

Enhancing e-learning through supplementary offline material

Tobias Unger^{1,2}

¹ Tobias Unger; IAA, University of Marburg; Wilhelm-Roepke Str. 6d, 35032 Marburg, Germany

The advantages of e-learning have been discussed and defined extensively; however, this also holds for its disadvantages, e.g. the Lost in Hyperspace phenomenon, reading on the screen, print-and-run behaviour of students, and a few others. Can supplementary offline material decrease these problems and thus enhance e-learning? Educational Software has often been supplemented by offline material such as workbooks, readers, additional articles, etc. Undoubtedly, using supplementary offline material helps to reduce the 'reading-on-the-screen' problem and it helps the students to take notes or complete tasks. But which kind of offline material is useful to enhance e-learning? How must it be layouted and structured? How can the complexity of non-linear text and multimedia elements be transferred into a linear and static format? What are its benefits? Some of these questions recall a similar process that was discussed about a decade ago: Hypertextualisation – the art of writing and designing hypertext (hypermedia) for educational purposes. With respect to using offline material to enhance e-learning, we now might argue for a reverse process: De-Hypertextualisation – the art of converting online material (especially multimedia applications) into a linear and static format to supplement (not substitute) the online content. Experiences, strategies, and various examples (taken from the Virtual Linguistics Campus; www.linguistics-online.com) will be introduced and a theoretical approach to de-hypertextualisation will be discussed.

Keywords De-Hypertextualisation; Print-Material; Virtual Linguistics Campus

1. Introduction – Problem Definition (Why?)

The Virtual Linguistics Campus (VLC; www.linguistics-online.com) currently offers numerous courses in applied and theoretical linguistics. Furthermore, a complete Online BA is going to be offered by the end of 2007. The e-learning platform was set up in 2001, has been constantly revised (with respect to its content and didactical design), new courses have been embedded, and old courses updated. More than 2000 students from various countries have successfully completed different courses and Universities from all over the world have made use of the materials and courses found on the VLC. All courses are designed to be either used additionally to in-class teaching (the blended learning approach) or completely online.

Thanks to the extensive feedback from the online and remote students, as well as the people who lecture the various courses, and other VLC-users, the engineering team of this platform is constantly trying to improve the VLC and, by this, enhance the learning results of the students. During the last five years of teaching via this online learning environment we have noticed that students tend to print out almost every node of the online content provided (print-and-run), which seems to be a general problem of courses offered completely online [1]. There seem to be various reasons why students would rather print out numerous pages each week than sit in front of their screen for several hours:

- reading on the screen is tedious and text is less legible, the efficiency of reading on the screen will always be up to 10% worse than reading from a paper, and the speed of reading decreases up to 25% [2-3]:

“For a variety of reasons, text is less legible on a screen than at the same size on paper. [...] Text on a screen usually has less contrast than on paper, and the angle of viewing is less flexible, meaning that readers have more difficulty adjusting reading conditions to their specific needs, and thus may have greater eyestrain and neck strain in reading. Another contributing factor to poor legibility is screen resolution.” [4]

² t.unger@staff.uni-marburg.de

- the learner cannot (in contrast to working with books, articles, or handouts) make any notes on the screen next to a specific text passage, cannot underline or highlight anything, and cannot write questions or comments next to a paragraph [5]:
“[From] asking whether or not they printed out the content, points to the difficulty students have in breaking away from tradition. For many years of their education, students are used to textbooks, notes and articles, all in paper form. They read through it, turn the pages, underline important statements or sections and add their own comments in the margins. [...] All of a sudden, in [a] web-based environment, the student is required to change habitual studying techniques into new ones.” [6]
- with print-outs students are spatially more flexible; they can take their print-outs anywhere:
“The book is the greatest interactive medium of all time.³ You can underline it, write in the margins, fold down a page, skip ahead. And you can take it anywhere.” [7]
- students want to use the material for later purposes (e.g. examinations)

However, printing out the online content as it can be found on the specific e-learning platform has two main disadvantages. That is, almost all multimedial elements cannot be appropriately displayed (e.g. audio files are completely lost), and non-linear text, as we find in hypertext systems such as the WWW, cannot be printed out in a coherent order:

“The more ‘hyper’ a hypertext is (that is, the more layers it has) the more difficult it will be to transfer it to paper. Such a hypertext cannot (or only very complicatedly) be printed out and does not make much sense in this format.” [8]

Once a text is ‘converted’ into a hypertext and enriched by multimedial elements, it is very problematic to ‘re-convert’ the hypertext or print it out without any loss [9]. Nevertheless, experiences show that many students do print out almost every node of the hypertext environment although important information is lost (multimedial elements) and the print-outs cannot be successively arranged (non-linear text) and are of poor quality. Hence, developers of e-learning content need to think about specific techniques of how to allow the student to have the online content printed out in an appropriate and acceptable way:

- Variant a: Printer-friendly version:
 The ‘print text’ option can often be found on online newspaper platforms and could also be used with respect to educational environments. However, this option does not solve any of the above mentioned problems that arise when printing out multimedially enriched online content in a hypertext system (each node has still to be printed out separately and (dynamic) multimedial content is lost).
- Variant b: Online tools to make notes and/or underline phrases:
 To be able to mark, underline, highlight, or write down comments on the screen certainly is a big advantage for the students. Nevertheless, it does not diminish all the other reasons why students tend to print-and-run. In the end, the commented text will probably still be printed out:
“Simply publishing a text on the Internet and allowing students to underline words with an electronic text marker will add nothing to conventional book learning.” [11]
- Variant c: Additional print-material:
 If additional print-material (e.g. a script, reader, workbook, etc.) is offered either as a pdf-file or as an already printed out version, the students are able to mark, highlight, and write down comments, they can take it anywhere, and keep it for later purposes. Furthermore, since they are not purely dependent on the online material, the problem of the legibility of text on the screen is solved.

But if we provide additional print-material, we might torpedo online learning in general. Students might not even look at the online content any more and rely solely on their printed version. The question then is: How can we provide offline material that supplements, but does not substitute, the online content and, thus, helps to enhance e-learning in general and the motivation and learning results of the students?

³ This, of course, is quite debateable [10] and depends on your definition.

2. Design of Additional Offline Material (How?)

The additional offline material has to supplement and not substitute the online content. Otherwise, the benefits of e-learning will not be made use of and we could advise our students to just read a book (which, of course, in itself is always a good thing). Hence, a complete one-to-one transfer of the online content is not an option, instead we have to think about how to have the student use both online and offline material. Furthermore, the content of the print-material has to somehow embed the multimedia content, the hypertext has to be linearized for printing purposes, and coherence between online and offline material has to be maintained.

In order to maintain the coherence of both formats, additional material (except for further references and questions) should not be added to the print-material, so that the user does not get lost between offline and online material. Hence, a rather strict correlation of the offline content to the online material should be adhered to.

Linearization of all textual elements found within an informational unit⁴ is essential, but a very critical part. Can a non-linear text, that was originally designed and structured for hypertextual usage, be converted into a linear format? A hyperfiction⁵, for example, cannot, because it follows the typical rhizome structure, where each node of the rhizome is as important as all the others (→ no horizontal or vertical hierarchy). With respect to educational learning environments, horizontal hierarchies are important to rank certain information and a vertical hierarchy helps to divide an informational unit into different sub-topics (which itself may contain further sub-topics)⁶. Hence, it is possible to define the general hierarchy of an informational unit and to transfer this hierarchy into print-material (now we may refer to this distinction as main chapters, sub-chapters, and further elements within a sub-chapter). The only thing that is lost is the connection of the various nodes; hence, we have to decide where a certain piece of information fits best (since a node may be linked to various other nodes) so that it is not repeated over and over again.

Very often we can find hyperlinks within a node that open pop-up windows to display additional or in-depth information. How can this information be integrated into the main text? Here are some strategies that can be applied:

- the extra information is embedded into the main text or is placed and indented right after the term in question (which itself can be set in boldface to visually emphasize the connection)
- if there is a list of terms, where each item contains more specific information, which is displayed in a pop-up window, this extra information is set directly next to the term in question (which itself can be set in boldface)
- illustrating examples are set in a text box next to the information they illustrate

Linearizing text is important and crucial; however, just copying and pasting the text will not make the student use the print-material actively. The student will probably either use solely the print-material or the online content. Hence, two more important tasks that the designer of print-material has to undertake have to be discussed: How can we make the student use the print-material to supplement the online content? and, How can we convert the multimedia elements? Interestingly, both tasks are connected with each other.

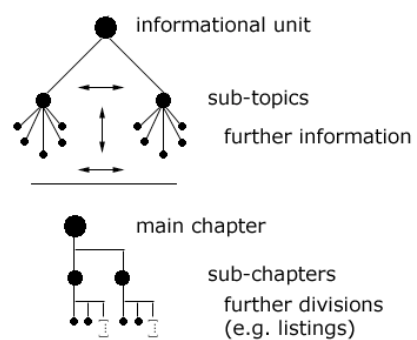


Figure 1: Linearizing (Educational) Hypertext

⁴ The term 'informational unit' describes a wider but specific topic that is explained (e.g. consonants) which includes further information on the topic (e.g. bilabial consonants).

⁵ Hyperfiction is a literary development of an electronic text with various connections to allow a multiple entrance to the content of the text (see, for example, Michael Joyce: *Afternoon, a Story* (1987)).

⁶ Is Nielsen's inverted pyramid applicable to a whole informational unit and not just a single webpage?

Since we have to keep a tight contextual and visual connection (coherence) between online and offline content, we cannot structure the print-material differently, and should not just embed new or different elements. The only way to have the students use both formats supplementarily is to make them go online and work on the screen because important information or examples are not included in the print-material and to have the learners fill it in themselves.

Due to the different media formats that can be found online (static media: text and pictures; dynamic media: interactive elements, sound files, animations (and video files)), different ways of converting their content to a 'fill in task' can be distinguished⁷:

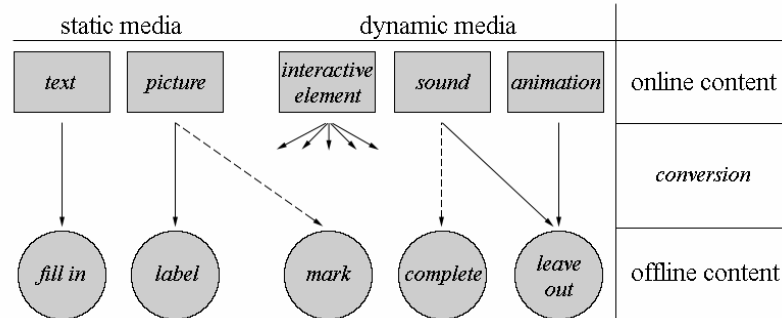


Figure 2: Converting static and dynamic media in to 'fill-in-tasks'

Certain textual elements (specific terms, dates, formulas, etc.) can be left out in order to have the learners write down the textual element in the print-material themselves. Pictures, in contrast, may be labelled or certain parts could be marked. With respect to interactive elements, numerous 'fill in tasks' can be generated, depending on the type of interactive element (e.g. drag'n'drop) and the creativity of the designer of the print-material. However, interactive tasks found online can often not be converted into any kind of 'fill in task' at all (e.g. virtual labs); then, they have to be left out. This also holds for sound elements (which sometimes can be converted into completion tasks) and animations.

Since making use of dynamic and interactive multimedia elements is the most important advantage of e-learning and since these elements cannot be represented satisfactorily in print, it becomes obvious that print-material and online content have to supplement each other and that learners have to be aware of the fact that they must consult the online content.

One way of making the student aware of the fact that some information, additional interactive options, or multimedia elements are missing in the print-material but are available in the online content is to make use of various symbols, which can be located in the margin. The VLC print-material makes use of the following symbols, which are all located in the margin:













	Tooltip: Further information on rollover is available online.		Animation: Check the animation provided in the online content
	Cross Searcher: Search for linguistic content within the entire VLC.		Sound: Check the sound example/file provided in the online content
	Glossary: Check term in question in the glossary found online.		Video: Look at the video provided in the online content
	Language Index: Listen to and read more about a specific language.		Further Information: Additional information can be found online.
	VIP Index: Read more about an important linguist.		Multimedia: Additional (interactive) multimedia content is available.
	Interactive Tutor: An interactive task can be found online.		Fill In: Supplement the blank spaces in the print-material.

Table 1: Symbols used in the VLC print-material

⁷ This, of course, is and can only be a broad generalization and the forthcoming description is based on the experiences of converting multimedia elements found on the VLC.

3. Conclusion

The process of linearizing hypertext and converting multimedia for print-material in order to minimize print-and-run and enhance the learning success of the students can be classified as a process of de-hypertextualisation. Furthermore, offering supplementary print-material helps to reduce (!) two central e-learning problems; namely, they reduce the legibility problem of text on the screen, because the information is also available offline and they reduce the problem of keeping up the motivation of students to sit in front of the screen, because the workbooks need to be completed which, then, can be consulted whenever needed without turning on the computer. Additionally, they increase the sustainability of the content to be learned, because the print-material can be accessed even years after the course has finished (e.g. for final exam preparation), and they increase the sustainability of learning, because the students are involved actively in acquiring the information (e.g. completing the information in the workbook where necessary).

Print-materials allow a more common or more habitual way of acquiring skills and knowledge, because the students can individually write down ideas in the workbook, highlight important keywords etc.; just as they are used to in traditional teaching or learning. However, in order to achieve these results, especially the increase in the sustainability of learning, the print-material has to adhere to a few important rules. First, it must not replace the online content; online and offline materials have to supplement one another so that the advantages of both media can be used for the acquisition of skills and knowledge. Furthermore, online and offline content have to follow a particular and consistent structure, where the print-material should mirror the online structure or learning path as much as possible. Next to these, active learning should be realized and supported by various tools, applications, and media specific elements as much as possible. This holds for both, online and offline material, although both media need to support active learning differently (e.g. interactivity versus 'fill-in-tasks'). Finally, multimedia elements cannot be adequately realized in print. However, they should be integrated into the offline content as well as possible and where necessary. At least a reference should be included that makes the student aware that important elements can only be accessed or consulted online. Only if the print-material follows these criteria, will it not be just a 'nice accessory' that is offered to students or worse subvert e-learning.

References

- [1] C. R. Wolfe, Learning and Teaching on the World Wide Web, Academic Press, San Diego, 2001, p. 6.
- [2] E.-M. Jakobs (ed.), Textproduktion in elektronischen Umgebungen, Lang, Frankfurt a. M. et al., 1999, p. 2.
- [3] B. Bruns, P. Gajewski, Multimediales Lernen im Netz: Leitfaden für Entscheider und Planer, Springer, Berlin, 2002, p. 82.
- [4] T. Brinck, Usability for the Web: Designing Web Sites that Work, Morgan Kaufmann, San Francisco, 2002, p. 262.
- [5] T. Oberle, M. Wessner, Der Nürnberger Trichter: Computer machen Lernen leicht!? LTV-Verlag, Alsbach/Bergstraße, 1998, p. 130.
- [6] A. A. Arif, Preliminary Evaluation of a Web-Based Module in Construction, m-ICTE-2003, p. 4
<http://todowebextremadura.com/papers/104.pdf> <07.08.2006>
- [7] Michael Lynton 1996, quoted in: E. Knowles (ed.), The Oxford Dictionary of 20th Century Quotations, Oxford University Press, Oxford, 1998, p. 196.
- [8] P. Handler, Stileigenschaften elektronisch vermittelter Wissenschaftstexte, In: E. M. Jakobs (ed.), Textproduktion in elektronischen Umgebungen, Lang, Frankfurt a.M. et al., 1997, p. 89-108 [98].
- [9] F. Intemann, Kommunikation – Hypertext – Design: eine Untersuchung zur Struktur und Optimierung hypermedialer Lernumgebungen. Waxmann, Muenster, 2002, p. 81.
- [10] J. Nielsen, Multimedia and Hypertext: The Internet and Beyond, Morgan Kaufman, San Francisco, 1995, p. 13.
- [11] C. Friesendorf, E-Learning and International Relations - What Teachers Can Learn From Neil Postman, p. 7.
http://www.isn.ethz.ch/edu/el_consulting/_doc/ELearn_and_IR.pdf <07.08.2006>