

"SignOnOne": Visual language learning for the Deaf only or for all others also?

1 Introduction

"SignOnOne" is an online course for teaching English to deaf adults without any prior knowledge of English. As the deaf are barred from the acoustic channel, they need to receive all their information via the visual channel. For this target group, the respective project consortia first developed "SignOn!"¹ at a low intermediate level for deaf people who already know some English. Because the feedback from the target group demanded a course for beginners, "SignOnOne" was designed with some changes and amendments of what we call now the "SignOn-method": It uses sign language as the language of instruction (the users are provided with translations of the English sentences, words and phrases into the national sign languages of the project partner countries and some grammatical information, help, etc.). We do not describe the method in detail here ², but concentrate on the role of animations: the learning program in its "SignOnOne"-version includes animations to visualize the cognitive concepts within the English sentences. Each animation is linked to a sentence in the English text. The animations were developed based on the theory that languages are learned by watching or participating in "scenes" and "scripts" and "anchoring" the adequate language elements on these scenes and their elements.

The hypothesis is that - at least for some learner types - this possibility offered within ICT programs enhances language learning. Related to this hypothesis, linking the language to what you can see, feel or do, these animations could be of interest to all language learners.

2 Linguistic background: Evolutionary-cognitive perspective

From an evolutionary perspective the following assumptions are important for our theme:

- New systems or system elements in organisms develop on the basis of predecessor systems/elements;

¹"SignOnOne" as well as "SignOn!" can be found on the web at <http://www.signonone.eu>. Both projects were funded by the EU (SignOn! 2004-6 within the framework of the Socrates, Lingua 2 programme, SignOnOne 2008-10 within the framework of the Grundtvig programme).

² For a complete description of the SignOn-Method cf. Hilzensauer & Dotter (in press); for teaching written English to deaf people Dotter 2008.

- The properties of these new items cannot be deduced from those of their predecessors; i.e. new properties emerge which we describe by the metaphor of "evolutionary step". As a consequence, Cognitive Linguistics³ assumes that human languages emerged from their cognitive predecessors, which are the senses, the processing of their "impressions" in the brain and pre-language communication behavior. All primary language activities of any individual have to be "anchored" on the entries coming from the predecessor systems (later on, naturally, there is also considerable influence from language back to cognition, naturally). By that, language delivers important evidence concerning these predecessor systems, as there is:
- Biotic necessity leads to "representative homomorphisms" between the environment and organisms: environmentally oriented organic systems work simpler if they have non-arbitrary or iconic relations to phenomena in the environment, mediated through the organisation of the senses, naturally. This is valid for the cognitive processing and memory of environmental phenomena, including language.
- Drawn back from language structures as well as findings from research on primates and other mammals, we can assume that our species perceives its environment as "structured scenes" (Schank 1972) or "structured cognitive gestalts" (Lakoff 1977) which can be combined to "process-/action- sequences"/"scripts". This happens - from the perspective of Constructive Realism (cf. Wallner 1992) - in the individual cognitive system on the basis of its interaction with the environment and constitutes every single/individual "reality" stored in the brain which - by socialisation and exchange - leads to an at least partially common one.
- The relationship between preverbal cognitive elements or structures and language coding elements or structures is neither bijective nor surjective. Nevertheless this relationship shows "rules" or "structures" which we may also call "strategies of coding". These strategies develop rather "naturally", but diverse, taking all human languages, on the basis of structure and working principles of our organism, necessities of learning and communication as well as economic principles.
- Perceiving and processing the world in "scenes" affects coding in languages directly: sentences (as structured language gestalts) have a relation to scenes (as perceived structured gestalts), phrases relate to roles of participants in this scene or to localisation in space and time, word classes relate to different qualities of perception (e.g. action, object, property).

³ "Cognitive Linguistics" is used by several scientific models; cf. Evans & Green 2006 or Wildgen 2008. The difference to some "cognitive linguistic" approaches in the tradition of Generative Grammar after Chomsky has to be stressed, however.

- Both cognitive processes and language allow the "transfer of concepts" from an original area to new ones: metaphorical coding is one of the major advantages of human language because it allows a high degree of flexibility against the environment, originally starting from very simple, concrete concepts (cf. the hypothesis of "embodiment" by Lakoff/Johnson 1999).

3 The SignOn-method

As mentioned above, we will concentrate on the connection between animations and learning English for the deaf target group. Concerning this part of the learning program, the artists doing the animations were asked only to animate the elements present in each sentence, no more and no less, in order not to create too much bias by producing too rich animated scenes (avoiding any so-called "stage decoration" in order to make the animations more pleasant).

3.1 Learning strategies to be applied by users

These strategies relate to several principles well known in foreign language learning, like

3.1.1 Stay in the target language as much as possible

Briefly, this means not always to "think in ones mother tongue" and then to translate what one conceived in one first language into what is necessary in the target language. On the contrary, one should try to conceive texts from scratch in the target language, avoiding the use of ones first language as far as possible. We can connect this strategy to the cognitive perspective easily: in terms of "anchoring" the new language on ones perception/cognition means that learners should not use their first language anchoring as a "bridge" to the new language but that they should try to build new direct connections between their perception/cognition and the elements/structures of the target language; i.e. "anchoring" the new language to cognitive contents independently of their first one.

3.1.2 Learn "like a child"

A child is exposed to language many hours a day. (S)he tries to filter sound (or sign) strings out of the speech chain which it can relate to some of its cognitions (we will not go into the whole theme of ontogenesis of language here), adding new language elements every time that already known relations between language elements and cognitions allow this. In this way they develop networks of words and of word sequences (slowly accompanied by word form changes for various purposes); many repetitions allow the automatization of production of certain language

units related to respective cognitive units.

In analogy to ontogenesis, the adult learner in SignOn should also try to keep to immersion (= stay in the new language), making efforts to find relations between certain language elements or structures to certain elements or structures to be found in the animations (i.e. the simulation of scenes to be perceived in reality). Having identified some elements, the learners should repeat going through the same "experience" (= looking at the scenes again and finding out further elements or structures). Repeating also assists with sustainable cognitive anchoring of already learnt elements or structures.

3.1.3 Discover language through cognitive concepts and their relations (scenes)

By trying to relate language elements/structures to cognitive content (i.e. an at least partially preverbal "understanding" of perceived processes, actions or states, etc.), the new language and its lexicon and grammar networks are memorized by establishing relations to directly perceivable or cognitively stored non-verbal elements or structures. This helps to reduce the bias of the first language which emerges from learning by translating utterances from the first language - where they are conceived - to the target language (we do not want to exclude such strategies which are also valuable for contrastive reasons or common e.g. for vocabulary learning, but their influence should not be too great).

3.1.4 Discover the concrete units of the target language yourself

Looking on a scene and finding out the relations between the language elements/structures to the elements/structure of the scene bit by bit, the meaning/function of the former can be detected by the learners when performing several attentive cycles through the same material. Naturally, in order to make that possible, in everyday reality the dialogue partners of language learners offer several communicative strategies which we know as "motherese" for children in ontogeny and as "foreigner talk" for people seeming to have another mother tongue than ones own one. These strategies could be at least partially modeled by a learning program; for SignOnone it was not possible to realize examples for that because of the budget restrictions.

3.1.5 General restrictions to the proposed learner strategies

Due to the differences between pre-verbal and language-related cognition, there are some limitations to the method itself which cannot be avoided:

- Visual representation of language (content) by animation of hypothesized visual cognition/memory is just an approximation of the content of a text; e.g. - related to the interplay of cognition and language - you cannot represent a specific sentence out of a

set of semantically identical or similar, but syntactically different sentences. This means that the respective variations within a language have to be learned by experience which would be very complex to include into the learning program (but not impossible, naturally).

- Animation without any language is almost not possible or very difficult/time-consuming. As we are living in cultures with languages (e.g. containing names e.g. for persons or places) and are surrounded by written language, we would have to reconstruct the whole language learning process which children pass through in a learning program which is not impossible, but practically non-affordable and probably unacceptable to users.

3.1.6 Practical restrictions in terms of use of the learning program

A "pure" application of the strategies mentioned above would take a lot of time for this "learning by discovering" and would create high costs for learning software/materials as well. Therefore some "short ways" for discovering the new language are offered, mainly translations of words, special phrases and sentences of the target language into the first language of the learners. However, the learners should be motivated to use this help not excessively but just in order to overcome a certain difficult point (we can compare that to what is done with crosswords or computer plays and existing complete solutions: Looking into the solution always spoils the fun of playing).

3.1.7 Practical restrictions in terms of project budget

Despite the restriction of the budget to 7000 Euros, the Czech animation group⁴ did a great job which would be really worth an award. Nevertheless, we had to agree upon several pieces/thoughts not to be realised because the budget was too low (e.g. to represent what could be shown as a process simply by a word). This means that the concept of animations cannot be shown in its full possible extension in the examples now to be found in the course.

3.2 Adaptations for the target group

Additionally to the strategies just presented, the SignOn-method offers adaptations for the needs of deaf learners, which especially means that sign language help (= help in the first or preferred language of the target group) is always available. This enables deaf people - who have often had bad experiences with schools/teachers not adapting to their information/communication wishes -

⁴ Radka Faltinova (drawing pictures, scenarios), Robin Horak (technical part), Ilja Rajdova (scenarios).

to go back easily to their first or preferred language if there is any question they do not want to solve by target language use only. On the one hand this is just to make the learning more comfortable for people who often suffered from an inadequate learning environment, on the other hand this is a possibility demanded by certain learner types in general (which we may characterise as "rule learners" or "information/explanation based learners" in contrast to more "inductive" or "immersion" learners).

This type of "learning assistance" especially for persons with no or bad experiences from their educational career could be easily adapted for other target groups than deaf people, naturally.

4 The broader context of visual representation or learning ("neighbours in thinking")

There is a lot of "visual(izing)" devices or respective theories; functions ranging from data visualization, e.g. by "picture language" as invented by Neurath (cf. the 2010 publication of his unpublished work from the 1940s), to the identification of 'primitives of visual cognition' as "Visual language of design" in architecture; cf. Leborg 2006 and to visualization of complex circumstances or knowledge representation (for examples cf. <http://www.visualcomplexity.com/vc/>).

All of these descriptions/theories - some of them known for a long time already, can somehow be set into relation either to cognitive processes in general or to a cognitive perspective of language learning. However, differences in the function or meaning of notions used like "language" have to be stressed: Leborg e.g. states that he is giving a "grammar of visual language"⁵ where "language" cannot be understood in the sense of linguistics (analogue to the notions "body language" and "picture language").

5 Results

At the start of work there was some doubt and resistance against the whole enterprise, which was - after some hot discussions on the theme "How would you propose to represent X?" - followed by the creation of some "routines" for representing different "categories" of situation, or content. As mentioned before, the low budget led to some compromise between possibilities/creative ideas and realisation, naturally.

In trying to visualize different sorts of communicative settings or acts, we are either confronted with general difficulties resulting from the evolutionary advantages of language (compared to its

⁵ Cf. <http://www.vanseodesign.com/web-design/visual-grammar>

predecessor systems), or with difficulties in terms of creative/adequate representation. To begin with the latter:

- Thinking (hypothetical speaking)/plans can be represented as it is done in comics (by bubbles at the head of the thinker showing what is going on in his/her brain)
- Indirect speech/writing can be represented by 'transitively chaining' the real speaker/signer to what (s)he is reporting from the other speaker, e.g. by zooming in or also using some bubbles.
- Aspect (e.g. finishing) would require parallelization of scenes or some other special provision of relations between e.g. two actions/events.

Turning to the more 'inherent' possibilities given by language, we find:

- Names: They (except of so-called 'telling names) have to be given as themselves, i.e. by written language, naturally.
- Questions: They can either be represented by the respective typographic sign ('?') or could be changed into interactions like "I want to know ..." which, however, is not completely the same as a question (identical with a question only when it is used as an indirect speech act).
- Time (relations): They can easily be represented by clocks (which we interpret as language-dependent) or - in case of relative time - rather inadequately by some relations of actions/events.
- Complex relation between actions/scenes (in languages coded by words with meanings like e.g. 'when', 'though', 'but'): This seems to be very difficult, if not impossible.
- Metaphors: This seems also to be very difficult, if not impossible.

A special case is 'context' or 'situative' information in general: Which provisions have to be given to a learner in order to make him understand the framework of any communication (e.g. knowledge of cultural rules or of the 'brain content' of the represented speaker/signer - e.g. expectations, wishes - which makes him/her exactly acting as (s)he does) ? This issue was left out of the project.

6 Prospects

"SignOnOne" could be used as a tool for testing whether a visual "scenic representation" of what happens in a sentence helps with multimodal memorizing as well as with "naturally analyzing" texts along visual perceptions. If the assumptions of cognitive linguistics are true, it should be possible to verify this also for hearing subjects. If the verification was successful, the

SignOn-Method could be adapted for any language as an additional source for "visual learning"

⁶.

In the case of positive test results, the strategies of animations should be further refined. There could also be software solutions facilitating the analysis processes of the learners, e.g. providing annotation of animations, easy switching between areas of analysis (text-lexicon-grammar) and inserting/saving notes/learning results.

Additional animations could show the relation of an animated scene to concepts, their sequencing and other content/context signals (including pragmatic information). Animations can also be used for contrastive language analysis and grammar explanations.

7 Invitation

Both courses can be used free of charge. Interested people are invited to contact us (franz.dotter@uni-klu.ac.at) if they aim at producing either additional English lessons or adding a new sign language to the existing ones. Further software development (under a Creative Commons agreement) would also be very welcome.

8 References

- Dotter, Franz (2008): English for deaf sign language users: Still a challenge. In: Kellett Bidoli, Cynthia J. & Ochse, Elana (eds.): English in international deaf communication. Bern etc.: Lang, 97-121
- Evans, Vyvyan & Green, Melanie (2006): Cognitive linguistics: an introduction. Edinburgh: Edinburgh University Press
- Hilzensauer, Marlene & Dotter, Franz (in press): The "SignOn"-model for teaching written language to deaf people. To appear in: Proceedings of the 9th International Conference on Education and Information Systems, Technologies and Applications: EISTA 2011
- Kendon, Adam (2004): Gesture: Visible Action as Utterance. Cambridge: Cambridge University Press
- Lakoff, George (1977): Linguistic gestalts. In: Papers from the regional meeting. Chicago Linguistic Society 13, 236-287
- Lakoff, George & Johnson, Mark (1999): Philosophy in the flesh: the embodied mind and its challenge to western thought. New York, NY: Basic Books
- Leborg, Christian (2006): Visual grammar. Princeton: Princeton Architectural Press
- Neurath, Otto (2010): From hieroglyphics to Isotype: a visual autobiography. London: Hyphen Press

⁶ We do not elaborate this here, but we think that sign languages as visual languages should be considered intensively in the field of visual learning. Cf. also the close linking of gesture and spoken languages as described e.g. by Kendon 2004.

- Schank, Roger C. (1972): Conceptual Dependency: A Theory of Natural Language Understanding. In: Cognitive Psychology 4, 532-631
- Wallner, Fritz (1992): Acht Vorlesungen über den Konstruktiven Realismus. 3. Auflage, Wien: WUV Universitätsverlag
- Wildgen, Wolfgang (2008): Kognitive Grammatik. Berlin/New York: de Gruyter