

# A Computer Assisted Vocabulary Learning Program

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## **Workshop CAMELEON 2011**

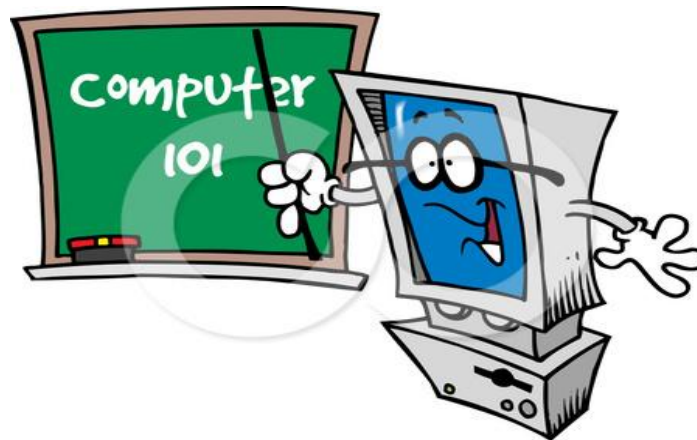
First Workshop on Collaborative and Automatic Methods for  
the Multilingualisation of Lexica and Ontologies

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Co-Advisor: Dra. Rosa M. Vicari

# CALL – Computer Assisted Language Learning

- Using technology to help language learning
- ICALL – the “I” makes all the difference



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# Learning



*“Learning is an enduring change in behaviour, or in the capacity to behave in a given fashion, which results from practice or other forms of experience.*

*SCHUNK 2011*”

- Learning involves change
- Learning persists with passage of time
- Learning occurs through experience

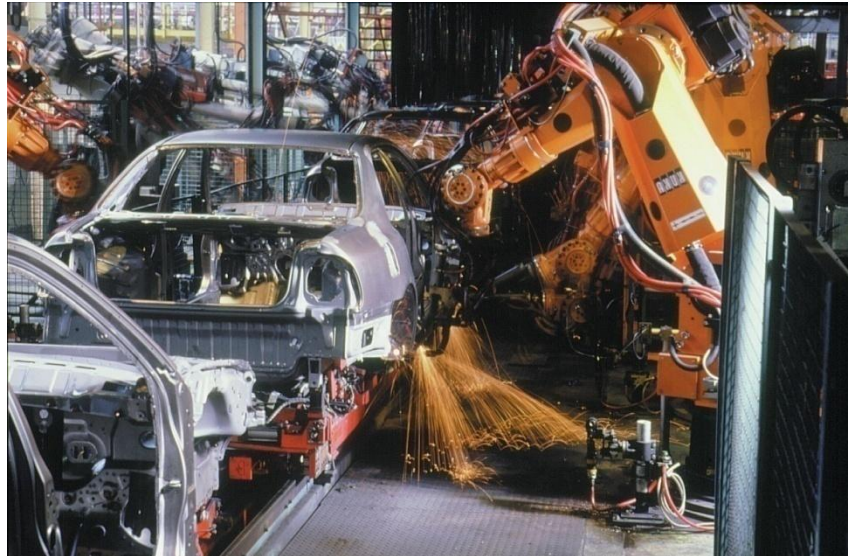
# Skill Acquisition Theory

Declarative Memory x Procedural Memory



# Skill Acquisition Theory

- Declarative memory → controlled performance
- Procedural memory → automatic performance
- Language learning occurs through **automatization**





# Manual CALL

- Teacher use Authoring tools such as Hot potatoes
  - + Small entry cost
  - - Static selection
  - - Manual creation
  - - Few exercise types
  - + Instant feedback

The screenshot shows a green header with navigation buttons '<= Index =>'. Below the header is a green box with instructions: 'Fill in all the gaps, then press "Check" to check your answers. Use the "Hint" button to get a free letter if an answer is giving you trouble. You can also click on the "[?]" button to get a clue. Note that you will lose points if you ask for hints or clues!'. The main content area has a title 'A Gap-Fill Exercise made with JCloze' and subtitle 'Gap-fill exercise'. A green box contains a list of words: 'JCloze answers button click clue gap lower see students'. The text below reads: 'This is a simple gap-fill exercise made with the [ ] program. The user enters his or her answers into the gaps, then presses the "Check" [ ] to find out which are correct, and to get a score. For each gap, any number of correct [ ] can be accepted. For example, this [ ] allows the answers "gap", "space", "blank" and "slot". Try them and you'll [ ]. If the user needs help, he or she can [ ] on the "Hint" button to

The screenshot shows a grey header with navigation buttons '<= Index =>'. Below the header is a grey box with instructions: 'Type your answer for each question, then press "Check". If you need help, you can click on the "Hint" button to get a free letter.'. The main content area has a title 'A Text-Entry Quiz made with JQuiz' and subtitle 'Short-answer quiz'. A grey box contains a progress indicator: '<= 1/5 =>'. The text below reads: '1 What word would be appropriate in this sentence: "JQuiz is the tool to use when you want your students to be able to \_\_\_\_\_ the answer themselves, rather than selecting it from a list."'. Below the text is a text input field. At the bottom are three buttons: 'Check', 'Hint', and 'Show answer'.

# Livemocha



- Learning social network
  - + Tries to put non-natives in contact with native speakers
  - + Motivational
  - - Dubious quality
  - - No feedback sometimes

Unidade 1 > Lesson 1 > Introdução

Lesson 1 Progresso

0% 25% 50% 75% 100%

**Exercícios Requeridos**

- Aprender
- Revisão**
- Escrever
- Falar

**Exercícios construtores de habilidades**

- Ler
- Ouvir
- Chamariz
- Questionário

← Página do Curso



Bom Dia

⏪ ⏩ ⏴ ⏵

ночи Спокойной Привет Доброе дела? Как утро

✓

# Tagarela

- Focus in providing informative feedback in free text tasks (AMARAL et al. 2011)
- - Manual creation
- - Static selection
- + Instant feedback
- + More complex exercises



The screenshot displays the 'Leitura' (Reading) section of the Tagarela platform. At the top right, it shows 'Módulos: 1 2 3 4 5' and 'Atividades: 1 2'. The main heading is 'Leitura'. Below it, an 'Instrução' (Instruction) section with a flag icon states: 'Leia o texto e responda às questões usando frases completas e o vocabulário apresentado no texto.' (Read the text and answer the questions using complete sentences and the vocabulary presented in the text.)

The exercise is titled 'Quem é você?' (Who are you?). It includes a small profile picture of a woman and three paragraphs of text:

- Eu me chamo Patrícia Mattos, tenho quinze anos e moro em São Paulo. Eu estudo em uma escola pública e tenho muitos amigos.
- Eu moro com minha mãe. Seu nome é Marta. Ela tem quarenta anos e é cozinheira em um restaurante de luxo.
- Eu tenho um irmão. O nome dele é Cláudio. Ele mora nos Estados Unidos e é músico. Ele toca Jazz e Blues. Ele é um excelente guitarrista.

Below the text, 'Questão 2' (Question 2) asks 'Quantos anos ela tem?' (How many years does she have?). The user's answer is 'Ela é quinze ano.' (She is fifteen years old.). A feedback box on the right provides the following information:

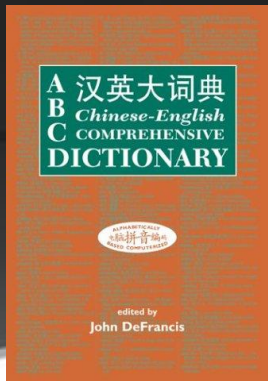
- Análise:** Input: Ela é quinze ano. I am not expecting the verb **ser** for this answer. Try using **ter** instead.
- To see a possible answer, click [here](#).

At the bottom, there is a 'Report Errors & Suggestions' button. A navigation bar at the bottom of the exercise area shows 'Questões: 1 2 3 4 5 6 7 8' and 'Próxima Questão (3)'. A keyboard layout is visible at the bottom of the answer input area.



# Putting the “I” in ICALL

- Historicamente, pouca interação PLN/CALL (NERBONNE 2003)
- CALL system are usually the same for each and every learner
- Users don't choose activities effectively (BARR 2008)
- Dynamic exercise selection and generation
  - According to user skills
  - According to user interests
- NLP Resources
  - Wordnet, Framenet, Dictionaries, Corpora
  - Parsers, taggers



# Aprendizado Léxico

- Vocabulary knowledge is the best predictor of text comprehension (LANDAUER et al. 2009)
- Reading + explicit training is the more efficient than just reading (WESCHE; PARIBAKHT, 2000)
- Many types of basic activities (GORJAN et al. 2008)
  - flashcards, insert translation, fill the blanks, etc
- More advanced learners can use Hypertext glosses (YUN 2011)
- Computer assisted vocabulary training improves long term retention (ZAPATA & SAGARRA 2007)

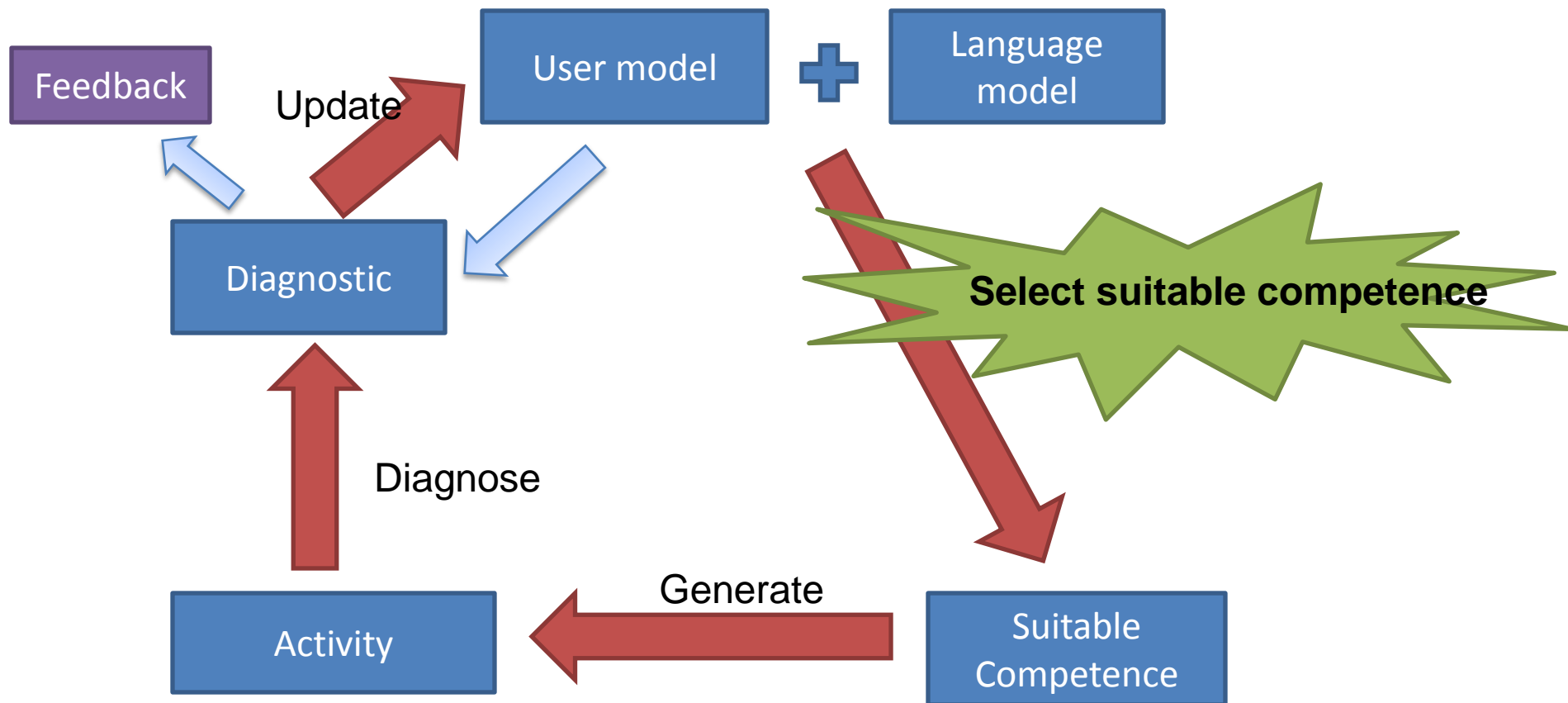


## FILL IN THE BLANKS

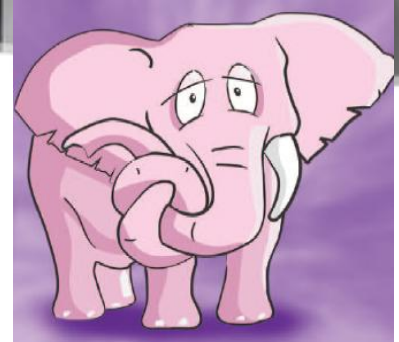


1. If your clothes catch on fire you should stop, drop, and \_\_\_\_\_ .
2. You should always \_\_\_\_\_ both ways before crossing the street.
3. Children should never \_\_\_\_\_ with matches.
4. Always wear your \_\_\_\_\_ while riding in the car.
5. Always wear your \_\_\_\_\_ when riding a bike.

# An intelligent language learning program

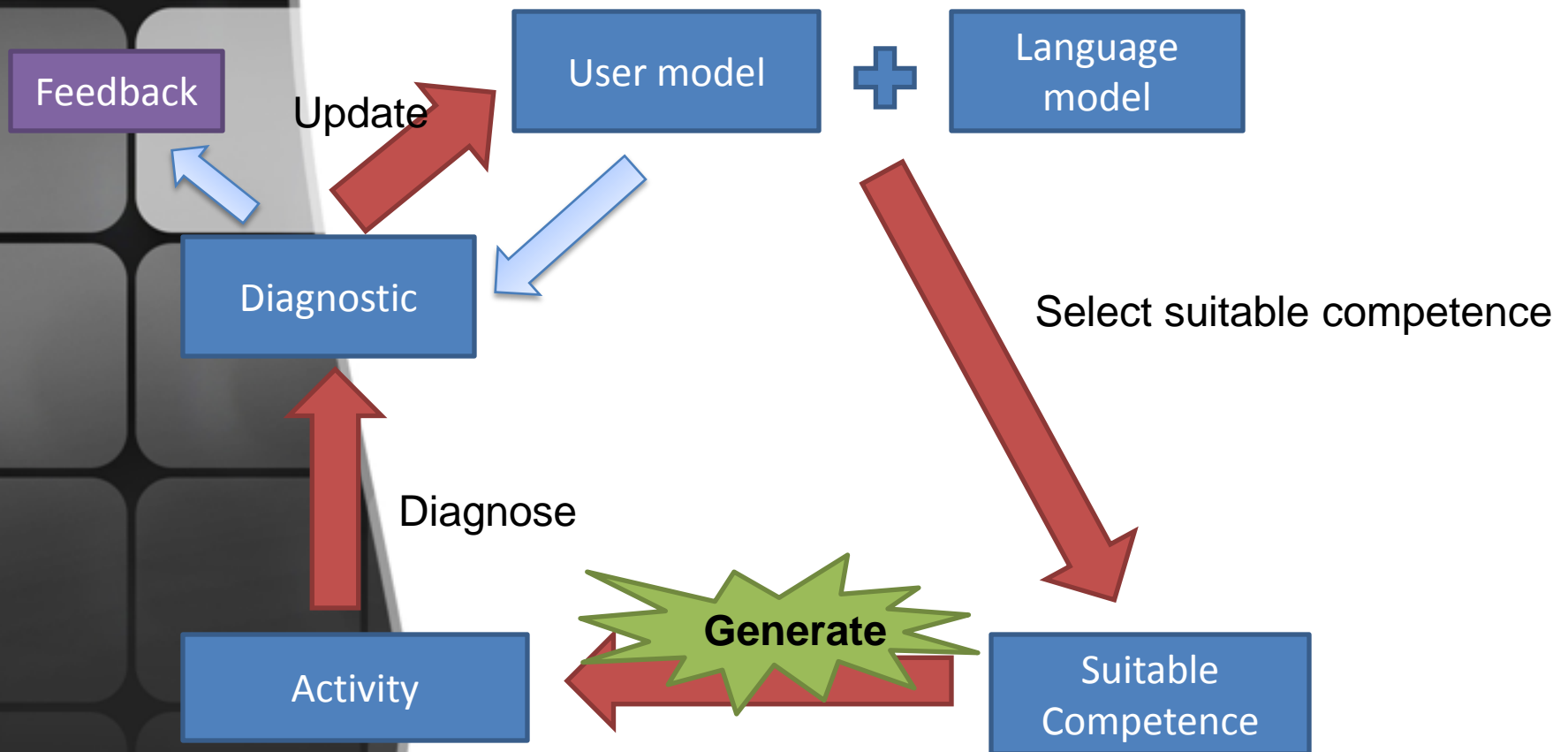


# Select suitable competence



- Objective: maximise learning over time
- Competence can't be “too hard”
- Spaced Repetition, optimal timing (PAVLIK & ANDERSON 2008)
  - Improve long term retention
- **Implemented:** Spaced repetition vocabulary retrieval
- Open question: does spaced repetition apply to form oriented tasks?

# An intelligent language learning program



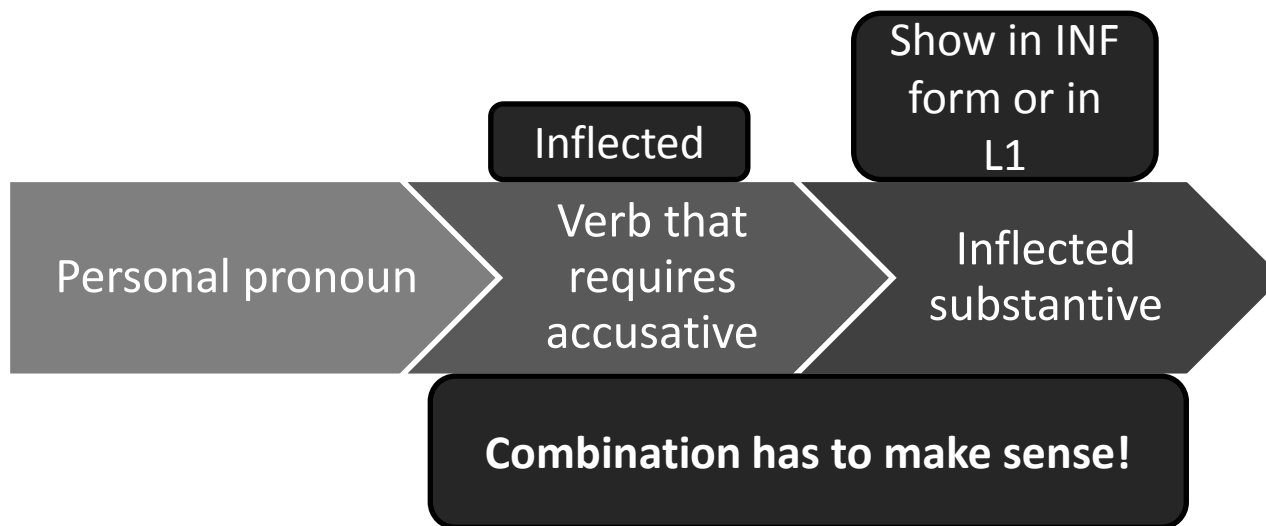


# Generate

- Ranges from very simple to very complex
- **Implemented:** simple passive vocabulary training
- **Great opportunity for application of NLP!!**
  - Automatic cloze creation
  - Automatic text gloss creation
  - Use of NLP resources

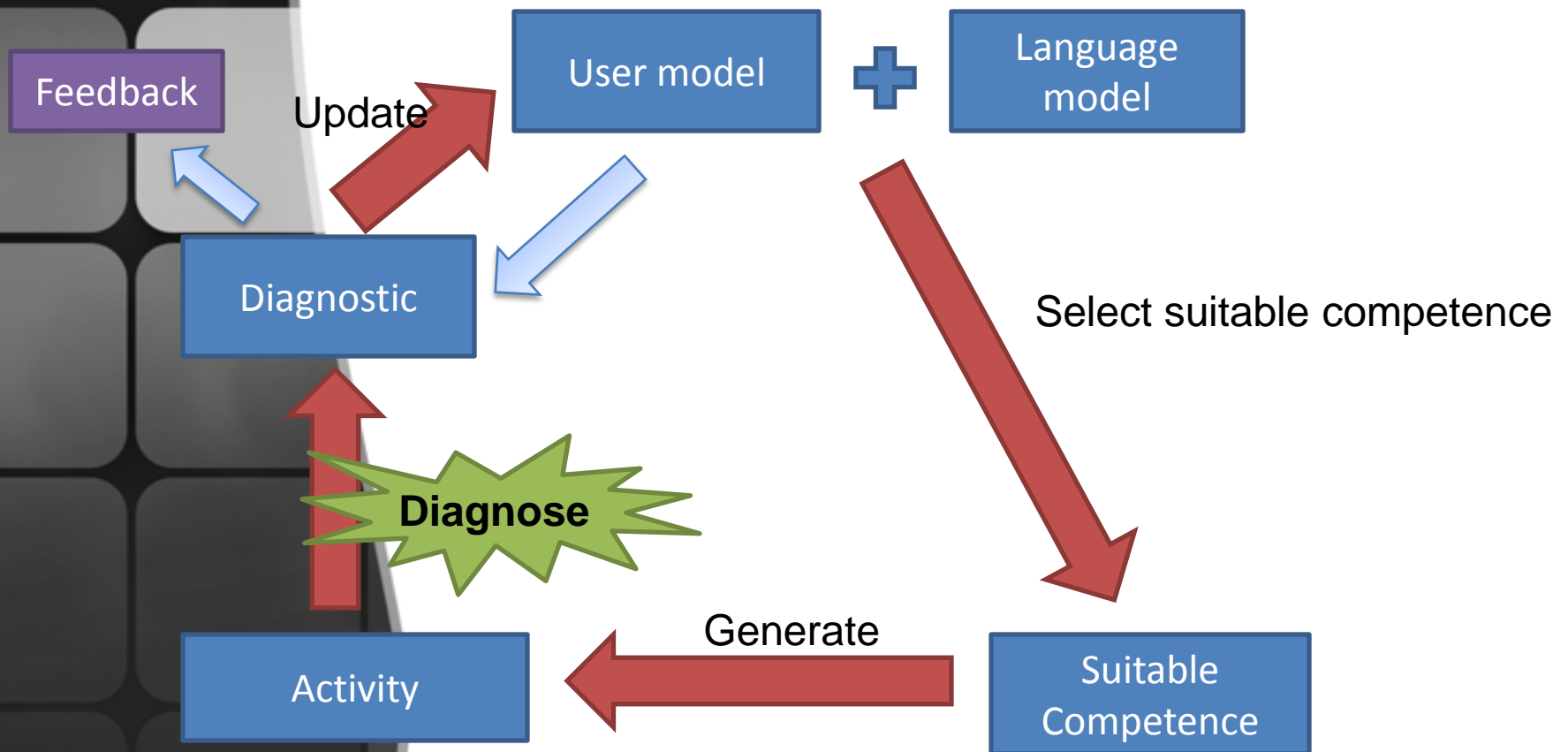
# Example: morphological learning

- Generation from templates  
(GALLOWAY & PETERSON-BIDOSHI 2008)



~~I drove the sky.~~

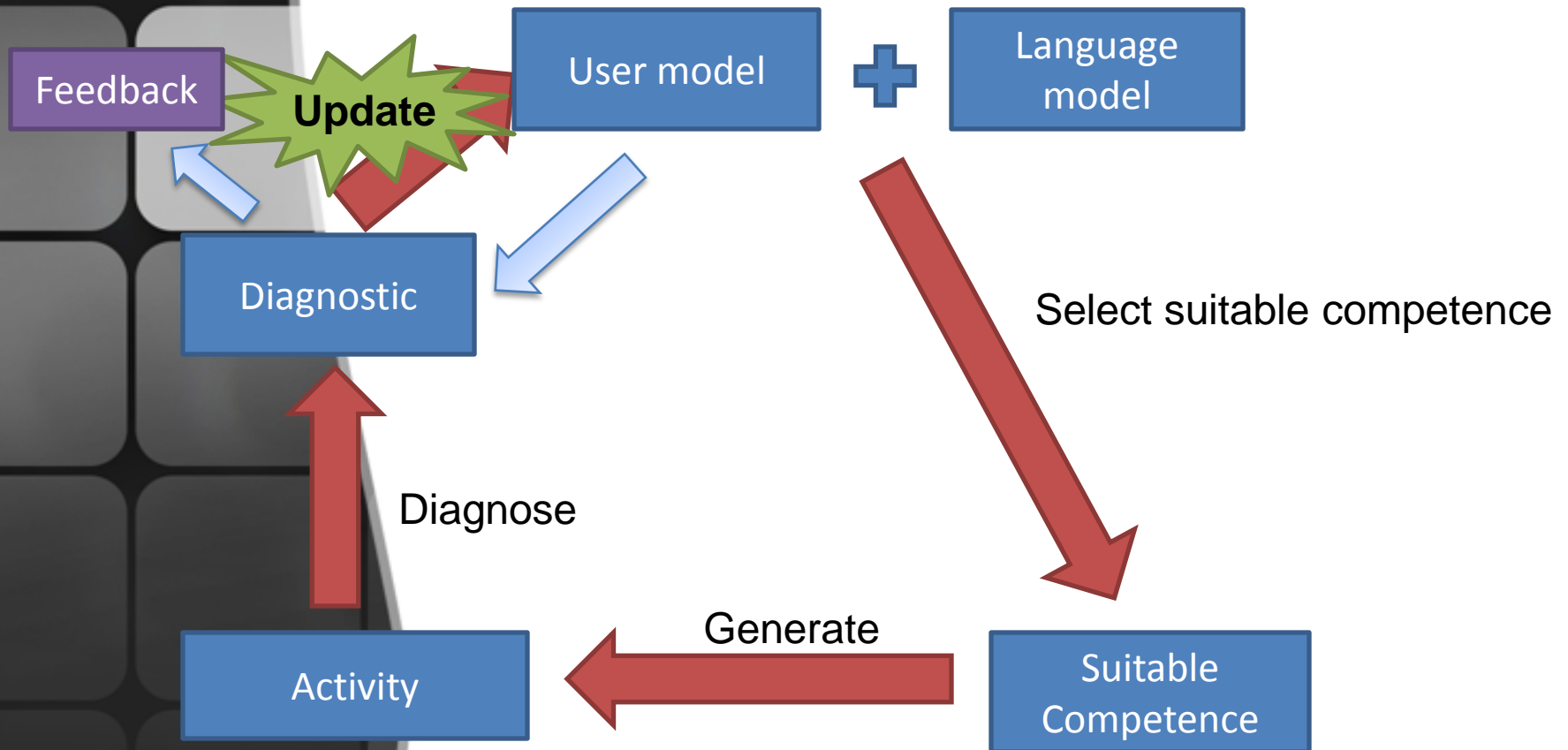
# An intelligent language learning program



# Diagnose

- Simple exercises -> simple diagnostics
- More complex exercises
  - May involve many competencies at the same time
  - May be more or less open form
- **Implemented:** exact match for one competency
- **Opportunity:** use current user model to infer which competency had the greater probability of causing a mistake

# An intelligent language learning program





# Update user model

- Users following the same course and with similar backgrounds may have very different competencies developed, i.e, user ability can't be captured by a single number (HEIFT 2008)
- *Very* fine grained
- Model each competency separately
  - Each word is divided into productive and receptive competencies
- Each user action changes the model
- Based on the diagnostic, update affected competencies

# Conclusion

- Preliminary tests show improved retention of passive vocabulary in Russian
- Many opportunities to use NLP techniques and resources

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Thank you!  
Questions?

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