ON-DEMAND GENERATION OF INDIVIDUALISED LANGUAGE LEARNING LESSONS

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ABSTRACT

This paper is in two parts. In the first part a theoretical structure for learning and teaching foreign/second languages is described in some detail. It argues that knowledge is not transmitted to students but that it is an internal construction which depends heavily on each person's history. In its second part, the paper goes on to describe a Computer-Enhanced Language-Learning Support System (CELLSS) based on the theoretical framework developed. One of its major features is to enable students to generate, on-demand, lessons which focus on their specific learning needs and thus meet these needs more effectively and efficiently. One of the important consequences of this development is that students have significantly more freedom to engage in asynchronous learning activities responsive to their needs at any time of day or night and in any order. Taken together, these developments undermine some of the classical notions of teaching where an entire class does more or less the same thing at the same time and in the same space. Instead, these developments argue for a much more open, flexible and dynamic learning structure where the classroom is not necessarily the locus of activity. Finally, the paper provides a concrete example of a lesson generated by the system under student control and points to some interesting future research possibilities.

Keywords: Computer-Enhanced Language Learning, language; lesson-generation, individualisation, autonomy.

Reflections on language-learning

In a paper entitled 'The Secret of the Shao-Lin Monk' published in *On-CALL* (Lian & Lian, 1997), Ania Lian and I argued that language-learning, by virtue of the nature of the human condition, required a re-think in the ways in which it was implemented so as to enable it to make room for differences between people and for the unpredicted and unpredictable needs which they may experience.

Underpinning these conclusions and suggestions for change are the following theoretical issues:

(a) Language and all semiotic systems, and therefore language-learning, are essentially about the management of meanings.

(b) Meaning is not objectively present e.g. in words and situations but is created as a result of each person's interactions with the world, its various discourses and other signifying practices (or events). Such a view is reflected in

Petar Guberina's metaphor of the "filter" (Guberina, 1972) and Pierre Bourdieu's notion of the "habitus" (Bourdieu, 1995). It is also reflected in the works of people such as Joan Kelly Hall. As she states:

> "the accumulated knowledge, linguistic or otherwise, and the understanding engendered by such accumulation is situated in and dependent on the history preceding that moment, the social identities of the participants, their responses to these and the conditions of the moment" (Hall, 1995, p. 227).

Effectively, this means that the present is seen through the past. Thus in real life, the traditional synchronic-diachronic opposition of classical linguistics disappears and the past in fact figures as a constant companion of the present and enables people to generate meanings. (Derrida, 1982).

Thus, such things as the semantic fields of words and schemata are dynamic and are constantly being reconstructed and adjusted by each individual at all times to take account of changing situations. In other words, neither language nor meaning are finite and determined by external objective criteria. Rather, they are fundamentally idiosyncratic and therefore both subjective and ever-changing. This understanding of language and meaning-generation also tends to undermine the traditional notion of the synchronic study of language as, in every sense other than the statistical sense where language is an abstracted object, language never stands still long enough to be analysed in its present state.

But the Guberina filter or Bourdieuan habitus do not influence only the ways in which people construct meanings based on language. They also influence meaning-making by acting on the ways in which people perceive, or attempt to make sense of, the world as a whole. In order to understand, and therefore live (it is as serious as that), one has to be able to organise the world. This is what the filter/habitus does. Failure to organise and therefore to make sense of the world, inevitably leads to death.

To give two examples of meaning-construction, the filter/habitus can be thought of as being responsible for the mis-perception of the French sound [y] (as in *bus* or *rue* or *vu*), thus making it difficult or impossible for some non-native speakers of French to pronounce it. In a different sense, it is also responsible for such events as overseas tourists being shouted at by an irate San Diego taxi-driver because they were not aware of the finer points of the culture of tipping on the American West Coast. These interpretations of the world - although socially-grounded and, as such, non-individual in their nature - are perceived in relation to an individual's own history (Bourdieu, 1995, p.60) and therefore, in the end, become individual. They are not ready-made "objects" to be studied or somehow "ingested" as pre-defined and immutable objects but are constituted of dynamic internal meanings constructed by our personal logical and representational systems (Lian, 2000).

To put it another way, in any person, the process of interaction between that which is socially constituted and the historically-shaped individual experiences of the person makes the process of language learning essentially a process of accumulating history and establishing relationships. This, in turn, takes the form of "practical taxonomies" (or schemes organising the perceptions and productions of individuals) which are constituted in practice and directed toward practical ends.

This definition of learning as a practice-oriented and sociohistorically conditioned process obliges pedagogic practices to recognise the element of unpredictability which is implied by such a model. In other words, the discursive basis of the individuals' cognitive and evaluative structures can result in learners requiring individualised, unpredicted and unpredictable assistance in order to fulfil their objectives.

Thus, the language-learning environment which my colleagues, my students and I are developing is informed essentially by a theory of meaning and meaning-management which asserts that meaning is subjective, individual, idiosyncratic and the result of a process.

At the same time, and still informed by the same theoretical considerations of filter and habitus, the learning environment is based on a related theory of perception which finds its root in the phonetics area. This theory, known as verbo-tonalism, was developed in Zagreb by Guberina (Guberina, 1972): and asserts that perception is essentially a process of organising the critical elements of incoming signals, as identified by the learner's filter/habitus, into structures which enable learners to recognise and process, in a native-like manner, that which would otherwise be unperceived by the student.

These considerations shift the pedagogic focus away from a preoccupation with objects, rules or other forms of content to be transmitted or transferred to the learners and, instead, move us toward the conceptualisation of the manner, or the means, by which learners can be provided with conditions to assist them in the process of linking and contrasting differences that are significant in a given set of circumstances.

This shift in focus gave rise to three organising principles for the development of language-learning environments (for a discussion, see Lian, 1987). They are outlined below.

(a) Awareness: the requirement of bringing a phenomenon to a learner's conscious or unconscious attention – otherwise the phenomenon will remain unrecognised,

(b) Autonomy: the ability to function independently as a learner and to manage one's own learning and

(c) Achievement: the setting of personal goals and assessing whether these goals have been reached.

The following consequences follow:

(a) Learning is conceptualised as constituted in practice i.e. an activity where the conditions facilitating **awareness**-raising opportunities allow learners for explorations of the dynamics which govern the manner in which they are mobilised by the native speakers. Learning, in such a model, rather than being conceptualised as an ensemble of fixed components, is a product of confrontation (and further exploration) between the kinds of expectations that the native speakers bring with them into particular contexts and those of learners.

(b) A practical consequence of this perspective in relation to the provision of feedback is an emphasis on facilitating interaction with authentic materials (texts) from the very beginning i.e. we maintain a consistent image of what the language studied looks like, instead of implying something like: "Well, yesterday French (or English, or whatever language) looked like this, but today it's different". The latter is the normal condition when learners are exposed to so-called "simple" language which becomes progressively more "complex".

(c) Learning is conceptualised a process which is sociohistorically conditioned i.e. where the conditions for facilitating feedback seek to empower learners rather than turn the process of learning into a power clash between learners' practical interests and the interests of those, who in an attempt to help, hijack the monopoly on the legitimate structuring of the world.

(d) A concern with **autonomy** brings into focus the ways in which a learning environment allows students to control the feedback that they receive in relation to the actual difficulties that they experience and the demands that the tasks place on them. In this context, learning is conceptualised as a process which is practically oriented i.e. where learners' practical experiences mediate the dispositions which generate their practices and perceptions.

(e) At the heart of the **achievement** aspect of the conditions for conceptualising feedback is the notion of students

(i) whose behaviour is a product of their practical relation to the conditions of their functioning and

(ii) whose success will be determined by the environment's potential to facilitate opportunities to select "between those organisational feature which enable one's communicative success and those which do not" (Lian & Lian, 1997, p. 1). In short, such a focus implies the necessity:

"to move away from conceptualisation of the learning process as that of recording of knowledge passed on from the knower to the learner, or from an expert to a naive person. Rather, its task is to meet the challenges implicit in the view that the process of learning is that of relating the old to

the new: a genuinely individualised understanding of learning directed toward facilitating development of principles for generating appropriate cultural behaviours." (Lian & Lian, 1997, p. 1).

The above logic leads to the construction of a language-learning environment which:

(a) focuses on meaning-construction and where, as a result, authentic text or material is the object of study from the very beginning. Here meaning is regarded as the product of constant processing. As a result, the primary focus of activity is on enabling learners to make sense of spoken and written linguistic and non-linguistic texts (e.g. listening and reading comprehension and non-verbal text too) with work on the "productive" skills too.

(b) enables learners to function as independently as possible whenever and wherever it is appropriate to do so - particularly where individual needs and personal objectives are to be met. This does not mean the disappearance of the teacher but a role for the teacher as advisor and resource person and as a counsellor for developing the necessary autonomy. This is particularly relevant in today's Do-It-Yourself world where people are clearly solving many of their problems by themselves and for themselves through the use of tools such as Google, social networks and other online support.

As a result of (a) and (b) above, the environment revolves around the notion of task taken in the sense of a complex, sometimes open-ended, set of ungraded activities revolving around a selected theme, e.g. "Create a Day on French Television". Such tasks necessarily involve learners in all 4 macroskills together with a requirement to understand the workings of non-verbal aspects of

communication. Progression and types of activities undertaken are established essentially by the student, in consultation where appropriate with a teacher or other expert support person belonging to their personal learning environment (Pineda, 2014), when each student is confronted with a specific macro-task (e.g. writing a script for a television game show) or with a specific micro-task (e.g. discovering how a game show host greets people on the show). Attempts to perform these tasks give rise to unpredicted and unpredictable demands on both students and learning environment as students discover what they cannot do. Thus, logically, the curriculum for this kind of course cannot be based on an arbitrary or norm-based (i.e. statistically-determined) progression.

While for some this environment may seem far too "uncontrolled" or "chaotic", it is in fact essentially self-regulating as learners negotiate their way through it in ways and at levels which are appropriate to the specific moment of their language-learning development (Lian & Mestre, 1985).

Not surprisingly, the system can be thought of as subverting traditional course design which usually insists on the setting of specific objectives and learning of "content" through the coverage of lists of topics, functions, notions, grammar points and so on.

However, if outcomes are assessed from a proficiency-oriented perspective rather than a content-oriented perspective which, in its more enlightened forms, takes account of the learner's personal objectives, the model is perfectly workable (Lian & Mestre, 1985).

A computer-enhanced language learning support system

The computer-enhanced language-learning support system (CELLSS) to be described below forms an essential core for the language-learning model just described. Without it, the model, while still valid, would be very difficult if not impossible to implement. While the system is very much the outcome of the above reflections it is also actually possible to use it in the context of other teaching/learning environments whose fundamental theoretical assumptions may be quite different.

Having said that, making any use at all of the system will necessarily mean that some of its built-in features will have to be accepted, even if the general pedagogic framework is not. There are at least three such features which are built into the system.

The first feature relates to awareness-raising.

Many, if not most, of the activities contained in the CELLSS revolve around the notion of awareness-raising i.e. (either consciously or unconsciously) bringing to the notice of students aspects of language at work which they might not otherwise have perceived and, furthermore, trying to do this in such a way that their filter/habitus is modified appropriately.

The second feature relates to load-lightening.

Lightening the load implies reducing the processing load through a variety of techniques thus freeing the brain/mind to attend to other matters. For instance, in the case of intonation, pronunciation and listening, electronic filtering will bring out the intonative, phonetic or psycholinguistic characteristics of sound patterns and help with their integration.

The third feature relates to feedback

Feedback is often regarded as a response by another person or computer system to some external production by

the student: e.g. an utterance or a piece of writing. While that happens in some parts of the CELLSS, feedback can also be conceptualised in a different way: that of learners refining their understandings through self-examination of linguistic and cultural phenomena in a variety of different ways, each of which sheds new light on the phenomena thus enabling them to modify or otherwise refine the ways in which they make sense of them. One can think of this in the following way: learners make assumptions or hypotheses about the meanings of phenomena and these hypotheses are either confirmed, rejected or modified as a result of new awarenesses relating to those phenomena. More awarenesses are then generated by comparing the phenomena to other related, or even unrelated, phenomena stored either externally, in a database for instance, or even internally in the learners' memory. It is a form of internal dialogue. This internal dialogue is of critical importance to sense-making and personal knowledge-construction as argued by supporters of dialogic approaches to meaning-making (e.g. Aukerman, 2013).

In that perspective, feedback does not need to be external, originating outside the learner, but can result from a learner's self-dialogue, or internal conversation, involving assessments, (re-)thinking and reflections of the meanings of observations or commentaries by self and others on specific phenomena.

The development of autonomy will help this dialogue to occur. Based on past experience with similar approaches (Lian & Mestre, 1985), autonomy development will occur partly as a result of interaction with the teacher (or other people), partly as a result of interaction with systems such as the CELLSS and, importantly, interaction with self.

In a more directly practical sense, a CELLSS such as the one to be described implies the ability for people, either singly or in groups, to do different things at different times in response to their needs. As a result, it attacks in a fundamental way the standard notion of "the classroom" as the privileged place for teaching and learning and as a place for synchronous pre-determined activity. In turn, this weakens the concept of fixed teaching materials supporting a pre-determined teaching programme. To be able to do different things at the same time people will require access to different materials for different purposes.

Thus, under this approach, the standard pre-programmed textbook (even with accompanying website) would ultimately disappear and would need to be replaced by something like sets of resources organised for free individual access in response to unpredicted/unpredictable activity. For maximum effectiveness, such resources could be stored and distributed in online databases (Lian & Mestre, 1985; Lian, 1996).

Figure 1 below provides a more detailed description of the general topology of a specific example of a computer-enhanced language-learning support system meeting the above requirements. It is currently under development by the author, his colleagues and his students. From a purely technical perspective, the system is meant to be accessed through the Internet and uses Open software, which is freely available at no cost. It is written primarily in PHP, uses a MySQL database management system and a Linux-based Apache Web server (although there are other options available for this). User interfaces are generated in a variety of ways and include the use of Javascript and Java applets and also capitalise on features of the HTML5 standard (ultimately to be moved to higher versions of HTML in due course).

Figure 1
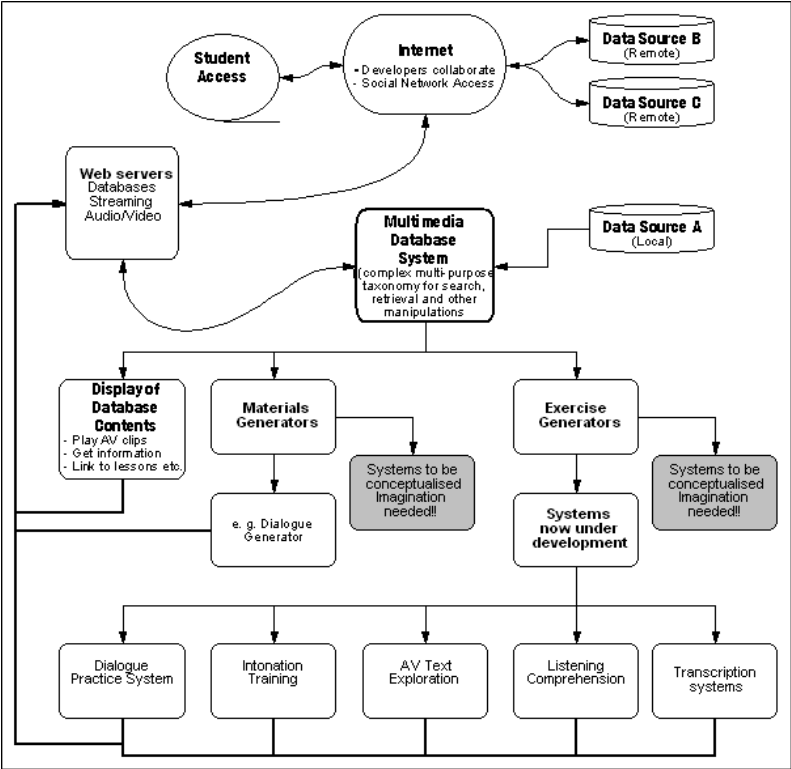
Beyond features already identified, an important feature of the system both pedagogically and technically is its integrated nature. It is meant to be part of a coherent pedagogic and technical environment which can grow and develop coherently in the spirit of individualisation and self-adjustment and does not consist simply of a set of disparate unrelated lessons, computer programs or other materials. In the same vein, the system does not force learners to follow pre-determined paths through its nodes. Instead it adopts a rhizomatic approach which gives users total freedom to access any part of the system from any point to any other point. For a fuller discussion of rhizomatic models, see (Deleuze & Guattari, 1987) and (Lian, 2004; Lian, 2011).

Another important pedagogico-technical feature is that the system is designed to be distributed and to grow in a dynamic, organic way as a result of students' interactions with it. It is amenable to collaborative development, thus constantly growing as new materials or comments are added, in the spirit of open software and, because of this feature, growth will occur at the lowest possible cost while maximising both learning and developmental access.

The growth potential of the system is considerable as is the potential for new research and original pedagogic thought. This potential is signalled specifically in Figure 1 through the use of the words "Imagination needed". This simply says that the system offers theoreticians and practitioners of language- learning, and students too, many opportunities for reflecting in original, interesting ways and worthwhile ways on the workings of language/culture learning and teaching. Now for some details.

At the heart of the CELLSS, and essential to all of its operations, is a multilingual, multicultural, multimedia database of authentic and pedagogic instances of language and culture in action (including non-verbals). Authentic language and culture events can take the

form of movies, interviews, soap operas, news broadcasts, advertisements, in fact any authentic language activity which has been recorded. Pedagogic material is, of course, teacher-prepared. Both types of multimedia materials can be stored either inside the database itself or externally in some other convenient (and shareable) space e.g. the "Cloud". Shareability is very important as the database is conceptualised as a dynamic and growing collection of materials and these resources are controlled, or at least heavily influenced not only by the database managers but also by a community of interested people including students, teachers, language and culture experts and non-experts, native-speakers and non-native-speakers of the language being learned.

While storage of and access to the multimedia materials are essential and critically important, no less essential are the following elements:

(a) a sophisticated taxonomy for classifying language and culture events. The current extensive taxonomy includes such categories as: functions, notions, topics, settings, power relationships between participants, and many more categories. Significantly, it also includes a gestural category and various fields for including comments by experts. Each example of language in action is classified in multiple ways using many of the taxonomy's categories. Where appropriate, the database also contains access and location information for the multimedia materials.

(b) the ability to retrieve and display information according to the taxonomy described above: a tailor-made search engine is therefore essential so as to enable highly refined searches.

(c) a way of displaying information quickly and enabling rapid Confront,

Contrast and Contest activities (A.-P. Lian, 2000).

(d) an interface system (an API) to enable other programs or applications to access the database for their own unpredicted and unpredictable purposes.

In its simplest manifestation, the database can act as a kind of dictionary, displaying examples of words, phrases and gestures in their audiovisual contexts. Functionally, however, it would act more as a kind of "reverse" dictionary. Most dictionaries are based on word lookups which students then need to contextualise. They often have difficulty in doing so as they lack the necessary cultural and linguistic knowledge to make appropriate choices. In the case of this new form of dictionary, the student might begin not with a word but a context and could then build back toward a word or phrase or gesture. Depending on the student's objectives, a search could be based not on word lookup but on a combination of words and contexts.

Two examples will help to clarify these points.

The student encounters an unfamiliar word phrase or gesture and wishes (i) to understand it better, (ii) to gauge how it is used in other contexts and (iii) to determine whether its meaning changes in subtle or major ways when the context changes. For instance, is the question "May I help you?" always an offer of assistance or does it have another function? When is it an offer of assistance and when is it not? How can you tell? The database would provide an answer and show actual use of the question in various authentic or realistic contexts.

The student wants to know what word or phrase to use in a specific context e.g. "What words or phrases should I use to greet my boss in an informal situation on the week-end?" A database lookup with

nuanced contextual information relating to power relationships and cultural practices will help. It will show not only a single response in the form of an example of language in action but provide a multiplicity of audio, visual and written texts with explanations to illustrate the rich range of interactions possible in this context. Furthermore, as the database is not restricted to any particular language, it would be possible to compare ways of solving this specific issue in a variety of languages and cultures, including his/her own.

All of the materials above can be supplemented with additional information in the form of comments from specialised and unspecialised social networking sites – and, furthermore, information harvested from these sites may also be stored in the database thus creating a growing resource for current and future students to tap into.

While this sophisticated dictionary function was a primary motivation for development of the database, it quickly became clear that the database could be used for many other purposes. As a result, the notion of the database as a single-purpose tool gave way to the notion of computer-enhanced language-learning support system, essentially a complex, self-adjusting, language-learning environment.

On-demand student-generated learning materials

A technical environment such as this one provides many new and often unexpected opportunities for supporting students' individual and equally unexpected learning needs (and as we saw above, opportunities to exercise our pedagogic imaginations). In particular, and quite notably, it provides an opportunity for departing from the standard teacher- or textbook-determined "pre-prepared" lessons which are fixed and arbitrary in

content and, inevitably, repetitious (i.e. the same material is always found on the same page of the textbook with no facility to adapt it to different contexts). In fact, if constructed properly, a CELLSS can enable students to generate their own lessons according to their own personal wishes and needs. This is an important development as, now, students are able to personalise/individualise lessons which they design for themselves (with expert help as necessary), and to create a highly-focused and responsive learning experience specifically tailored to their personal needs. This is made possible by the development of computer-based technology and a new curriculum model. It creates new opportunities for enhancing learning as well as many opportunities for conducting research in both on-demand lesson generation *per se* and its impacts on students.

Basically, an on-demand student-generated lesson is a lesson constructed by the students themselves, at a time when they need it, in answer to their personal needs and according to the points that they may wish to focus upon as a result of difficulties encountered in attempting to achieve communicative tasks. The notion is based on the straightforward understanding that students should be able to focus on what they actually need and not dissipate their energies on learning materials "just in case" they may need them some day. The spirit of this approach is also reflected in the strengthening notion of "just in time, just enough and just for me" pedagogy in today's Do-It-Yourself world.

Logically, building upon one's own lesson as and when one needs it is a much more powerful way of using resources than finding ready-made and immutable materials which may or may not meet a specific student's needs. Student-generated

materials, because they are under the control of the students themselves will, by definition, always meet students' needs provided the infrastructure itself does not impose limitations and provided students have developed the necessary critical skills to make valid judgments about what they really need as opposed to what they believe they need (actually an important area of research).

The following scenario will serve to illustrate. Several Australian students of French are engaged in a project called "A Day on French Television" where their task is to construct a realistic simulation of a normal day on French TV. As part of the project they wish to develop a typical French television game show and are specifically interested in how to open the show and conduct interviews of participants. These sub-tasks will require them to produce a series of "yes-no" questions and "information" questions. They are not quite sure how to do this. They interrogate the database for "French television game shows" together with "yes-no questions" and "information questions". The database returns a number of authentic recorded game shows which they can view at leisure which include many instances of "yes-no" and "information" questions that they are able to inspect individually.

They identify specific questions that they feel are appropriate for their purposes and that they would like to examine, perhaps practise further and possibly integrate into their task. In addition to the authentic examples found they also select pedagogic templates of "yes-no" questions which have been perceptually-enhanced and which will enable them to better perceive the intonation patterns of these questions. These pedagogic templates will offer more focused, optimised, models of questions designed to defeat the filter/habitus (listening habits) of Australian learners of French (how this is achieved is beyond the scope of this paper). The selected records are then fed into a lesson template which presents the material in a pedagogically interesting way which conforms with the principles of Awareness, Autonomy and Achievement (Lian, 1987) as well as Confront, Contrast and Contest (Lian, 2000; Lian, 2004).

Lesson templates can come in many shapes and forms. For this particular proof-of-concept system a template was developed which focuses on intonation and pronunciation (Lian, 2004). Ultimately, though, templates themselves and not just content should be under the control of the students too. This particular template has the following characteristics (see Figure 2 below).
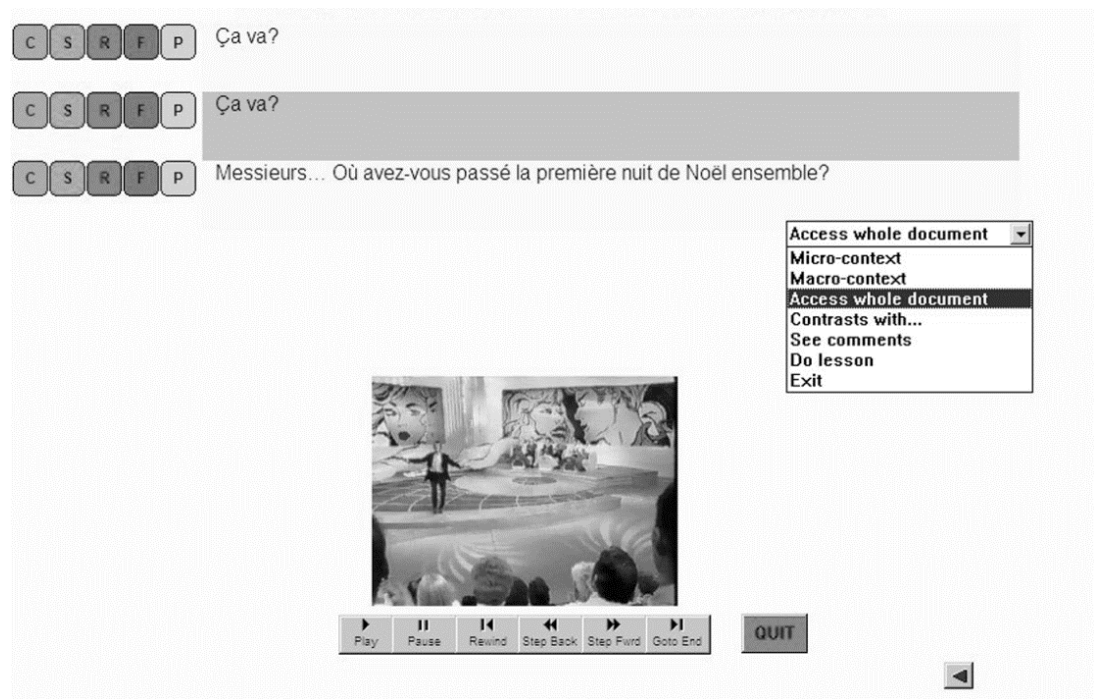
Figure 2. Learner-generated intonation excercises

Figure 2 shows the result of a student selection of "Yes-No" and "Information" questions found in a TV game show called ***Les Z'amours***, a French version of ***The Marriage Game***. All examples selected here by the students are of authentic utterances and do not include any pedagogically-manipulated intonation samples.

Each example is displayed in its own section of the screen. To the left of each example are 5 buttons whose functions are described below.

(a) The button marked **P** enables listening to the example utterance.

(b) The button marked **F** plays a low-passed filtered version of the utterance to enhance the perception of the intonation and reduce the processing load on the student (Lian, 1980).

(c) The button marked **R** allows students to record their voice.

(d) The button marked **S** allows students to hear their voice.

(e) The button marked **C** allows students to hear their voice embedded between two native speaker productions of the utterance (the original recording) in the following sequence: Native-Speaker voice – Student Voice – Native-Speaker voice. This allows students to make very rapid comparisons of their voices with that of the native speaker.

(f) Clicking on the utterance itself displays a description of the intonation pattern possibly with a graph of the pattern.

(g) Right-clicking on the utterance itself brings up a menu of choices enabling the student to

access the utterance in its immediate context (**Micro-context**),

access the utterance in a larger context (**Macro-context**),

access the entire document (**Access whole document)**,

contrast the utterance with other patterns (**Contrasts with**),

access a commentary about the utterance (**See comments**), or

connect to a lesson or other related activities (**Do a lesson**).

The purpose of these activities is to give students the opportunity to Confront, Contrast and Contest their perceptions/ understandings of the patterns being studied in many different ways, largely by assessing/re-assessing the workings of each utterance/pattern in various contexts and thereby changing the way the student perceives it. By selecting and isolating the utterance/patterns in different ways, it also gives students an opportunity to alter their processing load by changing at will the amount of context they are exposed to. At the same time, using different contexts enables a better understanding of the operations and meanings of the utterance/ pattern.

Significantly, while the system enables Confront, Contrast and Contest activities within each pattern studied, it also enables simple and rapid Confront, Contrast and Contest activities **between** the various patterns, thus strengthening the understanding of how the patterns work. They also give special attention to issues of grammar (Hermann et al., 2003) and context. Thus similarities, differences and variations are discovered.

While this template expects a significant amount of listen/repeat/ reflect activities, it creates no barriers either in respect of content or in respect of navigation, providing easy facilities to connect with other parts of the system as determined by the students (with or without expert assistance). This clearly illustrates the open architecture of template, system and pedagogy.

A typical set of learning activities might involve the following:

Students listen to each group of patterns (both filtered and unfiltered versions) to acquire a broad understanding of similarities and differences between them.

They select sets of utterances belonging to the same group (e.g. "yes-no" patterns) and study each set systematically and in-depth.

At various moments, they also contrast sets of utterances with others in the same group not only from the point of view of pronunciation but also from the perspective of the functionality of each utterance/pattern.

They then move on to the next group of utterances/patterns (e.g. "information questions") and repeat the process.

Finally they systematically compare the patterns between them (e.g. "yes-no questions" vs "information questions") and look up additional examples elsewhere.

While the above has assumed a systematic approach to the study of utterances/patterns, there is no reason to expect that this will always (or ever) be the case. Each student (with or without help) will deal with their own needs as they see fit or will seek assistance. Of course, while the system is conceived as open and rhizomatic in structure, it is possible to imagine, under a more closed curriculum, that a fixed procedure could be set in place by teachers, with or without consultation with their students.

Research perspectives

The advent of systems allowing students to generate their own lessons opens up new possibilities for learning practices and many research possibilities of a technical and/or pedagogic nature. Some of these are listed below but, like all research, some of the areas to be investigated are both unpredicted and unpredictable. Many are contingent on actual use of and experimentation with the system, the state of technology and the state of pedagogic thought. The following constitutes a short (and obviously incomplete) list of a few possible areas of study.

Technical issues

From a software perspective, what is the best way to enable the system to construct lessons?

In a practical sense, how does one collect and incorporate materials into the database system and how is it possible to connect the various pieces of the system?

What is the best way to empower students to construct their own templates? Should they use drop-lists? Should they use a scripting language? Should system managers use the same or different systems to create templates?

How can one best distribute lesson materials and obtain, at a technical level, content for lessons?

Pedagogic issues

How do students actually use the system? What assumptions/beliefs guide their behaviors? Does behavior change according to the material being studied?

How much guidance should students be given? Is there a contradiction between providing guidance and respecting difference?

How can students be educated to make personally valuable choices when constructing and using self-generated lessons?

What impact will the availability of student-generated lessons have on education in general and language-education in particular?

Conclusion

This paper has sought to introduce a powerful concept in the field of Computer-Assisted Language and Culture Learning, that of on-demand generation of individualised language-learning materials by students i.e. students create their own lessons according to their personal needs. This innovation is derived from two important developments:

The recognition of the individual nature of (language-)learning (as it is based on personal history) leading to the development of intellectual frameworks for language-learning which can make proper provision for individualisation and

The development of a computer-based infrastructure derived from (a) above and able to respond to individual student needs by enabling them to create on-demand (i.e. when they need them) lesson materials appropriate to their personal learning needs.

These developments, taken together, are steering the locus of learning/ teaching systems away from arbitrary content and monolithic pedagogy toward the development of dynamic, adaptive, systems responsive to individual needs. In so doing, in addition to providing opportunities for improving language teaching and learning, they open up new and rich research perspectives which will shed light on the theory of learning and teaching as well as providing opportunities for conceptualising computer-based infrastructures for language and culture learning in new and exciting ways.

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