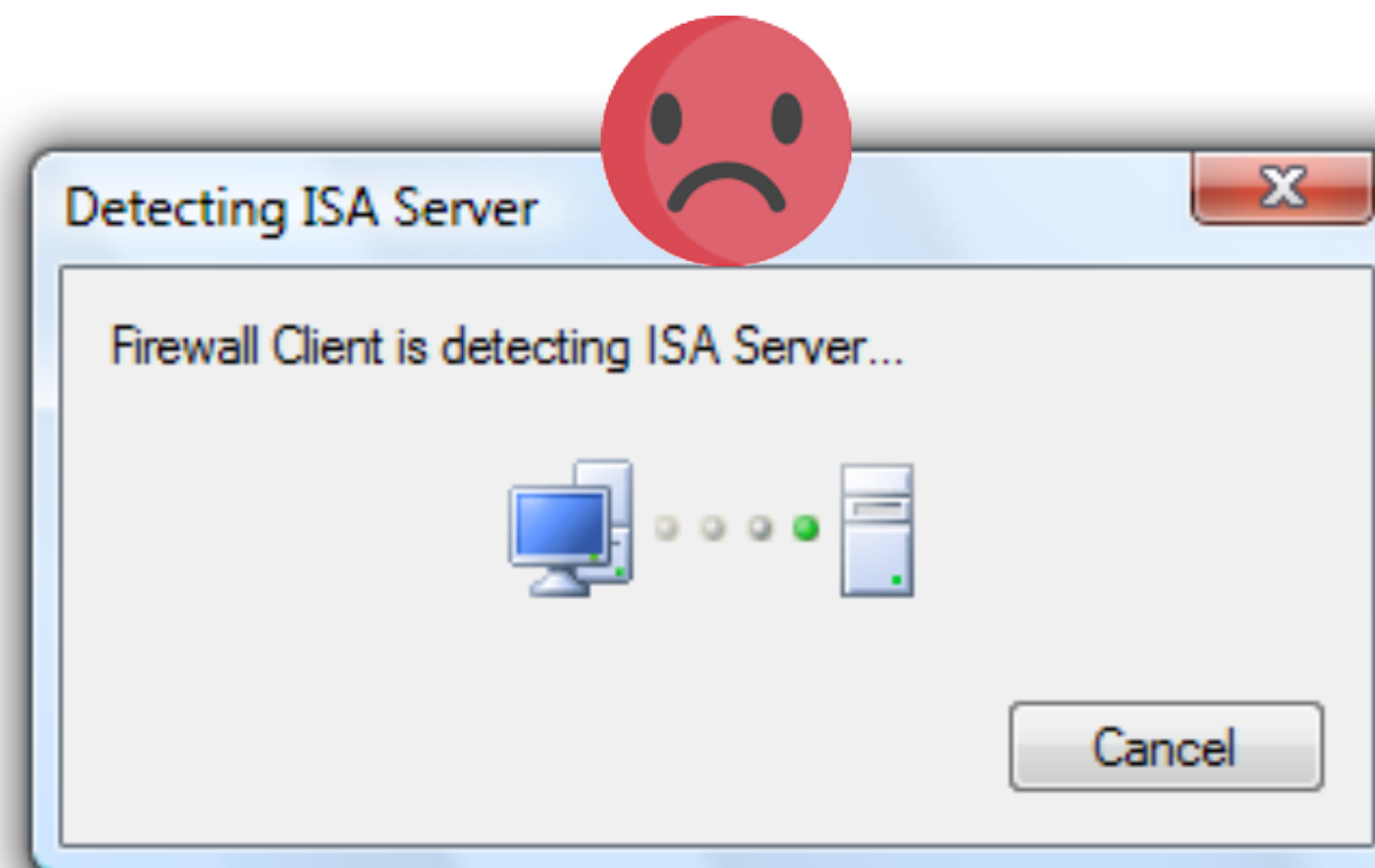


Robustness #3: Responsiveness

- Qual a taxa de comunicação (percepçionada) com o sistema
- Tempos de resposta curtos ou instantâneos (percepção humana ~100ms)



- Quando não for possível, fornecer indicação de atividade



Robustness #3: Responsiveness

“This is true on our computers and it’s true at lines at Disneyland. You look at it and it tells you how long it’s going to take and you set an expectation. When you get to the front of the line faster than you thought you were going to (or when that particular piece of software loads faster than you thought it was going to), you leave the encounter feeling positive.”



(Jason Farman)

Robustness #4: Task conformance

- Quanto o sistema suporta as tarefas dos utilizadores (c.f. fosso da execução)
- “Task completeness” (nível de suporte)



\$114.99

& **FREE Shipping.** [Details](#)
& **FREE Returns** ▾

Arrives: **July 15 - 18** [Details](#)

Fastest delivery: **Thursday, July 9**

Qty: 1 ▾

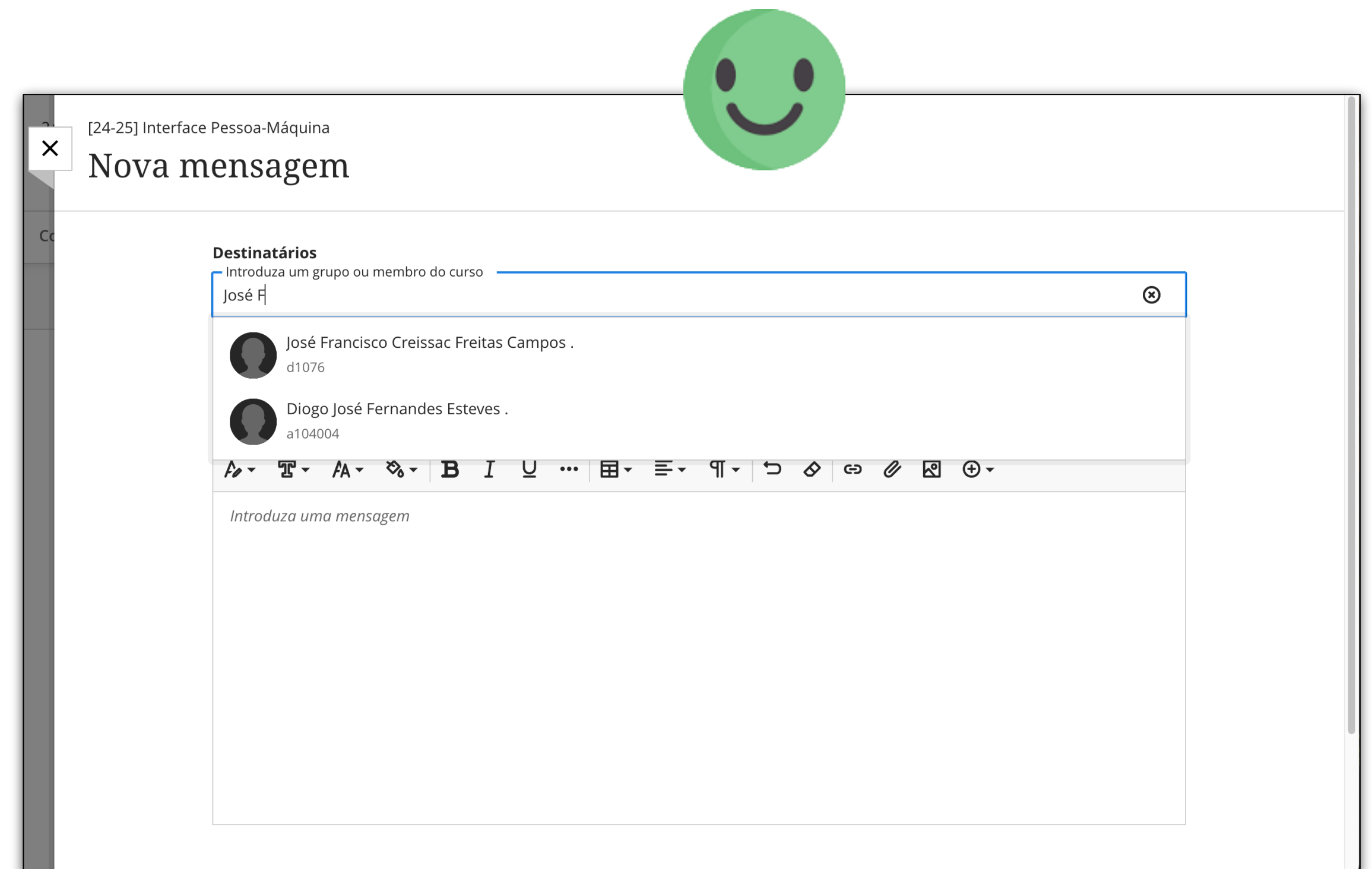
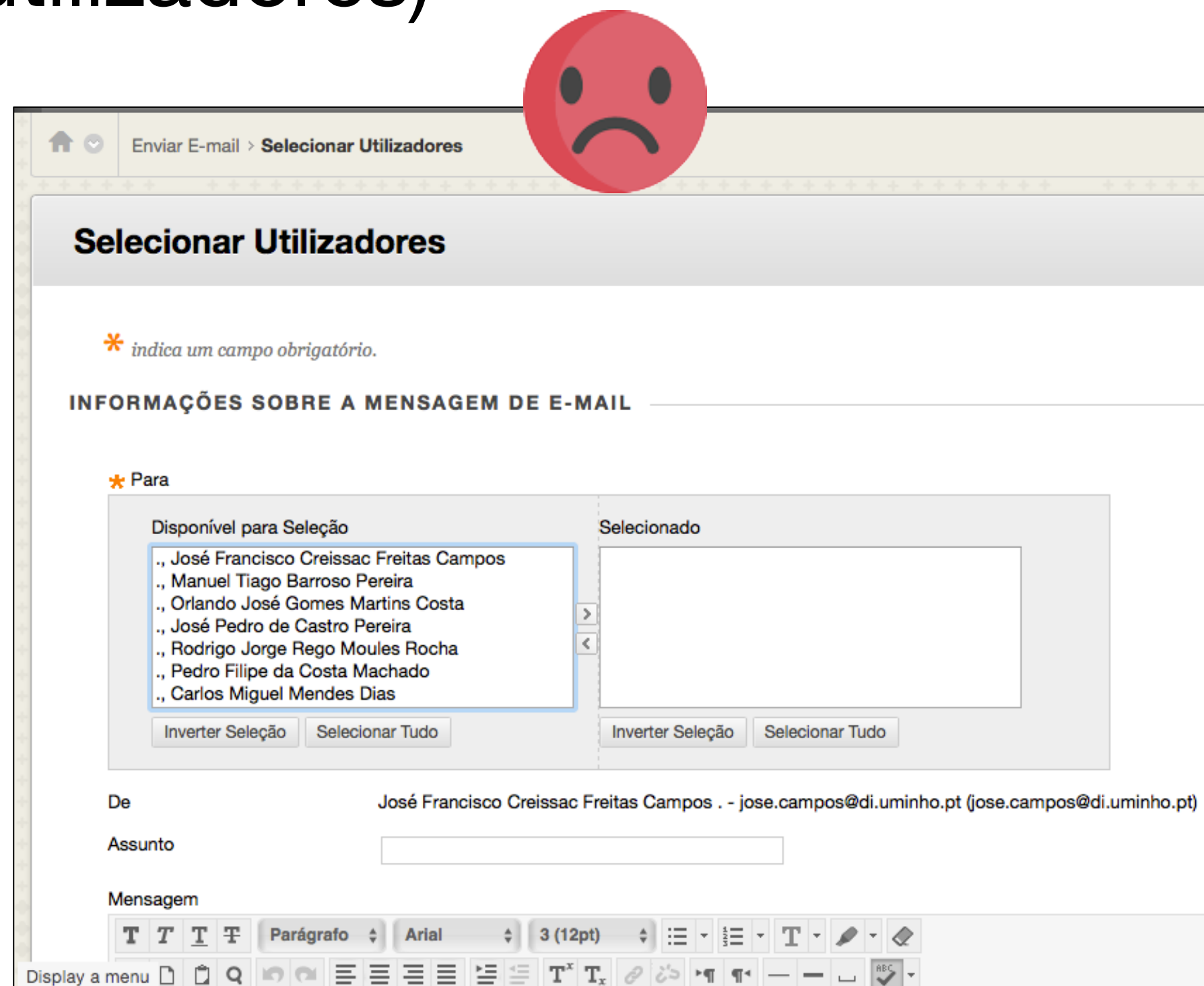
 **Add to Cart**

 **Buy Now**

Ships from and sold by
Amazon.com.

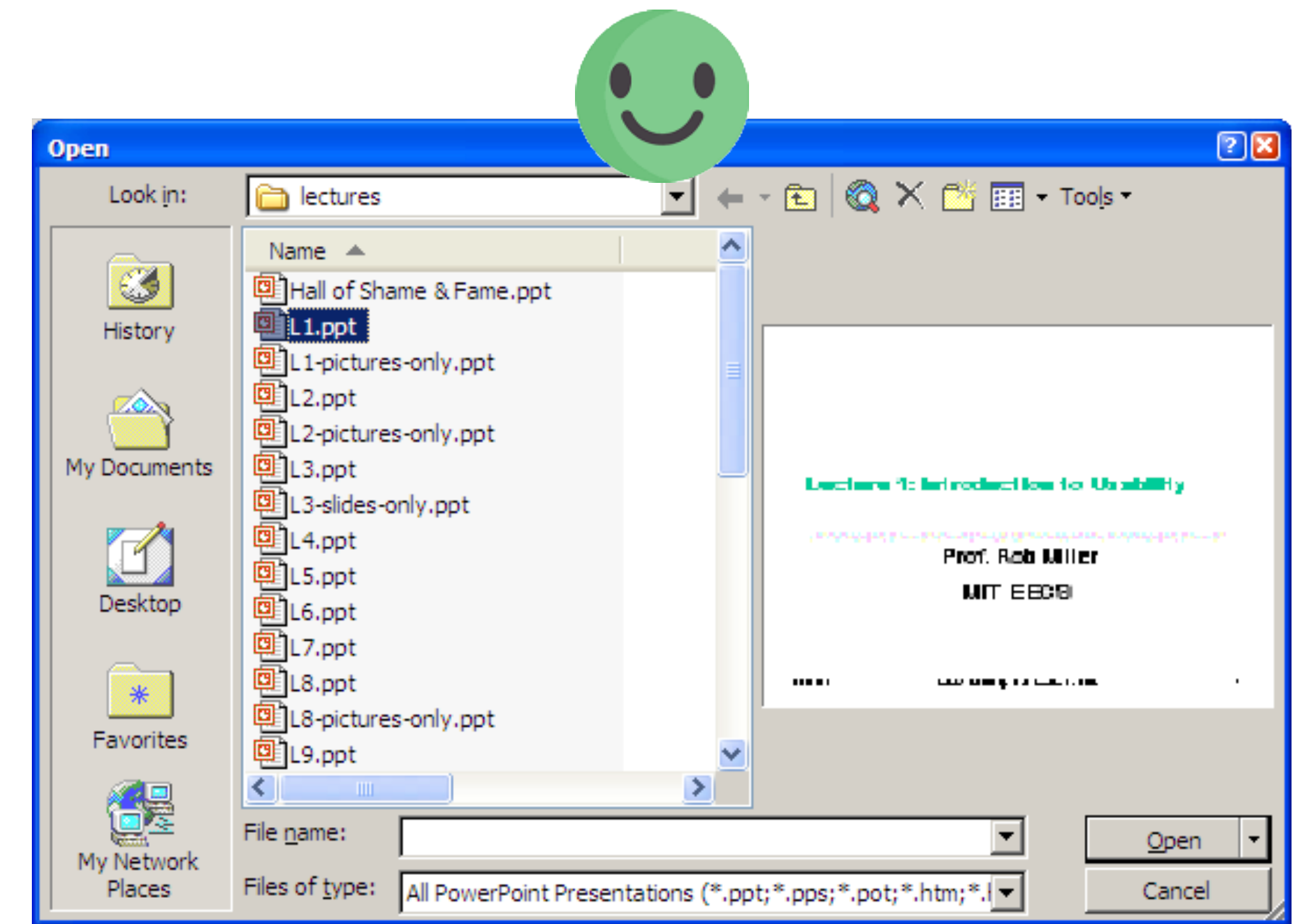
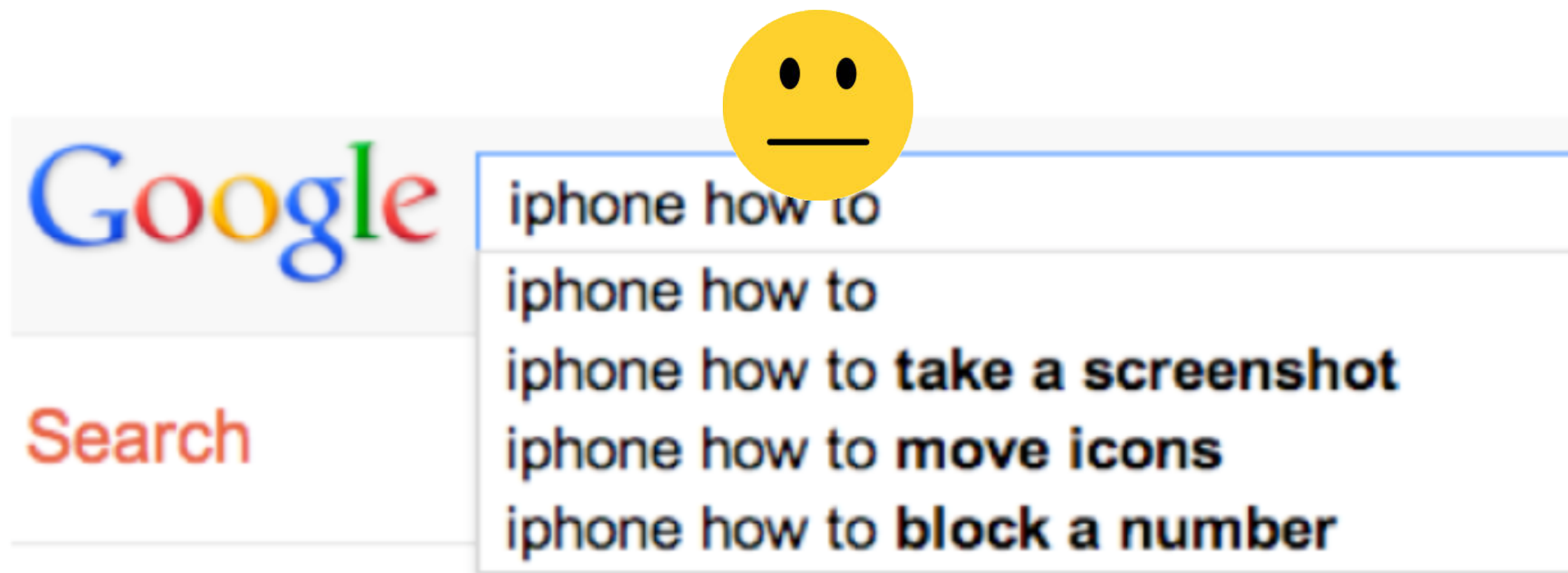
Robustness #4: Task conformance

- Quanto o sistema suporta as tarefas dos utilizadores (c.f. fosso da execução)
- “Task adequacy” (relação entre suporte do sistema e compreensão dos utilizadores)



Robustness #4: Task conformance

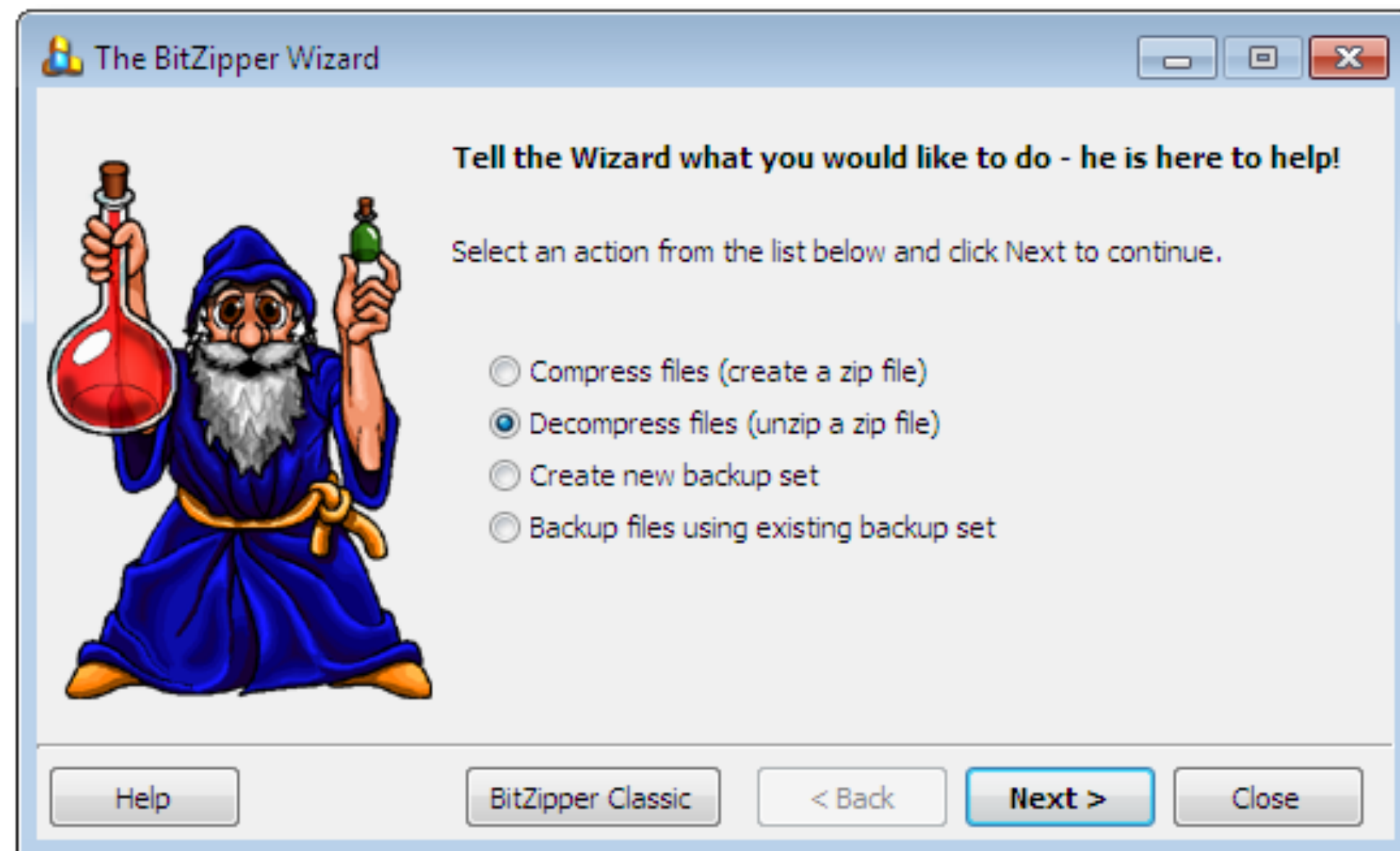
- Quanto o sistema suporta as tarefas dos utilizadores (c.f. fosso da execução)
- “Anticipation” $\Rightarrow$ “Task adequacy”



Princípios de usabilidade

- Dimensões podem ser conflitantes

💡 Necessário tradeoffs



+learnability
- flexibility

+robustness
- flexibility

Two-Factor authentication

LearnWorlds requires you to protect your account with 2FA. How would you like to receive one-time passwords (OTPs)?

☐ Mobile app authenticator
Use a mobile app like Google Authenticator to generate verification codes.

☒ Email
Receive verification codes via email.

Continue

+robustness
- learnability

Princípios de usabilidade

- Dimensões variam em importância consoante o contexto
- Learnability: utilizadores novos / tarefas pouco frequentes
- Flexibility: utilizadores especialistas / tarefas muito frequentes
- Robustness: tarefas críticas
- 💡 Diferentes utilizadores podem ter experiências diferentes
- ! Impossível de classificar uniformemente

