Usability and Pedagogical Design: are Language Learning Websites Special?

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Abstract: This paper explores the usability of e-learning websites, with particular reference to foreign language learning. Notions and concepts of usability are analyzed, and a definition of 'pedagogical usability' is proposed. The key issue is whether there are aspects of pedagogical usability that are discipline-specific. The paper examines the way in which language learning and teaching, in particular Technology Enhanced Language Learning (TELL), has approached usability as an area worthy of consideration when developing technology-enhanced learning materials. We propose three elements of a research agenda that should be taken forward - pedagogical usability, intercultural usability and website evaluation - to generate a more complete picture of what constitutes usability in language learning websites.

Introduction

Usable systems are generally regarded as being efficient, easy to learn, effective to use, and enjoyable or engaging from the user's perspective. For the last three years, we have been investigating aspects of *pedagogical usability* – that is, usability as this affects educational website design and development, particularly in the context of supported open and distance learning (Shield & Kukulska-Hulme 2003; Muir, Shield & Kukulska-Hulme 2003). As part of this research project, we analysed student responses to the *Annual Courses Survey* – a questionnaire which is administered every year to obtain student feedback about different aspects of Open University (OU) courses. We found that language students' ratings of their course websites were the least favourable in the university. A case study of one OU languages course website revealed several usability issues. Furthermore, comments made by OU languages students who were interviewed about their course websites suggested that there may be deeper issues involved than those that can be addressed by generic usability guidelines. These findings led us to ask whether there are aspects of pedagogical usability that are discipline-specific.

This paper explores the issues around the usability of e-learning websites, and goes on to explore the perspective of one discipline, namely foreign language learning. First, we consider the notions and concepts of usability and how generic website usability studies have influenced educational websites. Next, we examine the way in which language learning and teaching, in particular Computer Assisted Language Learning (CALL), has approached usability as an area worthy of consideration when developing technology-enhanced learning materials. We then draw upon the outcomes of our research with OU languages students and, finally, based on our investigations in this field, we propose a research agenda that takes into account the discipline specificity of pedagogical usability studies.

Refining the Notions and Concepts of Usability

The Web provides a means by which to offer learners access to up-to-date and easily-updatable course materials, activities, resources and tutorial support. In spite of these benefits, however, learners may be left frustrated or disappointed by their encounters with their course-related websites when these do not address their needs or expectations. Preece (2000) remarks that website developers often assume they know users' wants and behaviours, forgetting their own high level of technical expertise. Difficulties may also arise when graphic design is prioritized over other aspects, so that a web page looks attractive but is difficult to read (Brinck *et al*. 2002). In other words, website design is typically the province of the technical rather than the content expert. However, increased awareness of user issues relating to website design means that website usability is an area that touches those groups involved in educational website development, such as academic content providers, who would not previously have thought this to be relevant to their work.

The concept of usability was originally developed within the discipline of HCI (Human-Computer Interaction) and applied to the interaction of one user with one computer. A decade ago, Preece *et al*. (1994) described usability as a "key concept" in HCI, "concerned with making systems easy to learn and easy to use" (Preece *et al*. 1994:14), and distinguishable from the notion of "user experience", which encompasses a wider set of concerns such as creating systems that are satisfying, enjoyable, fun, entertaining, helpful, aesthetically pleasing, supportive of creativity, rewarding or emotionally fulfilling. Already at that time, HCI researchers recognized that to produce systems with good usability, it was necessary to understand the psychological, ergonomic, organizational and social factors that determine how people operate, and to consider group working, integration and interaction of media, as well as the wider impacts of computer technologies. While how people learn to use a computer system was well understood, much less was known about how people learn *with* – as opposed to *about* – computers. HCI being a specialised area of knowledge, it seems that there was also a gap between what was known and the actual practice of interface design, a problem we would still recognize today. By 2000, Preece had moved on to considering usability in the context of online communities, concluding that "...software with good usability supports rapid learning, high skill retention, low error rates and high productivity. It is consistent, controllable, and predictable, making it pleasant and effective to use." (Preece 2000: 27).

To support online communities, Preece suggests that developers have to identify software with suitable usability (the software often being web-based, or embedded in a website), "… then tailor it to more closely to meet the community's needs" (Preece, *ibid*: 27), thereby implying that there is a further dimension to consider. In a subsequent book on *Interaction Design*, Preece *et al*. (2002) explain that 'interaction design' is defined as "designing interactive products to support people in their everyday and working lives" (also described as "finding ways of supporting people"), and it is concerned with a broader range of issues, topics and paradigms than has traditionally been the scope of HCI. It entails "creating user experiences that enhance and extend the way people work, communicate, and interact" (Preece *et al*. 2002: v). Usability is again distinguished from user experience, the former encompassing effectiveness, efficiency, safety, utility, learnability and memorability, whilst the latter has a focus on aspects such as satisfaction and enjoyability (as mentioned above). A difference between generic *design principles* and generic *usability principles* is also identified: "…whereas design principles tend to be used mainly for informing a design, usability principles are used mostly as the basis for evaluating prototypes and existing systems." (*ibid* 26). In other words, design principles are general reminders about what to provide or to avoid when designing websites, whilst usability principles are considered to be specific and used to assess the acceptability of interfaces. An interesting question is the extent to which these two areas of responsibility should be separated. E-learning brings usability into a shared arena, highlighting the need for technical or design experts and academic experts to work together more closely than ever before to produce usable websites.

Beyond Usability: E-Learning

Understanding of the specific requirements of usability in Web-based learning and e-learning is gaining momentum, but there is little published research as yet in this quite specialised area. Among researchers in educational applications of computing, Laurillard (2002) addresses issues of usability from a pedagogical perspective, focusing on three aspects: user interface, design of learning activities, and checking whether learning objectives have been met. She emphasizes (2002:194) that "the aim is to design an interface that never intrudes on the task in hand". Hale & French (1999) considered the assessment of Web design based on what they described as 'learning principles': reducing conflict and frustration; repetition of concepts using variations in technique; positive reinforcement; active student participation; organization of knowledge; learning with

understanding; cognitive feedback; individual differences; and motivation. Hall (2001) concludes that in training websites, several themes are important: site organisation, taking advantage of the hyperspace environment by building in flexibility and learner control, and use of case examples from the vast resources available on the Web. Hall also believes that collaborative learning activities should be part of such a Web environment. Cronjé (2001) warns against placing learning materials "in a pre-packaged instructivist learning shell", as this may create an impoverished environment, one in which "creativity and imagination remain unchallenged." Nielsen (2001) has remarked that although general usability standards apply equally to e-learning, there are additional considerations, for example the need to keep content fresh in learners' minds so that they do not forget things whilst trying to accommodate new concepts.

In our own usability project at the UK Open University, we have developed the notion that there are several layers of usability, namely technical, general, academic and context-specific (Muir *et al*. 2003), and we have gone a long way toward refining our understanding of the academic and context-specific aspects, which include the broad context of e-learning as well as contexts defined in terms of specific disciplines and the learning activities undertaken within those disciplines. We have seen how the specific context of a website's use can dictate certain design decisions. For example, knowing that Technology students tend to have much more experience with computing than Healthcare students, a site for a technology course based on the Internet is able to prioritise the use of cutting-edge technology, while a site for a Healthcare course probably would not. The way we see it, if the learning and teaching resources supplied by an educational website are not presented and sequenced in a pedagogically-focused manner, the learner is less likely to succeed in achieving the specified learning outcomes of the course. Thus, context-specific usability depends on pedagogical usability. But that is not the end of the story. No matter how pedagogically effective the content may be, it is of little use if the learner is unable to locate it in a poorly organized website. Pedagogical usability, then, is based upon principles of general usability. And there is still one more level: a well-designed website with pedagogically effective content may nevertheless fail if it cannot be reliably accessed. Technical usability is therefore the basis for the other three levels, whilst not being sufficient by itself.

Technology-Enhanced Language Learning and Usability Research

Technology-enhanced language learning (TELL) is an 'umbrella' term that incorporates different approaches to the use of computers for language learning and teaching. It includes computer-aided/assisted language learning (CALL) - often drill-type programs intended to improve accuracy in the target language - computer-mediated communication (CMC) and even generic computer-based production and presentation tools such as word-processing packages and computer-supported research tools like concordancing and parsing programs. As it has become ever more ubiquitous, the Web has been used by TELL practitioners for the development of materials and activities for both CALL and CMC as well as to support learner access to authentic target language materials that may be used as part of the overall experience of engaging with the target language and culture.

Approaches to Technology-Enhanced Language Learning

TELL materials and activities have their beginnings in different language teaching philosophies ranging from approaches that focus on form and concentrate on drilling particular forms of the target language through to pedagogies that draw upon constructivist philosophies and focus on fluency, collaborative and cooperative learning. Describing the necessity to make principled choices about which technologies to employ for language learning, particularly at a distance, Doughty and Long (2003) place TELL within a theoretical framework that refers primarily to second language acquisition (SLA) theory and educational psychology. They draw a useful distinction between *methodological principles* that are "…motivated by theory and research findings … which show them to be either necessary for SLA (second language acquisition) or facilitative of it" (2003: 51) and *pedagogic procedures* which "comprise the potentially infinite range of local options for realizing the principles at the classroom level" (2003:53). Although their work resides in "an embryonic theory of teaching" known as Task-Based Language Teaching (TBLT), they map methodological principles onto pedagogical procedures in the second language classroom and in TELL in a way that would seem to be applicable to language learning and teaching more widely.

Indeed, if methodological principles are, as Doughty and Long suggest (ref cit) "…putatively universally desirable instructional design features, „" a similar approach to e-learning website usability might well address issues that are implicit in the work of researchers such as Hémard & Cushion (2000) and Plass (1998). Hémard & Cushion (2000:103) touch upon the possibility of discipline specificity in usability studies, reporting that in their work they strive to "…establish important links between HCI and CALL as two distinct, but overlapping and interdependent, disciplines…". Plass (1998) argued that: "…evaluation criteria [for multimedia software] need to be developed based on domain specific learning processes and activities and on the cognitive processes that these activities involve." (1998: 35) and proposed a model for interface design that "puts the user, the content, and the instructional activity in the center of the design process" (p.41). The key question here is whether there are discipline specific as well as generic usability factors and, if so, are these influenced by pedagogic processes employed within a discipline?

Approaches to Usability within TELL

An examination of the literature of TELL reveals that usability issues – sometimes also referred to as *evaluation criteria* – have been addressed mainly in the area of standalone CALL materials. TELL researchers and practitioners demonstrate awareness of general usability heuristics such as those proposed by Nielsen (2000, 2001), referring to aspects such as "user interface" and "HCI" (eg Hémard & Cushion 2000, Allum 2001), but references to the user experience are now beginning to appear more frequently in the literature; for example, Hémard captures the notion of "going beyond" general usability, offering a definition of usability that includes reaching "a threshold of acceptability beyond which users can begin to interact productively and voluntarily instead of simply acting and reacting" (2003: 23). Indeed, investigations into aspects of TELL-based usability appear to reflect an underlying trend similar to what is described in general usability literature, namely a move from a focus on technical usability to an approach that is centred increasingly on the user experience. For example, TELL usability research has ranged from studies of how to transform "…good lesson plans, classroom or textbook activities … into effective CALL exercises" (Allum 2001:146), to investigations of "students' views on the Web as a viable environment for learning" (Felix 2002: 48).

The fact that usability has been approached from a variety of standpoints within the CALL community becomes very clear in a study carried out by Levy (2002). Using a corpus drawn from CALL literature, he addresses the notions and concepts that have emerged around the term *design* in that field. Although the main thrust of his research is to describe "..the discourse processes and products of design in CALL…" (2002:58). Levy also addresses some aspects of usability as these emerge in what he refers to as "design of an artefact", that is "… the building of Websites, learning environments, courseware packages, exercises and authoring systems…" (p.61) and language learning websites - primarily aspects of HCI as these involve the end-user. Two websites (referred to as 'integrated learning environments') in particular are identified as being successful, the Stanford African Languages and Multimedia Applications (SALAMA) and the Virtual Language Center (VLC) because: "They each involve a coordinated and suitably linked collection of resources plus a mixture of tools and tutorial features that, properly managed, can provide learners with the information and help they need when they need it." (Levy 2002: 64) The emphasis here is not on the interface, but rather on the *content* of the website. However, content alone does not make a website usable, as Allum (2001: 146) points out: "Teacher-designed, pedagogically sound software often fails in terms of usability". Allum implies that generic usability principles as well as sound pedagogy must be employed in the development of usable language learning websites, arguing that software that does not meet the end users' expectations in terms of interface design is likely to prove to be unusable. He urges that 'general usability concepts' should be employed throughout the design process and commends Nielsen's generic usability guidelines to the reader.

Hubbard (2003) carried out a survey to elicit research questions that TELL professionals (Hubbard calls them *CALL professionals*) would like to see answered. He not only asked respondents to outline their 'favourite' research question, but also to classify their own position within TELL as primarily Teachers, Researchers or Software Developers. His analysis of the responses revealed that a) research questions fell into four main categories, *design-centred issues, learner-centred issues, effectiveness issues* and *research-centred issues* and b) of the 64 completed questionnaires that were received, 29 respondents considered themselves to be researchers, 22 practitioners (teachers) and 11 classified themselves as software developers while one respondent abstained from choosing a particular category. Although Hubbard found that the majority of questions posed by his respondents fell into the category 'effectiveness issues' (eg. does TELL 'work'?), from the point of view of the usability researcher, the category *design-centered issues* is probably of the most interest. Of the 15 responses

received in this area, 10 could be said to fall into *usability issues* (2 content, 2 evaluation, 3 HCI and 3 multimedia) but only two of these questions were suggested by respondents who considered themselves to be primarily (software) developers. A second aspect of Hubbard's survey was to attempt to identify whether self-classification correlated with different types of research question; here, although the number of responses received was relatively small, the difference between the interests of developers as opposed to researchers and practitioners was quite marked (Tab. 1) Hubbard (2002) notes that trends identified in his survey are empirically weak but states that nevertheless, they "may still provide some insight into the current state of mind of a large group within the field".

	Researchers	**Practitioners**	**Developers**
CALL Effectiveness (does it work?)	4	0	0
Interaction issues	1	0	3
Effective Practice	3	3	0
Learner Variables	6	6	0
Descriptive studies	5	3	0

Table 1: Types of research question asked by different categories of TELL professional

Felix (2002:51) is one of the few researchers who report directly on learner views of the appropriateness of Web-based language learning sites for independent study: "An analysis of which aspects of the Web materials contributed to the perception of their usefulness showed that the most important elements were clear and logically organized content…, clear objectives…, meaningful feedback…, and easy navigation through the program … ".

In language learning literature, then, usability appears to be a recognised area that has been somewhat explored from several different angles. Some researchers (Hémard 2003, Felix 2002, Allum 2001, Plass 1998) stress the importance of the relationship between content, user expectations and usability principles, while the different approaches to software and website design become apparent in surveys of the literature (Levy 2002) and CALL professionals' own views (Hubbard 2003).

Towards a Research Agenda

So far in this paper, we have presented:

- an overview of generic website usability principles and concepts and their evolution
- a review of usability as it appears in CALL literature

Taking these sources together, it appears that there are elements that could form part of a research agenda, that have not been addressed in depth and that are particularly pertinent to language learning websites. These fall into three main areas:

Pedagogical Usability

As we have seen, the purpose of e-learning websites needs to be clearly stated to ensure that learner needs and expectations are managed. For language learning websites, there is yet another set of choices that needs to be made, and which is not really addressed in any of the sources we have examined here: should the website use the first or target language? Linked with this question are pedagogical concerns such as: should the interface be presented in the target language? While often pedagogically desirable, would such an interface expose learners to particular usability issues? Furthermore, given that websites can, and often do, take a multimodal approach, how should information be presented and how should users interact with it? For example, Kress & van Leeuwen (2001: 46) point out that in post-industrial societies, multimodal methods of communication may be of at least equal importance to language. This question is closely related to the second aspect of usability that may be of particular appropriacy for language learning websites, intercultural usability.

Intercultural Usability

Although intercultural aspects of website usability are the focus of research (e.g. Evers et al. 1999; Marcus & West Gould 2000), there are likely to be particular issues around intercultural usability bound up with language learning websites. As well as questions about which language to use, the way in which information is best presented is worthy of further investigation. Among those questions that might be addressed are included: do usability principles vary according to culture? If so, should language learning websites adhere to the usability principles of the home or the target culture? Here, the relationship between intercultural and pedagogical usability is clear, since the pedagogy of the home culture may influence the course-related website in a way that could negate the intercultural aspects of the target culture. There are signs of an awakening interest in the portrayal of 'self' and 'other' in website design. For example, van Dijck (2000) compares two Colombian portals, one that is an adaptation of a US portal to a Colombian context and one that was developed in Colombia. In contrast, in spite of a growing interest in intercultural aspects of Website usability, there is little discussion of general e-learning or language learning websites. "Current emphasis in modern language teaching and learning highlight interculturality and reconceptualise goals in terms of producing 'intercultural speakers' who will be capable, adaptable actors and mediators in globalized contexts" (Jordan 2002). In their description of the *Cultura* project, Furstenberg *et al.* (2001:55) note: "Our focus will be on the pedagogy of electronic media, with particular emphasis on the ways in which the Web can be used to reveal those invisible aspects of a foreign culture, thereby giving a voice to the elusive "silent language" and empowering students to construct their own approach to cross-cultural literacy", the project itself addresses issues of interculturality such as how the target culture is reflected in articles from authentic websites from the home and target cultures. It does not consider the types of usability issues that may surround these websites.

Website Evaluation

Interviews with OU Languages students as part of our own usability project revealed that they believed that their course websites could provide them with a portal to authentic target language and culture websites. This implies that they would expect the tutor to offer pointers to "good" authentic websites, but the question also arises as to how learners themselves could evaluate the "worthiness" of authentic target language Websites, and this appears to be closely related to intercultural and pedagogical aspects of language learning websites; if learners are to be able to carry out independent web browsing in the target language, they will need the tools to evaluate what is available. Issues of how the web is used by multilingual users have hardly been touched upon, and would include the usability of search tools as well as the understanding of emerging language registers and conventions on the Web.

Conclusions

We have seen how the general usability research literature reflects a gradual change from a focus on 'ease' - making systems easy to learn and easy to use - towards an interest in the user experience, which encompasses a wider set of concerns such as satisfaction, enjoyment and helpfulness, and looks for ways of supporting people. Enhancing and extending the way people work, communicate, and interact, are key principles in this evolved approach to usability. Within an online community context, principles such as consistency, control, and predictability have been highlighted, along with a need to tailor the interface more closely to meet the community's needs.

Going 'beyond usability' is about looking for learning principles and seeing learners interact productively and voluntarily via an interface that does not intrude on their task. It is about taking advantage of the hyperspace environment by building in flexibility and learner control. It involves an appreciation of cognitive activity such as the need to keep content fresh in learners' minds. What is more, creativity and imagination should not be forgotten.

In terms of language learning it seems, little research directly related to the usability of language learning websites has, as yet, been carried out; what has been done has concentrated, on the whole, on the technical aspects of usability. On the other hand, more recent studies have begun to reflect a growing interest in the end-user experience of language learning artefacts such as websites with researchers such as Felix and Hémard & Cushion reporting on end-user feedback. Levy identifies some of the features that go towards making a

language learning website usable (suitably linked resources with learning support tools) and Hubbard's survey reveals that researchers in the area of online language learning are interested in usability-related issues such as the relationship between the technical and the pedagogical, with one participant in the survey stressing the importance of considering the end-user experience.

Finally, then, it would appear that there are areas of usability relating to language learning websites that are currently under-researched and that may require a discipline-specific approach. These include intercultural aspects of language learning and authentic target language websites and how these may affect the end user's experience. Issues that may, at first sight, appear to belong to more generic usability principles may also be discipline-specific; one of Hubbard's questionnaire respondents, for instance, asked whether choice of font, colour or page layout may in some way affect second language acquisition. While we are aware, at least to a certain extent of the effect such aspects have on the end user from the point of view of generic usability, it is less clear at present whether they have a similar effect from a discipline-specific perspective. Since the primary aim of language learning websites must be to promote the acquisition of the target language and culture, these are questions of primary importance and worthy of further investigation. By raising these issues with respect to the discipline of language learning, we also hope that this will promote wider debate about discipline-specificity in website usability.

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