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AUTONOMY MEETS INDIVIDUALIZATION IN CALL

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Résumé

Le développement des matériels EAO pour un apprentissage autonome soulève à nouveau des questions sur un apprentissage individualisé. Cet article examine quatre fonctions informatiques visant une approche individualisée en tutorat EAO : a) la nécessité de cibler et de traiter les difficultés linguistiques de chaque apprenant ; b) la nécessité d'enseigner des contenus pertinents pour les apprenants, liés à leur spécialité ; c) l'évaluation individuelle afin de mieux planifier l'apprentissage à venir ; d) l'exploitation de matériels interactifs qui privilégient le style d'apprentissage de chaque utilisateur. Cet article présente quelques exemples de recherches sur ces questions, mais conclue que bien d'autres seront nécessaires dans la prochaine génération de matériels EAO afin de mieux promouvoir un apprentissage en autonomie.

Abstract

Development of CALL materials for autonomous learning reintroduces issues about individualized learning through CALL. This paper explores four software features intended to provide individually tailored learning in tutorial CALL. The first is the need to identify and address precisely the linguistic difficulties that particular types of learners have. The second is the need to teach the language of the specific content that is relevant to learners. The third is the need to present material and interact with the learners in a way that enhances their learning style. The fourth is the use of assessment of individual learning to recommend further study. This paper presents some examples of work that has begun to explore these issues but suggests that much more needs to be done in these areas if the next generation of CALL materials is to support autonomous learning better.

Introduction

Current interest in developing and evaluating CALL materials for autonomous learning may rejuvenate efforts to increase the quality of individualized learning that CALL materials have promised for many years. As Benson (2001: 140) puts it, "there is an assumption that technology can provide learners with the kinds of support they need in order to develop the skills associated with autonomy," but the validity of this assumption depends on the characteristics of the activities the technology supports. Indeed, CALL in particular and technology-based learning materials more generally have a long history of promising to offer individualized learning designed as a resource for autonomous learners and for the development of autonomous learning skills. However, individualized CALL is not the area in which autonomy and technology typically intersect. Tutorial CALL applications have received criticism by some teachers and researchers concerned with autonomy (eg J. Milton, 1997). But in considering the potentials of technology for constructing environments for autonomous learning in view of the multifaceted nature of second language acquisition, it may be useful to consider the potential that individualized tutorial materials might hold alongside other technology-based tools.

1. Autonomy, individualization, and learner fit

Throughout the history of CALL, one finds the idea that technology should be able to afford the learner more appropriately individualized instruction than what can be achieved through classroom learning. The first chapter of Ahmad et al's book (1985: 5) points out that one advantage of the computer for language learning is that it "can be made sensitive to the learner's pace, pattern of responses, and so on, and can adjust the linguistic material to the needs of the individual". Almost 20 years later, it would be difficult to find an example of CALL in use by language learners that displays these characteristics. But the vision is still an attractive one to some teachers and learners even if it might be played out differently today. In particular, it might be argued that materials are needed to support the autonomous learner in ways that adapt to the learners' linguistic knowledge, content interests, learning style, and metalinguistic awareness.

> *Adaptive instruction prescribes the methods for changing the form of instruction to suit the needs or desires of individuals. This assumes that all learners will not perform equally given a single form of instruction. The idea also entails the assumption that the nature of instruction should be adapted, and that we make available to learners more than one form.* (D. Jonassen & B. Grabowski, 1993: 35)

However, this promise rests on the extent to which CALL materials fit the needs of particular learners. I have argued that "learner fit" is one of six criteria that should help to guide evaluation of CALL within a particular context (C. Chapelle, 2001). Learner fit is defined as "the amount of opportunity for engagement with language under appropriate conditions given learner characteristics" (C. Chapelle, 2001: 55). Factors mentioned include opportunities for working with structures appropriate to the learners' level and their characteristics such as willingness to communicate, age, and learning style. In the interest of moving toward CALL materials that can be argued to address learner fit, this paper describes four software features intended to provide individually tailored learning. The first is the need to

identify and address precisely the linguistic difficulties that particular types of learners have. The second is the need to teach the language of the specific content that is relevant to learners. The third is the need to present material and interact with the learners in a way that enhances their learning style. The fourth is the use of assessment of individual learning to recommend further study. These critical design questions along with the associated research issues are summarized in Table 1.

design questions	**research issue**
What linguistic material should the learner be taught?	Learners' linguistic needs
What subject areas and topics should be reflected in the language?	Learners' interests
What didactic approach(es) should be taken?	Learning styles
When should materials be recycled or finished?	Assessment

Table 1. Critical design issues for individualized CALL.

When autonomy is considered in connection with technology and individualized CALL, agents other than the teacher and the learner play a role in instructional decision-making. In this paper, therefore, a software designer and computer come into play as design questions are considered. For each of the design questions associated with learner fit, a corresponding research area can be identified. I will give some examples of work that has begun to explore these issues but will suggest that much more work needs to be done in these areas if the next generation of CALL materials is to support autonomous learning better.

2. Linguistic needs

In designing individualized CALL for explicit instruction the software developer has to decide which linguistic features to focus on. A number of approaches might be taken for doing this, but to take one example from developers working with advanced-level L1 Korean speakers of ESL, Cowan et al (2003) systematically examined errors in the written language of a sample of students representative of the target population. Having gathered a small corpus of text from these students, they looked for the types of errors that would be predicted by contrastive analysis of English and Korean, and then developed their tutorial CALL software to address these problems.

Tutorial CALL focusing on the errors made by advanced-level learners was seen as the appropriate means for working on these aspects of grammatical accuracy because of the extensive opportunities that the learners had already had for explicit learning and implicit acquisition of these forms. One example of the errors that were addressed in the materials was overpassivization (eg *the accident was happened, *the birthrate was changed). Such verbs have probably been taught to these learners. One widely-used English grammar textbook includes an explanation of the distinction between those verbs which can and those which cannot passivize:

> *Only transitive verbs (verbs that can be followed by an object) are used in the passive. It is not possible to use intransitive verbs (such as happen, sleep, come, seem) in the passive.* (B. Azar, 1999: 208)

Example: *People grow corn in Iowa.* → *Corn is grown in Iowa.*
Peter came here two months ago. (no change)

This particular book did not cover all of the relevant verbs and contains no discussion of the ditransitive verbs such as *change*, whose passivization depends on the functional relationship between the subject and the verb. However, of the fifteen problematic verbs identified by Cowan et al (2003) in the learner corpus, many appear regularly in input that the learners should have been exposed to. Table 2 summarizes a corpus-based analysis of the availability of these verbs in everyday and academic English use.

word	examples of verbs that cannot passivize in Azar	in the most common 2000 words of English	in the academic English word list (A. Coxhead, 2000)
change		√	
consist			√
continue		√	
decrease		√	
disappear		√	
exist	√	√	
happen	√	√	
improve		√	
increase		√	
last		√	
occur			√
originate			
result		√	
suffer		√	
vanish			

Table 2. Opportunities for exposure to the overpassivized words.

Because many of the verbs can occur in both passive and unpassivized form, an additional issue concerns the types of examples that ESL learners may have been exposed to in the past. A look at the British National Corpus available on the web provides some hint about the possibility of the amount of exposure and the proportion of that which might be expected to affect learners language development. Table 3 shows a great deal of variety among the verbs, with the common intransitive one providing a large number of useful exemplars, and the common ditransitive one offering more confusing examples. These data are interesting from the perspective on understanding that the learners have probably been exposed to and taught all of the forms that they continue to have problems with even if the exposure has been uneven.

This is just one example of many difficult linguistic forms that can be verified to be problematic for a relatively large proportion of ESL learners. The large-scale learner corpora might fruitfully be mined to identify areas that require additional explicit instruction that the autonomous learner might benefit from. However, for such

instruction to be developed, at least three areas of research need to be investigated. First, like Cowan et al (2003) have done, appropriate and relevant linguistic areas in need of attention for particular learners need to be identified. Second, research needs to address empirically the theoretical issue of learnability of these forms where persistent errors occur. Third, the best instructional approaches for teaching specific advanced-level linguistic points need to be demonstrated empirically. Without CALL materials developed on this type of research basis, autonomous learners are really left to their own devices to learn on their own precisely what they have not been able to learn on their own.

verbs	frequency of examples in a sample from the corpus	percentage of good examples of all the tokens	good examples for ESL learners[1]	not useful or less useful examples for ESL learners
exist (common intransitive)	2455	92%	But the competition which has always existed between them is undeniable.	There existed a whole tangle of possible reasons.
decrease (common ditransitive)	780	40%	A large proportion of the local population was actively employed in the wool trade, although it had certainly decreased.	As the patient becomes stronger, the number of machine breaths is decreased and the patients have to breath more to maintain their minute volume.
originate (uncommon ditransitive)	727	88%	Orphic Cubism originated in 1912 to exploit the emotional, musical qualities of colour.	He himself originated the best moves of a patchy campaign.

Table 3. Good and bad examples in the input.[2]

3. Learners' interests

Individualized CALL would ideally have content that is as interesting to the learners as it is appropriate in the linguistic points covered. For advanced-level learners the web offers a wide variety of texts, but for beginners or for those wishing a pedagogical strategy to accompany their reading materials, software developers need to explore how best to determine and address learners' interests. One approach to development of materials for the autonomous learner is to offer parallel texts on a variety of topics. A very modest example of this type of branching can be seen in an ESL assessment, Longman English Assessment, in which the learners have access to texts on a variety of general content or those covering business issues. Figure 1 illustrates the branching strategy that occurs on the basis of the learner's response to a question at the beginning to the assessment.

A much more extensive example of subject area texts for learners comes from

[1] Good examples are clear intransitive examples.
[2] This is based on a search conducted in the British National Corpus, a one hundred million word corpus of spoken and written British English using the concordancer at http://sara.natcorp.ox.ac.uk/lookup.html.

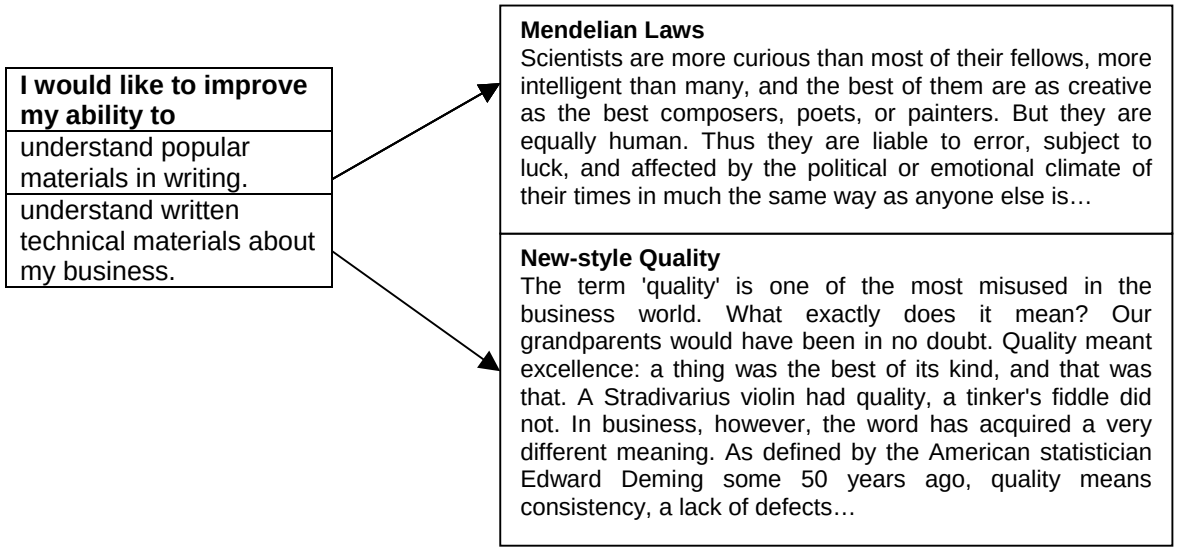


Figure 1. Example question from the Interest survey and texts from the advanced-level general and business texts in Longman English Assessment.

an academic English corpus compiled by Viviana Cortes at Iowa State University. The corpus consists of journal articles in the following subject areas: computer science, architecture, art and design, physics and astronomy, economics, engineering, animal science, biology, statistics, applied linguistics, and business administration. Each subject area subcorpus contains about 500,000 words. For advanced-level academic ESL learners, such a corpus provides a wealth of material that addresses the specific needs and interests of learners. As the example shown in Table 4 illustrates, such a corpus reveals important differences in the way that the ideational content of the texts is expressed through linguistic choices made by the author. As Schleppegrell et al (2004: 91) put it, examination of discipline-specific language reveals that the idea of the teacher needing to connect content with language does not make sense; instead, “language and content are already integrated”.

Journal, title (section)	Text
Journal of Animal Science, Effects of Sapindus saponaria fruits on ruminal fermentation and duodenal nitrogen flow of sheep fed a tropical grass diet with and without legume (Abstract)	Six adult African-type hair sheep (BW = 40.3 ± 6.3 kg) fitted with ruminal and duodenal cannulas were subjected to four treatments. Sheep were offered basal diets at a rate of 80 g of DM/kg of metabolic BW (equivalent to ad libitum access) consisting either of a low-quality grass hay (Brachiaria dictyoneura, 3.7% CP, DM basis) alone or in combination with a forage legume (Cratylia argentea, 18.6% CP, DM basis) in a 3:1 ratio (DM basis).
Communications of the ACM (Lead-in)	IT outsourcing continues to be a booming business. The reasons why companies choose to outsource have been well-documented, including reduced cost, improved performance, and access to wider labor markets [1, 4]. One aspect of IT outsourcing is the outsourcing of software production. An important trend that started in the 1990s and continues to increase today is to outsource software production globally [9]. Much of the software development takes place at offshore locations, where costs are low and labor is often plentiful. Software suppliers normally maintain small bridgehead teams in the client countries for sales and customer liaison purposes. Outsourcers in turn often locate executives in the supplier countries to, for example, oversee large projects.

Table 4. Example language from two journals in the Cortes corpus of academic language.

Examination of such a corpus and the variety inherent in it raises important questions about how the lexicogrammatical language of the discipline-specific texts can be taught. The problem goes beyond the transparent issue of the need for extensive resources to build and update such corpora. More difficult questions concern how to teach learners to become linguistic researchers so they can actually benefit from such a wealth of linguistic examples. As Aston points out, turning the learner loose with such a corpus "effectively assigns learners the role of methodological researchers, exploring resources and evaluating their potential for learning" (G. Aston, 1997: 204). Although any teacher would agree that learners' ability to act in this way would reflect the goals of autonomous language learning, the problem is the need to develop both general and content-specific strategies that can help learners to move toward this goal.

4. Learning styles

One would hope that individualized CALL would be able to adapt to fit different types of learners. Research in second language acquisition has identified learning styles or cognitive styles that may be important, but this research is inconclusive, and difficult to apply to classroom learning in a precise way, beyond the advice given to teachers to recognize that learners differ. One of the cognitive styles that has been investigated in second language acquisition research, field independence / dependence, serves as an example of the research issues involved in ultimately developing materials that are suited to learners with particular styles. Table 6 shows the characteristics of field dependent vs field independent learners as summarized by Jonassen and Grabowski (1993).

Field dependent ⟷	**Field independent**
global	analytic
accepts structure	generates structure
externally directed	internally directed
attentive to social information	inattentive to social cues
conflict resolvers	philosophical, cognitive
social & gregarious	individualistic
affiliation oriented	distant in social relations
interpersonal	intrapersonal
needs friendship	reserved, aloof
conventional, traditional	experimental
influenced by the salient features	generates own hypotheses
factually oriented	conceptually oriented
acquires unrelated facts	acquires information to fit conceptual scheme
accepts ideas as presented	represents concepts through analysis
influenced by format / structure	less affected by format / structure
gets feelings / decisions from others	impersonal orientation
sensitive to others	insensitive to social undercurrents
affected by stress	ignores external stress

Table 6. Characteristics of field dependent and field independent learners.[3]

[3] From Jonassen and Grabowski (1993: 88). These characteristics are intended to represent ends of a continuum.

Based on the descriptions provided in Table 6, most of us can probably think of people who might fit on the extreme ends of the continuum, ie very field dependent or very field independent. But how are teachers or computer programs supposed to assess a learner on the spot to determine their cognitive style? This has been a difficult issue in the study of cognitive style (C. Chapelle & P. Green, 1992). The assessments of field independence / dependence from psychology are appealing to some people, who want a measure that they consider to be validated. But in fact, measures are not validated once and for all contexts and purposes; instead, any particular measure needs to be valid for a particular use. For an assessment of cognitive styles that are appropriate to learning through CALL, one might prefer an assessment that required learners to respond to questions about their style pertaining to CALL. In such a questionnaire being developed by Monica Stella Cardenas Claros (2005) at Iowa State University, questions such as the following are being explored:

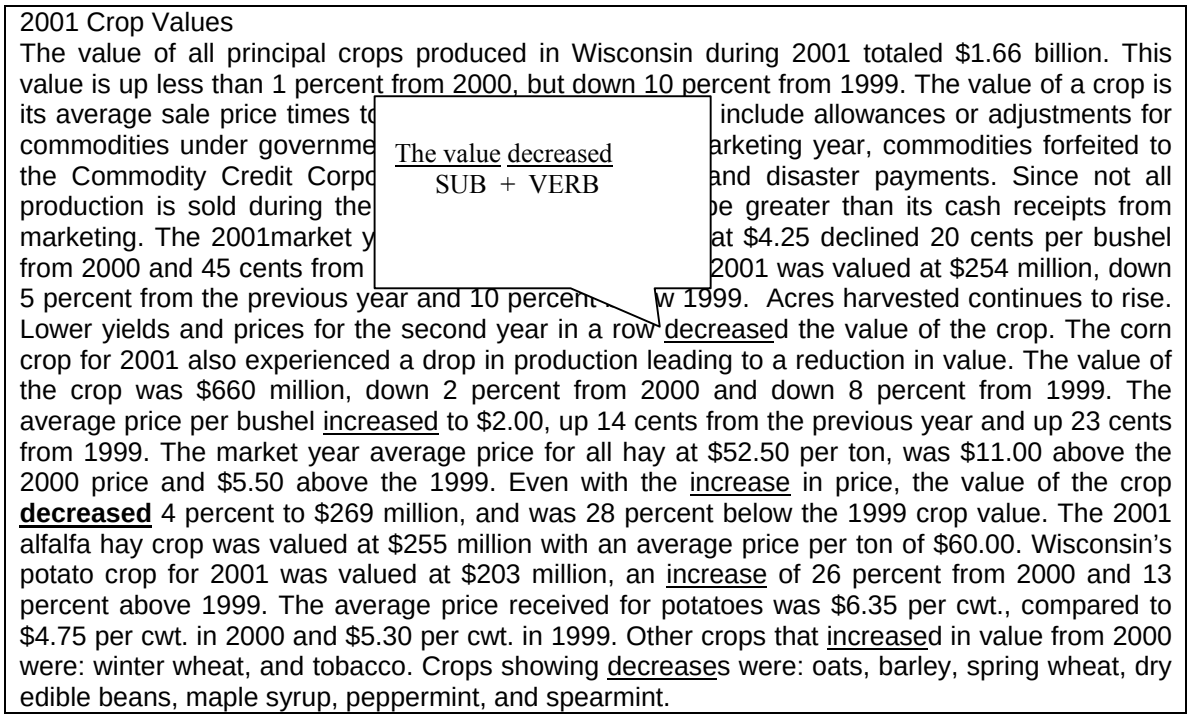
> To answer a vocabulary question accurately you would:
> a) use the hint option.
> b) give it a try trusting your knowledge.

In working with CALL, one would expect the field dependent learner, who is externally directed, to be the one to use the hint, whereas the field independent learner, who is internally directed and generates his or her own hypotheses, would give it a try without help.

Even if relevant learner styles can be assessed, the next question concerns the relevant instructional design options that might be beneficial for the learners. Perhaps the clearest distinction in instructional approaches relevant to field independent vs field dependent learners is the choice between a deductive / explicit presentation that presents learners with rules and examples and then gives practice activities, and an inductive / implicit presentation that provides learners with linguistic examples and help they can call on as needed. The latter is illustrated in Figure 2.

Development of CALL materials intended to harmonize with particular learning styles remains an issue of research rather than practice at this time, but with respect to styles and autonomy, one might ask which of the styles are most relevant to autonomy. Whatever those may be, it seems that field independent learners would be natural autonomous learners relative to field dependent learners. But what other learner styles are relevant? Some research on autonomy has suggested that “it is not autonomy per se that is foreign, but rather Western notions of autonomy, which tend to emphasize the individual rather than the collective. In contrast, some of the Chinese students in this study developed their autonomy best through a program that emphasized collectivity and peer leadership, which dovetailed nicely with revised course structure” (X. Fang & M. Warschauer, 2004: 313). In other words, culturally-related styles seemed to be an important factor in this setting.

If measurement of style is to move appropriately to more contextualized measures, researchers need to consider how to get multiple indicators of style from learners. Toward this goal, the use of working style data—the records of learners use of CALL materials—need to be considered and explored (J. Jamieson & C. Chapelle, 1987; H. Liou, 2000). For example, rather than simply asking the learners whether or not they would use the help option, a record of the data would demonstrate whether



2001 Crop Values
The value of all principal crops produced in Wisconsin during 2001 totaled $1.66 billion. This value is up less than 1 percent from 2000, but down 10 percent from 1999. The value of a crop is its average sale price times to include allowances or adjustments for commodities under governme arketing year, commodities forfeited to the Commodity Credit Corpo and disaster payments. Since not all production is sold during the e greater than its cash receipts from marketing. The 2001market y at $4.25 declined 20 cents per bushel from 2000 and 45 cents from 2001 was valued at $254 million, down 5 percent from the previous year and 10 percent w 1999. Acres harvested continues to rise. Lower yields and prices for the second year in a row decreased the value of the crop. The corn crop for 2001 also experienced a drop in production leading to a reduction in value. The value of the crop was $660 million, down 2 percent from 2000 and down 8 percent from 1999. The average price per bushel increased to $2.00, up 14 cents from the previous year and up 23 cents from 1999. The market year average price for all hay at $52.50 per ton, was $11.00 above the 2000 price and $5.50 above the 1999. Even with the increase in price, the value of the crop **decreased** 4 percent to $269 million, and was 28 percent below the 1999 crop value. The 2001 alfalfa hay crop was valued at $255 million with an average price per ton of $60.00. Wisconsin's potato crop for 2001 was valued at $203 million, an increase of 26 percent from 2000 and 13 percent above 1999. The average price received for potatoes was $6.35 per cwt., compared to $4.75 per cwt. in 2000 and $5.30 per cwt. in 1999. Other crops that increased in value from 2000 were: winter wheat, and tobacco. Crops showing decreases were: oats, barley, spring wheat, dry edible beans, maple syrup, peppermint, and spearmint.

Figure 2. An example of hypertext help in a text (from http://www.nass.usda.gov/wi/crops/cropvalu.htm).

or not they actually did use those options when they worked. Finally, the breadth of instructional design options needs to be further explored in view of the needs of learners with different styles. Researchers such as Doughty and Williams (1998) and Skehan (1998) have outlined a smorgasbord of options to consider in designing tasks for language learners. Development of individualized CALL provides a forum for exploration of how these options intersect with learners' styles.

5. Assessment

Individualized CALL needs to contain some mechanism for assessing and providing learners with feedback about their success. "I would argue that most learners, at the beginning of the learning process, do not know what is best. It is the function of the materials augmentation… to develop skills and knowledge in learners which ultimately will leave them in a position where they do know what is best" (D. Nunan, 1997: 194). Nunan suggests that learners progress toward autonomy along a five-step process: (1) awareness of pedagogical goals; (2) involvement in selecting goals; (3) intervention in modifying goals and content; (4) setting their own goals; and (5) transcendence of the classroom to make outside connections.

The idea of steps in this process, in addition to the need that all learners have to know how they are doing, raises complex questions about assessment. On the one hand, individualized CALL needs to incorporate assessment of learners' mastery of the linguistic content covered in the materials. For example, in the ESL series Longman English Interactive (M. Rost & M. Fuchs, 2003), each unit contains a quiz on the linguistic points covered, and provides learners with a detailed report on their performance over what was covered. What Longman English Interactive does not do is to select some of the material that the learner did not know to be recycled for additional exposure and practice. Such a strategy would presumably further

individualize the materials effectively.

On the other hand, if the goals of instruction include the five step set of stages, shouldn't learners' degree of achievement of each of the stages be included as well? Assessment of learners' accomplishment of these metacognitive goals and mechanisms for feedback need to be explored.

6. Individualized CALL and conceptualizing autonomy

The four research issues concerning individualized CALL offer an additional perspective on autonomy than what one sees in a two-dimensional perspective that sees control for learning as residing in the teacher or the learner. Individualized CALL

perspectives on autonomy	**themes**			
	context	**agency**	**motivation**	**learning strategies**
psychological	Generalized environment—not theorized in detail.	Characteristic of an individual.	A characteristic of the individual that can be affected somewhat by instruction.	Learner variables that can change as the result of instruction. Required strategies depend on the task, style, and goals.
technical	Surroundings (eg self-access center).	Exists totally or in a limited way depending on perceived quality of individual access.	Variable depending on environmental conditions.	Tools supplied by the teacher through training.
technical-interactionist[4]	Individualized, interactive CALL activities.	Engaged through access to appropriate materials.	Affected by the quality of moment by moment engagement in task interaction.	Learning processes that are developed through instruction. Required strategies depend on the task, style, and goals; language learning strategies are unique.
sociocultural I	Social / cultural settings and relationships with other more capable people.	Control of learning through self-regulation.	Linked to becoming self-regulated.	Not explicitly discussed although implicit.
sociocultural II	Social / cultural settings and apprenticeships in social groups.	Participation in groups.	Linked to joining a community.	Grow through participation within communities of practice.
political-critical	Ideological positions.	Control over one's situation.	Associated with becoming free.	Not explicitly theorized (but may be relevant to gaining access to power).

Table 8. Perspectives taken toward autonomy defined by four themes (R. Oxford, 2003: 76-78).

[4] Added to account for individualized CALL.

can offer another source of structure, perhaps an intermediary point between the teacher and learner, or perhaps simply a third and different set of options. Table 8 includes a place for individualized CALL by adding a perspective, technical-interactionist, to the others that are given by Oxford (2003) in her analysis of autonomy across the four themes of context, agency, motivation, and learning strategies.

Conclusion

Although the individualized CALL discussed in this paper may appear some distance in the future in practice, I believe that the research I have identified will be useful in moving in that direction and valuable in its own right. These research issues focusing particularly on learners' linguistic needs, relationships between language and content, individual differences, and assessment are at the center of concerns in applied linguistics today.

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