Slide 1

Where does ICALL fit into
Foreign Language Teaching?

Luiz Amaral and Detmar Meurers

The Ohio State University

CALICO. May 19, 2006

Slide 2

Pedagogical Needs

▶ Computers widely used in foreign language teaching to help learners experience a foreign language & culture.
  ▶ multimedia presentations, web-based TV/radio/news, email/chat with native speakers, . . .

▶ Apart from the undisputed role of contextualized, communicative language use, which other aspects of language learning are relevant in this context?

▶ Research since the 90s has shown that **awareness of language forms and rules** is important for an adult learner to successfully acquire a foreign language.
  ▶ (cf., e.g., Long 1991, 1996; Ellis 1994; Schmidt 1995; Lyster 1998; Lightbown and Spada 1999; Norris and Ortega 2000; Schulz 2002)

Slide 3

Real-life constraints

▶ The time a student can spend with an instructor/tutor typically is very limited.

▶ In consequence, work on form and grammar is often deemphasized and confined to homework so that the time with the instructor can be used for purely communicative activities.

▶ The downside is that the learner has relatively few opportunities to gain awareness of forms and rules and receive individual feedback on errors.

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Real-life constraints
OSU practice confirming dilemma

A series of interviews with Spanish/Portuguese language instructors (cf., Amaral and Meurers 2005) finds that

▶ it can be difficult to achieve the communicative goal of an activity when students have problems using the appropriate language forms and sentence patterns.

▶ But class activities that focus on form or grammar patterns are perceived as problematic since
  ▶ they reduce the pace of a lesson, and
  ▶ individual differences make it impossible to have all students do the same tasks in exactly the same time.

▶ While instructors were very sceptical of CALL tools aiming to replace human interaction, they support tools
  ▶ practicing receptive skills
  ▶ reinforcing acquisition of forms
  ▶ raising linguistic awareness in general

An opportunity for instructional technology!?

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- ▶ The situation seems like an excellent opportunity for developing CALL tools to
  - ▶ provide individual feedback on learner errors and
  - ▶ foster learner awareness of relevant language forms and categories.
- ▶ But existing CALL systems which offer exercises
  - ▶ typically are limited to uncontextualized multiple choice, point-and-click, or simple form filling, and
  - ▶ feedback usually is limited to yes/no or letter-by-letter matching of the string with a pre-stored answer.

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- ▶ Linguistic modeling is needed to improve on this situation, e.g.,
  - ▶ tokenization: identify words
  - ▶ morphological analysis: identify/interpret morphemes
  - ▶ syntactic analysis: identify selection, government and agreement relations and word order requirements
  - ▶ formal pragmatic analysis: identify coreference relations, information structure partitioning, . . .
- ▶ Computational tools identifying such linguistic properties need to be integrated into CALL systems to obtain language-aware "Intelligent" CALL (ICALL).
  - ▶ These tools must be extended/written to permit and diagnose errors made by language learners.

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- ▶ Despite the clear potential, virtually no ICALL systems are integrated into FLT practice today. Exceptions:
  - ▶ Trude Heift's German Tutor (Simon Fraser University)
  - ▶ Noriko Nagata's Japanese Tutor (U. of San Francisco)
- ▶ Why?
  - ▶ Lack of interdisciplinary research combining computational, linguistic, and FLT/SLA expertise. (cf., also Garrett 1995)
  - ▶ Large ICALL projects tend to be overly ambitious, attempting to revolutionize foreign language teaching instead of addressing realistic FLT needs.
  - ▶ Lack of empirical evaluation of systems & components:
    - ▶ coverage of phenomena and learner error types handled by diagnosis module
    - ▶ nature of implemented activities, the feedback and the effect on language learners

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- ▶ Intelligent Tutoring Systems consist of at least three components (Hartley and Sleeman 1973):
  - ▶ the expert model
    - ▶ here: linguistic modelling & analysis, error diagnosis
  - ▶ the student model
    - ▶ here: static/dynamic record of student's profile
  - ▶ the instructor model
    - ▶ here: activity setup, feedback strategies, error taxonomy
- ▶ ICALL research has focused on the expert model; the vast majority of ICALL research
  - ▶ does not include an explicit model of the learner or the typical errors of the targeted audience
  - ▶ is not informed by SLA/FLT research on
    - ▶ good, contextualized activity design
    - ▶ effective feedback strategies
    - ▶ methodology for evaluation with real-life language learners

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BANZAI/ROBO-SENSEI (Nagata 2002)

- ‣ Positive:
  - ‣ Good contextualization (traveling in Japan)
  - ‣ Good cross-referencing with current textbooks
  - ‣ Based on FLT research (Nagata 1993, 1996, 1997)
- ‣ Limited integration of SLA and FLT insights:
  - ‣ Activity design:
    - ‣ extensive use of translation task
  - ‣ No learner model (as far as observable), e.g.:
    - ‣ no learner-dependent selection of feedback, i.e., system reports all errors
  - ‣ No instructor model (as far as observable), e.g.:
    - ‣ flow of instruction, i.e., which activities are chosen, purely based on student choice
  - ‣ Feedback, interface, and instuctions make extensive use of L1.

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German Tutor (Heift 2001)

- ‣ Positive:
  - ‣ Learner model
    - ‣ which errors detected in deep processing to report
  - ‣ Consistent use of L2
  - ‣ Ongoing FLT/SLA research, feeding back into system design (Heift 2004, 2005)
- ‣ Limited integration of SLA and FLT insights:
  - ‣ Activity design:
    - ‣ decontextualized activities
    - ‣ few activity types (dictation, build-a-phrase, which word is different, word order practice, fill-in-the-blank, build a sentence) Heift (p.c.): the current version of German Tutor, called E-Tutor, includes additional exercise types
  - ‣ No instructor model, e.g.:
    - ‣ flow of instruction based on student choice
    - ‣ activity type not shaping feedback
  - ‣ Nature of feedback:
    - ‣ explicit grammatical instruction is only type of feedback

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Spanish for Business Professionals (Hagen 1999)

- ‣ Positive:
  - ‣ Very nicely contextualized units
  - ‣ Good inclusion of audio material
  - ‣ Good sequence of exercises
  - ‣ Texts with hyperlinks to electronic bilingual dictionary
- ‣ Limited integration of SLA and FLT insights:
  - ‣ Activity design:
    - ‣ extensive use of translation as an input trigger
  - ‣ No learner model, e.g.:
    - ‣ no learner-dependent selection of feedback, i.e., system reports all errors
  - ‣ Nature of feedback:
    - ‣ extensive use of grammatical terminology (in L1)
    - ‣ inconsistent, interleaved use of L1 and L2 for feedback

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Challenge 1: Constraining Learner Input

Problem

- ‣ Processing completely free production input, allowing any number and type of errors, is not tractable.
- ‣ Systems must control/limit the type of input received.
- ‣ Current ICALL systems typically control input using outdated activity design: translation, dictation, etc.
  - ‣ Constraining activities in this way also circumvents need for semantic analysis of task appropriateness of input.
- ‣ Some consequences of this choice are:
  - ‣ decontextualized activities that do not fit communicative purposes
  - ‣ limited number of activity types

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Example: Translation in *Spanish for BP*

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Challenge 1: Constraining Learner Input
Suggestions

▸ How to control the input and be pedagogically sound?
  ▸ Free vs. controlled input is a continuum, not a dichotomy.
  ▸ Modify types of exercises so that they become communicatively significant.
  ▸ Constrain form and content of input through communicative setup of the activity.

▸ The activity design and explicit learner models needed here serve double duty:
  ▸ make activities and feedback pedagogically sound
  ▸ constrain which language expressions and learner errors the processing needs to be able to deal with.

Example:
  ▸ Vocabulary practice in Spanish for Business Professionals vs. in the TAGARELA system

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Example: Vocabulary practice in *Spanish for BP*

▸ While *Spanish for BP* contextualizes activities with texts and audio, it only does so for multiple choice activities.

▸ Vocabulary practice:

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Slide 1 (top-left)

Challenge 2: Task specification (L1 vs. L2)
Problem

- ▸ ICALL systems rely heavily on L1 to provide instructions
  - ▸ Should L1 be avoided completely?
  - ▸ What is the right measure?

- ▸ Instructions used in ICALL systems often are
  - ▸ too long for students to actually read them
  - ▸ too complex to be given in L2.

- ▸ Interface design is typically not used to help students identify different exercise tasks.

Slide 2 (top-right)

Example: Long instructions in *Spanish for BP*

Slide 3 (bottom-left)

Challenge 2: Task specification (L1 vs. L2)
Suggestions

How to provide instructions without or limiting the use of L1?

- ▸ Make activity types clear (list types of activities)
  - ▸ If exercise types are consistent, students experience with a given type of exercise can help avoid the problem.
- ▸ Use specific designs to indicate tasks
  - ▸ colors and icons identifying each activity type
  - ▸ page layout supporting task.
- ▸ L1 can be used as a resource, but demand-driven and not be mixed with L2
  - ▸ provide buttons that allows students to look at
    - ▸ illustrating examples
    - ▸ instructions in L1

Example:
- ▸ Activity page design for the TAGARELA system

Slide 4 (bottom-right)

Example:

Example:

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Challenge 3: Appropriate Feedback

Problem

▸ ICALL system design has made little use of SLA research on different types of feedback and their effectiveness. The systems
  ▸ rely heavily on L1 to provide feedback,
  ▸ mostly focus on explicit, meta-linguistic error feedback,
  ▸ using linguistic terminology which students are not necessarily familiar with.
    ▸ When should linguistic terminology be avoided?
    ▸ When does it help?
    ▸ Does it depend on the student?

▸ Most systems have no student model:
  ▸ Feedback is only based on type of error.
  ▸ No adaptation of feedback messages to student needs.

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Example: Feedback in *Spanish for BP*

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Challenge 3: Appropriate Feedback

Suggestions

▸ The role of meta-linguistic feedback for student uptake in ICALL (Heift 2004)
  ▸ Exploration limited to few, decontextualized exercise types.
▸ Integrate SLA research results on types of feedback and their effectiveness, e.g.:
  ▸ Predominant role of noticing (cf., e.g., Robb et al. 1986)
  ▸ No difference in students self-correcting errors based on uncoded vs. coded feedback (Ferris 2002)
  ▸ Feedback on agreement errors less effective for beginners (Pieneman 1984)
▸ The context influences the effectiveness of different types of feedback, so the transferability to the ICALL context needs to be tested (cf. e.g. Sagarra to appear).
▸ Well defined learner and instructor models can help us determine better feedback strategies.

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The TAGARELA project

- Our project develops a web-based intelligent workbook as a new instruction component of the Portuguese Individualized Instruction Program at OSU.
- It includes exercises typically found in current workbooks:
  - listening and reading comprehension
  - picture description
  - contextualized fill-in-the-blank and vocabulary
  - phrasing and re-writing

  and will provide immediate, individual feedback on
  - spelling, subcategorization, missing/extra words, agreement, selected case and verb forms, word order.
- Status: Project at half way point, with the
  - web-based intelligent workbook currently worked on
  - undergoing prototype testing in Autumn 06 and
  - a full test with regular Portuguese students in Spring 07.

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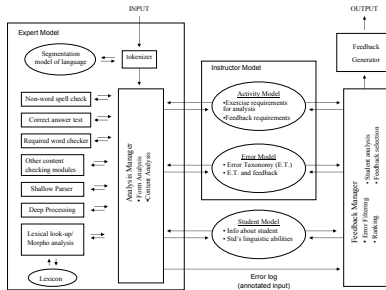
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- Integration of computational, linguistic, and FLT/SLA expertise opens up opportunities for ICALL research.
- For instructors to be able to rely on ICALL systems as part of their teaching methodology, we need more
  - explicit models of learners, activities, and error types
  - web-forms with activities that are designed according to specific pedagogical objectives of a course
- To advance as a field, ICALL needs more replicable evaluation of
  - the pedagogical effectiveness of ICALL systems
  - the error detection, localization & diagnosis techniques
    - e.g., using freely available, task-specific, error-annotated learner corpora

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Large ICALL projects tend to be overly ambitious, attempting to revolutionize foreign language teaching instead of addressing realistic FLT needs.

▸ For example, the €2,200,000 project FREETEXT, aimed at providing feedback on free production of language learners, fell short of its ambitious goal and ended without ever being evaluated with learners.

> *Par rapport à nos ambitions de départ, FreeText a vu ses ambitions réduites. La technique de la comparaison de phrases a dû être reportée après la fin du projet et les performances du système de diagnostic peuvent sembler relativement faibles par rapport aux espoirs soulevés. Il est aussi un peu frustrant de ne pas disposer de résultats sur l'accueil réel de nos outils d'aide chez les apprenants. Nous ne disposons que d'une évaluation de spécialistes et des réactions suscitées par les diverses présentations du logiciel que nous avons faites.*
> *(L'haire 2004, p. 10)*