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Just-in-time Grammar
Writing an on-line programme: first time experiences

In the following article we shall explain how our experience as language teachers¹ and our pedagogical concepts have informed the content design of an online revision tool for German grammar. In the first part we will outline the thinking behind the programme, including a short discussion of current trends in e-learning used for computer assisted language learning (CALL). In the second part we will describe how our work on this project has developed our ability to meet the specific requirements of e-learning language materials: how to get from paper based exercises to electronically implemented revision, or how to get from p-learning to e-learning.

The starting point for our project to produce an on-line tool for German grammar revision was very much driven by our recognition of students’ need for more practice. The advice given almost indiscriminately by teachers to their students is "You need to revise your grammar". This in turn often leads to frustration and despair: Where to start? Which bit of grammar should I begin with? These problems informed our idea not only to devise a tool for grammar practice but also to help students diagnose their specific needs.

¹ We are both Senior Language Teaching Officers at the Department of German at Cambridge University. We have co-authored a revision book for advanced German grammar (Upgrade Your German, 2003).
As experienced teachers of German we identified those grammar areas which we knew to be error-intense. However, rather than recommending a particular grammar topic to individual students we believe it to be more pedagogically sound (and more effective) if the students can identify the area themselves. For this reason we needed to develop diagnostic exercises which could point the users to the relevant grammar area(s).^2

We think that the diagnostic exercises have two effects: firstly, the student is not faced with a seemingly insurmountable task (must revise grammar!) as the programme apportions ‘grammar’ into more easily digestible units, and secondly, if the user recognises the need for the revision of a particular grammar topic (because he/she can not complete a certain diagnostic exercise) the student will be better motivated and the revision therefore more effective.

It became clear that the programme would have to be designed to tally with the following pedagogical theses in order to maximise motivation:

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^2 In this sense the programme runs counter to a trend identified by Britain, Liber 2004: “There has been widespread implementation and increasing use of Virtual Learning Environments in UK HE and FE institutions, but the evidence suggests that ‘pedagogical issues… have been of secondary concern’ in this process.” Quoted after http://www.jisc.ac.uk/whatwedo/programmes/elearning_pedagogy.aspx
1. The students must be able to recognise the relevance of the exercises. This resulted in the design of two distinct diagnostic units.

2. The students must be able to create their own path through the programme. This resulted in the non-linear structure of the programme. The various grammar areas can be done in any order, and the exercises can be discontinued at any stage, or else skipped entirely.

3. The students must be able to understand the connectedness of the different grammar areas in spite of the non-linear approach to further grammatical understanding. This resulted in the programme’s indexing system: when working on one grammar topic the user will be made aware of other related areas on demand.

4. The students must be able to use the programme independently. This resulted in the design of the built-in feedback: it is informative rather than being structured on a right/wrong basis, and is staggered, and referring users to further explanations. This directive also resulted in the design of a test and of a learning map: students can test their acquired skills and know which exercises they have completed and which they still have to do. Effectively, the programme remembers individual users.

In this sense, the programme is autonomous and interactive. It is autonomous in that the user can determine which exercises to do, when, at what speed, and how often. It is interactive in that the programme allows the user to switch between units and to ask for further information.\(^3\)

According to Warschauer, within an integrative approach to CALL, programmes “will never try to do anything that a book can do just as well” (Warschauer, 1999). The functions performed by the programme which a textbook can’t do are:

- diagnose problem zones,
- provide instant feedback,
- allow students to obtain further grammar information on demand,
- animate grammar rules visually,
- present texts as audio texts,
- provide translations of all vocabulary items on demand,
- automatically note which exercises have been completed and which are still to be done.\(^4\)

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\(^3\) For definitions of the term *autonomous* and *interactive* in the context of computer assisted language learning (CALL) see Tschirner 1999, Roesler 2000, and Hess 2006a and 2006b

\(^4\) We think that we cover most of the directives for good practice outlined by JICS:

In learning
- Routines of organised activity
- Clear goals and feedback
- Individualised pathways and routines, matched to prior performance

In teaching
Based on the idea that students need to learn about grammatical cohesion in order to avoid mistakes, we have developed two diagnostic units. The first one is text based and its prime function is to inform the user about how individual grammatical units of a text are interconnected with other units and are therefore determined by them. The programme demonstrates this in a minimum of six steps: a text is presented and by clicking on a particular word, all other words grammatically linked to this word are highlighted in the same colour. These ‘links’ include: agreement of subject and verb (number, case, conjugation) agreement of adjective and noun (number, gender), agreement of noun and proforms (number, gender, case).

The student has to identify all words linked to selected words nominated by the programme. In the next step, the student is shown the grammatical consequences of changing one element within a text.

This is an authentic situation as students often rewrite parts of their texts without remembering to make all the necessary changes resulting from this

- Task analysis into component units
- Progressive sequences of component-to-composite skills
- Clear instructional approach for each unit
- Highly focused set of objectives, described as learning competencies.
In assessment
- Accurate reproduction of knowledge or skill
- Component performance
initial change. After this students make the necessary changes themselves. They may need to change a masculine noun into a feminine noun, for example, or a verb taking the accusative into one taking the dative. In the last step, students can compare their corrections with the programme’s specimen solution, in which all necessary changes are highlighted. In cases where the changes are not understood, help is at hand: a symbol representing a chain (to further stress the idea of a link) can be dragged to an answer which is not clear to the student and, by using a pop-up speech bubble, the programme will point out the grammar topic most relevant for the answer. At this point the student may be satisfied, or he/she may wish to know more. Rather than leaving the diagnostic unit the student can put this grammar topic into a virtual shopping basket by clicking on the option ‘mark in learning map’ thereby guaranteeing that the related grammar exercises will appear on his/her individual shopping list for revision, called the learning map. The steps in this sequence can be summarised as: demonstrating the principle of grammatical agreement, testing this knowledge through applying the rules, referring to grammar exercises within the programme on demand and motivating further exercises.5

The second diagnostic unit consists of ten English sentences which have been translated into German. It works on the same principles as the first unit, but here the task is to find alternative versions to the given answers by making changes. Again, this is an authentic learning situation as students need to see that translating does not mean finding the one correct answer but rather that various alternatives may be possible. Students need to type in the required changes and again, in case the answer does not correspond with the one provided by the programme, the student can find out about the grammatical topic relevant for the answer and can mark it on the learning map.

5 This is in line with Hess’s idea of an ideal learning environment: “Ideally, the learner is able to determine his or her own learning dispositions and needs and, on that basis, select appropriate study material” Hess, 2006a
According to Hess (Hess, 2006b: 320) learners responded most positively to those IT based exercises which could be characterised as ‘efficient’. Just as in their daily use of the internet, what students appreciate most is the efficiency with which IT can help to perform tasks. What they look for in IT based exercises is the same: the speeding up of their learning routines, and the elimination of any superfluous tasks. This is precisely the idea which gave the programme its name: ‘Just-in-time Grammar’.

In the second part we will describe the process of turning paper based ideas for grammar teaching and learning into instructions for programmers.

Presenting grammar through changing visual stimuli to aid clarification and comprehension, and to facilitate memorizing and learning, is not a new concept. One of the most basic visual stimuli for printed text is the use of coloured or differently formatted sections of text to highlight their content. In a computer-based language learning programme, the possibilities of employing visual stimuli are considerably widened. The presentation of traditional language learning exercises gains a new dimension by exploiting the scope of the digitalised medium and its quick learner feedback facilities. To name but a few such possibilities which we have used in ‘Just-in-time Grammar’: highlighting text or sections of text or highlighting grammatical differences, for example, in tables: the logical connections between different declension systems can be made apparent through the highlighting of word endings, for example in adjectives in a table at the click of a button.

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6 For a more detailed evaluation of effective on-line tasks see Tschirner (2007) p.3
Animation of parts of words is another possibility. At the click of a mouse, the German possessive pronouns ‘sein’ and ‘ihr’ change into their English forms ‘his’ and ‘her’:
Learners can use help tools such as an electronic highlighter pen which learners can use to ‘mark’ words in text (see below), textual markers such as coloured arrows, drag and drop boxes, sorting exercises. This easy, but visually intensive sorting exercise helps to memorise the most common endings of a special group of nouns in German (weak masculine nouns):
In the following, we want not only to describe by way of examples some of the exercises we wrote, their function and how they appear on the screen, but also to show how when they were implemented by a technical team in the University of Cambridge Language the final product differed from our original conception. The point we are making here is an obvious yet essential one: either the writer of an online computer programme is also a wizard in computer programming and design, or he/she must be able to rely on an expert team who can implement what he/she has written.

We started off with a few briefing sessions with the Language Centre's staff. First, with the Director of the Language Centre, Anny King, who led some extremely productive and instructive brain-storming sessions on how the language learning process might best be supported through CALL and how visual (and other) stimuli or visual representations might be designed in the context of a CALL programme. In consultation with the technical team, led by Christoph Zähner and Jan Wong, we decided that the content should be presented 'screen by screen' and that the instructions given to the programmers should be colour-coded. In the final version of our content adapted for on-screen presentation the instructions for the programmers had become much more elaborate. From that point there were few questions from the technical team, who, after implementing the programme's functionality, passed it to their graphic designer, John Wilcox, who produced the product now to be seen on screen. The instructions we provided were apparently clear and easy to follow. The technical team have commented that what they appreciated most was that the paperwork they were given was complete with very clear instructions which along with accuracy and a strict adherence to the
concept of screens had made the online development of 'Just-in-time Grammar' a much more straightforward task than is often the case. Given that we had never written the content for a computer assisted language learning programme before, we think this was a very encouraging outcome.

The example we would like to use from the menu of ‘Just-in-time Grammar’, to describe the process of writing CALL exercises is ‘Verbs taking a dative object’. As mentioned in the first part of this paper, the selection of grammar areas for the programme’s menu was based on our experience of the areas in German grammar which tend to cause problems for the learner. Verbs taking a dative object form one such area: these are a large group of verbs which do not take a direct object, but only an indirect one, whereas most German verbs take a direct as well as an indirect object. With a number of these verbs, translating them into English does not help, as they take a direct object in English. Examples are for instance such common verbs as ‘to help’, ‘to thank’ or ‘to follow’. Thus these verbs are a stumbling block for learners, not only on the production side of the language, but also on the comprehension side. Given that German word order is more flexible than English, with its fairly rigid subject-predicate-object structure, and that German word order allows, for example, the dative object to come first in a sentence, a place where an English native speaker naturally expects the subject, the scope for confusion is fairly high. Additional complications might arise from the fact that endings on a dative object in the plural can look deceptively like a plural ending in the nominative. In short, there was a strong case for including verbs taking a dative object in the menu for ‘Just-in-time Grammar’.

This group of verbs appears in some German grammar books simply as a list to be learned\(^7\); in others, the verbs are grouped into sub-categories, as in the standard grammar book for advanced learners of German, Hammer’s German Grammar and Usage\(^8\). Our thinking was that with a computer assisted language learning programme these sub-categories, of which we identified three main ones, could be presented in a more visual way, which should help the learner at least to be more aware of these categories and ultimately, to learn these verbs and their special usage. The section ‘Verbs taking a dative object’ became in the end the longest in the programme with 22 screens, divided roughly half-half between learning and practice screens. The exact content of each screen can be seen in this overview.

**Overview over ‘Verbs taking a dative object’:**

(L = learning screen, P = practice screen)

<table>
<thead>
<tr>
<th>Screen / Content</th>
<th>Type of screen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject 1: Verbs taking a dative object</strong></td>
<td></td>
</tr>
</tbody>
</table>

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\(^7\) See for example, Dreyer /Schmitt (1994) p. 63f; or, for beginners: Reimann (1999) p. 195.

1.1. introduction to subject, drag and drop into text
1.2. introduction to subject, identify dative objects in text
1.3 gateway screen, sort verbs into 3 categories (drawers)
1.4 category (= drawer) 1 verbs, put prefixes to verbs
1.5 category 1 verbs, remember cat. 1 verbs
1.6. more category 1 verbs
1.7 more category 1 verbs, match prefixes to verbs
1.8 more category 1 verbs, insert verbs into sentences
1.9 more category 1 verbs, insert verbs into text
1.10 category 2 verbs, multiple choice
1.11 category 2 verbs, put verbs and dat. objects into sentences
1.12 more category 2 verbs
1.13 more category 2 verbs, highlight dative objects
1.14 category 3 verbs, translation of sentences
1.15 more category 3 verbs
1.16 more category 3 verbs, match verbs with translation
1.17 more category 3 verbs, match verbs with translation
1.18 more category 3 verbs, particular grammar point
1.19 more category 3 verbs, mixed exercises
1.20 final test, identify verbs and dative objects in sentences
1.21 final test, know appropriate verbs for translation
1.22 final test, identify and correct mistakes in sentences

This does not appear in the programme, but was written for our own and the programmers’ sake, to have a clear idea of the content of the topic. Likewise, the schematic table which makes learners’ progression through the topic clear: after two introduction screens, learners get to the so-called ‘gateway screen’ where they have to sort a number of verbs taking a dative object into three categories. The learner can then follow two levels of exercises for each category.
As can be seen from the schematic overview, at first it was planned to make the exercises for all three categories of verb a compulsory stage, before learners could proceed to the test. In the interests of learner autonomy, however, it was decided to give the learner equal and instant access to all three parts of this topic, introduction, exercises and test. Learners are introduced to the subject by a text on a familiar topic, the Love Parade in Berlin.
This text contains six verb + dative constructions and it is the learner's initial task to drag and drop either dative objects or verbs, or both together (as unit) into the text. Dropping the ‘right’ words will turn them green and they are accepted by ‘their’ box, whereas the wrong ones will bounce. The aim here is simply to raise and/or reinforce the awareness of verbs and their dative objects. As an aid which in effect gives the answers, the text can also be heard: clicking on the ‘Audio’ button not only activates an audio version of the text being played but also, as an additional stimulus, a series of pictures of the actual event in Berlin appearing to the left of the text.

The next screen is a follow-up screen, with the same text now appearing as a whole. In the previous screen the dative objects or verbs taking a dative object had to be dragged into this text, now the verbs, when clicked on, appear as a group in the menu and in colour (each in a different one) in the text. The learners’ task then is to identify the dative objects ‘belonging’ to each verb by means of a mouse-guided highlighter which has the same colour as the verb. Alert learners will have noticed on the previous screen that the dative objects in this text consist of noun phrases (i.e. the noun with determiner, adjective etc). To reinforce this point, in the initial stage the number on the highlighter is the same number as that of the words forming the relevant dative object. As those words are identified one by one, the number on the highlighter goes down until it reaches zero, which is when the highlighter itself loses colour and becomes grey. It has, so to speak, run out of colour and its job is finished.
The verb ‘folgen’ has been clicked on in the menu and has turned green in the text. The learner has successfully identified its dative object (‘dem VW-Bus’) with the highlighter which has now turned grey again and shows ‘0’ on its back. This is a playful and attractive way of showing that the valency of the verb determines the grammatical form of its object which can be unequivocally identified. On the following screen the verb ‘klar sein’ has been clicked on as well and has turned red in the text. The learner has not quite finished the job: Two words of the dative object have already been identified (‘den schärfsten’), but one remains ‘Kritkern’, and the highlighter indicates this.
The way in which these two screens were first presented by the writers for implementation is very different from how they look on the screen now. Design and colour present the text in a much more visually attractive and accessible way than it could have been done in a plain text. Highlighting part of text is one of the most tried and tested visual learning aids. Here, the learner can interact with the text in a way which would be impossible with a plain written text.

Next, the learner comes to the gateway screen. This is the central screen for the whole topic. Learners are asked to sort a number of verbs taking a dative object into three boxes which symbolise the three main categories into which these verbs can be divided. The original ideas for this sorting process were more elaborate than what could in the end be designed for the screen. Attractive ideas such as ‘picking verbs off a conveyor belt’ were abandoned as well as the image of a big box full of verbs taking a dative object all jumbled up standing in the foreground, from which they have to be sorted into a chest of drawers. These proved too elaborate to design. But the basic concept, of having a strong visual image to represent the three main categories has remained intact, and we see three big boxes on the screen: the image here is that of old-fashioned index cards in their boxes.
The verbs at the bottom of the screen, some of which the learner has already encountered in the introduction, need to be sorted into those boxes. The boxes will 'accept' the right verbs, but reject the wrong ones. It can be argued, of course, that by simply 'trying verbs out' and playing about, learners will eventually get every verb sorted into the right category even without knowing much at all. This is true, but the idea behind this is that the sorting process itself aids the learning process, or at the very least, aids a process of raising awareness that these categories exist. For the first category box, on the left, the distinguishing factor is that verbs with certain prefixes often take a dative object. When the 'right' verb gets put into this box, the prefix turns red, thus drawing attention to itself. In addition to this, the translation of the infinitive form of the verb appears in turquoise underneath (this happens with every verb that is sorted into the right box). After completing this process, the learner can choose to do a number of exercises for each category, which are graded in difficulty. These come up when the 'exercises' and then the 'more' buttons are clicked for each verb category. The turquoise arrows point toward the exercises 'behind' the boxes.

To stay with our example, 'Verbs with certain prefixes' is followed up with another sorting exercise; this time the learner has to sort a wider group of verbs with prefixes into two boxes and remember the prefixes that indicate a dative object.
Again, this can be done by trial and error, and again, we maintain that even an activity like that can help create an awareness of these categories and facilitate memorizing them. The exercises which follow stay focussed on prefixes,
up to a last exercise which is designed to test production: the learner needs to write into a text both dative objects and verbs:
As an aid, the whole text appears in its English version at the bottom of the screen and, for each object, the German nominative singular form is given in brackets the text. For the verbs, learners can click on the red help button (the one with an eye on it) and then a list of all the verbs needed for this exercise comes up, presented in a strong visual form, with a bright red background. The message is clear: if you haven't yet learnt them, you’d better start doing so now!

Our learner feedback to date has been very positive, and we are hoping to make this programme accessible to language teaching institutions free of charge. Our only condition will be for these institutions to send to us a detailed questionnaire in return for one year’s access to the programme. Access will then be extended. We hope to use the evidence from the feedback to apply for funding to support the development of a the second phase focussing on advanced grammar topics such as word order, passive and the subjunctive.

REFERENCES


JICS: Designing for Learning: An update on the Pedagogy strand of the JISC eLearning Programme
http://www.jisc.ac.uk/whatwedo/programmes/elearning_pedagogy.aspx


