

THE ROLE OF ONLINE MT IN WEBPAGE TRANSLATION

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ABSTRACT

This thesis is concerned with the use of online machine translation (MT) services to translate web-based text and enable the production and management of multilingual content on the Internet. The perspectives of interlingual dissemination and assimilation of digital information are both considered, to address the key challenges of using MT in the online environment. Adopting a language-neutral and system-independent approach, this thesis examines in depth a range of under-researched questions regarding the successful deployment of web-based MT software in a number of scenarios, with a view to raising the profile of MT on the Internet.

After the introduction, the literature review in chapter 2 includes contributions published mostly over the last ten years that deal with the topic of online MT from a variety of angles. Chapter 3 presents a questionnaire-based survey which investigates the actual usage of a range of free online MT services among 104 UK-based university students, and discusses the most widespread and unanticipated usage patterns that emerge from the data. Having identified some areas where further research is needed, we put forward some suggestions regarding how the user interface of web-based MT services could be enhanced.

Chapter 4 reports a case study considering the role played by free online MT services for the purpose of information assimilation, in which subjects have to find some information from five foreign-language websites. Two interesting findings are revealed: firstly, Internet users who take advantage of MT tools to extract basic information from a monolingual website available only in a foreign language actually tend to perform worse than the control group, who carry out the same task without the help of translation tools, despite not knowing the language in question; and, secondly, in spite of this worse performance, individuals using online MT consistently have a higher confidence in the accuracy of their answers, compared to the control group who do not use web-based MT. This suggests that users perceive Internet-based MT as a reliable tool to assist them in the assimilation of multilingual information for everyday real-life translation tasks on the Internet when they encounter language barriers.

Chapter 5 focuses on a redesign project during which an online MT facility was embedded into an existing monolingual English-language website to automatically disseminate its content in at least ten other languages, avoiding the need for human translation and localisation. The main technical and practical issues involved in this MT-based strategy to produce and manage multilingual web content are illustrated by four prototypes that were designed for this implementation project. These four prototypes were tested for usability and their effectiveness was evaluated by a group of 72 multilingual international users, who provided information about their design-related preferences. The results of these experiments are analysed in detail to suggest which implementation strategies are most successful and which approaches to the design of an online MT facility are most appealing for international users visiting a website powered by Internet-based MT.

Building on this work, a follow-up project covered in chapter 6 sought to address a number of issues flagged up by the previous user testing and usability evaluation. We present a set of ten user-centred and usability-oriented heuristics that we have developed according to well-established principles in human computer interaction and web usability, which can help web designers to successfully integrate online MT facilities into the interface of monolingual websites. The chapter explains how these heuristics can guide the whole life cycle comprising the design, development and implementation of websites powered by free online MT. In addition, we show that the heuristics can also be used to conduct thorough diagnostic evaluations of the success with which monolingual websites offer online MT for the benefit of their multilingual visitors. We mention possible improvements to extend the heuristics, so as to address areas that are relevant to online MT but are not covered at the moment.

Finally, chapter 7 draws some general conclusions and summarises the main contributions of this thesis. A number of open questions and issues that have been identified during the course of this research are discussed and some areas worthy of future work are outlined.

DECLARATION

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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ABBREVIATIONS AND ACRONYMS

ALPAC	Automatic Language Processing Advisory Committee
AMTA	Association for Machine Translation in the Americas
CAT	Computer-assisted Translation
CG	Control Group
DE	German
DU	Dutch
EGIT	Experimental Group with Knowledge of Italian
EGNO	Experimental Group without Knowledge of Italian
EL	Greek
ES	Spanish
FR	French
HCI	Human Computer Interaction
HTML	HyperText Markup Language
ICT	Information and Communication Technology
IT	Italian
JA	Japanese
KO	Korean
MBS	Manchester Business School
MT	Machine Translation
NIST	National Institute of Standards and Technology
NLP	Natural Language Processing
PRC	People's Republic of China
PT	Portuguese
PwC	PricewaterhouseCoopers
RTT	Round-trip Translation
RU	Russian
SATS	Synchronous Automatic Translation Systems
VMC	Virtual Museum of Canada
W3C	World Wide Web Consortium
ZH	Chinese

PUBLICATIONS BASED ON THE THESIS

A revised and extended version of some parts of chapter 2 (in particular section 2.5 and sub-sections 2.6.1 and 2.6.2) will be published as:

Gaspari, Federico & John Hutchins (forthcoming) “Online and Free! Ten Years of Online Machine Translation: Origins, Developments, Current Use and Future Prospects”. Paper accepted for publication in *Proceedings of the MT Summit XI*. 10-14 September 2007, Copenhagen, Denmark.

An earlier version of chapter 4 has been published as:

Gaspari, Federico (2006) “The Added Value of Free Online MT Services: Confidence Boosters for Linguistically-challenged Internet Users, a Case Study for the Language Pair Italian-English”. In *Proceedings of the 7th Conference of the Association for Machine Translation in the Americas “Visions for the Future of Machine Translation”*. 8-12 August 2006, Cambridge, MA, USA. Pages 46-55.

An earlier version of chapter 5 has been published as:

Gaspari, Federico (2005) “Embedding Free Online Machine Translation into Monolingual Websites for Multilingual Dissemination: a Case Study of Implementation”. In *Proceedings of the 27th International Conference on Translating and the Computer*. 24-25 November 2005, London, United Kingdom. London: Aslib/IMI.

An earlier version of some parts of chapter 7 (in particular sub-sections 7.4.1 and 7.4.2 and section 7.5) has been published as:

Gaspari, Federico (2004) “Enhancing Free On-line Machine Translation Services”. In Lee, Mark (ed.), *Proceedings of the 7th Annual Colloquium for the UK Special Interest Group for Computational Linguistics*. University of Birmingham, United Kingdom, 6-7 January 2004. Pages 68-74.

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FG

There is no need to do more than mention the obvious fact that a multiplicity of languages impedes cultural interchange between the peoples of the earth, and is a serious deterrent to international understanding. The present memorandum, assuming the validity and importance of this fact, contains some comments and suggestions bearing on the possibility of contributing at least something to the solution of the world-wide translation problem through the use of electronic computers of great capacity, flexibility, and speed.

The suggestions of this memorandum will surely be incomplete and naïve, and may well be patently silly to an expert in the field—for the author is certainly not such.

Warren Weaver, *Translation*, 1949/1955: 15

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 Overview of the Research Area

This thesis is concerned with the role played by online machine translation (MT) to enable the translation of web-based text and support the management of multilingual content on the Internet in a variety of scenarios, for the purposes of both assimilating and disseminating digital information. MT services have been available on the Internet for about a decade now, and in spite of being popular resources that help to cater for the needs for translation and multilingual communication of a diverse and large population of users, to date very little research has been carried out in this area. This state of affairs is quite surprising, given that the Internet is a thriving field of application for MT, thanks to the number of people who can access MT software via the World Wide Web, particularly by taking advantage of the free online MT services which cover an ever expanding range of language combinations.

In addition, due to the eminently multilingual nature of the Internet environment, users with any linguistic background can be exposed to content in virtually any language, thus creating a huge potential need for translations, as testified by the diversified range of services offered by the web localisation industry, which has seen a substantial growth in recent years. However, not all web content for which there is a potential translation need can be properly localised or translated professionally, and for some online texts the stylistic and grammatical quality of the end product of the translation may not be paramount, whilst cost and speed are of crucial importance. This can be the case, for instance, when there is a need to overcome language barriers in order to find some very specific information on a website or to interact with online services that are available only in unknown languages, to post translated messages on blogs or chatrooms, etc. In these scenarios online MT, and particularly free web-based software, can meet translation needs that could not be fulfilled otherwise, e.g. by web localisation providers or professional translators. As a result, the Internet opens up very exciting prospects for the usefulness and potential impact of MT, while at the same time posing unprecedented challenges to researchers, developers and vendors.

1.2 Statement of the Problem

The main problem addressed in this thesis concerns the identification and the systematic in-depth study of these challenges and of the key issues that have an impact on the experience of people using online MT services to translate web-based text and manage multilingual information on the Internet. Therefore, the investigation first reports data reflecting usage in real-life situations for a range of genuine tasks that has been gathered by means of surveys, experiments with user evaluations, web design and development projects in order to understand how people actually use online MT and in what areas they are likely to face the most significant difficulties. From this basis, conclusions are then drawn and recommendations are formulated on a number of points to encourage best practice in the deployment of the MT tools that are available online, so as to contribute to solve real multilingual communication problems encountered by users and ultimately promote the success of web-based MT services.

1.3 Rationale and Motivation for the Study

Research and development efforts in the field of MT have traditionally involved approaches and issues directly related in different ways to the linguistic performance of MT systems, with an emphasis on the quality of the output in the target language produced by such systems, which has consistently been regarded as the key concern to address. This situation is commonly reflected, for example, in projects, methodologies and metrics devoted to MT evaluation (where, by and large, evaluating a particular system means assessing the quality of its output), and is also highlighted by the attempts to design and implement MT software that have been pursued with various degrees of success over the years. These range from classic linguistically-motivated rule-based systems such as those designed to process input belonging to sublanguages or controlled languages, to more recent non-symbolic and empirical approaches that seek to limit, or avoid altogether, the use of explicit linguistic rules by performing statistical analyses of large datasets and corpora or by utilising bilingual examples to provide the translation, as is the case in statistics-based and example-based MT systems. Similarly, well-established techniques associated with the use of MT in production environments that rely on some degree

of human involvement to carry out the translation process, such as post-editing the raw output and even pre-editing the input text, have all been invariably guided by one overriding objective, namely having a measurable effect on the quality of the target text (regardless of how this is defined, e.g. in terms of grammaticality, readability, intelligibility, accuracy, fidelity to the source text, etc.).

Focusing on enhancing the quality of the MT output as the end product offered by translation technology is of course of utmost importance to the success and effectiveness of MT, and is recognised as a worthy and essential endeavour to drive forward the research agenda, in order to achieve the overall improvement of MT systems, thereby facilitating their acceptance on the part of the users. However, the rationale behind this study is that deploying MT on the Internet poses unprecedented challenges raising specific issues that have so far been neglected, but deserve to be carefully considered because they play a central role when Internet users interact with online MT tools. In view of this, throughout this study ample space is given to issues that are irrelevant to using PC-based MT software in offline mode, but the assumption underpinning the research presented here is that they must be investigated because the deployment of MT on the Internet calls for a shift in the focus and emphasis of research efforts. The primary motivation for this study lies in the need to explore a range of questions that are specific to the challenges raised by using MT on the Web and that have been ignored so far by the research community. From this point of view, the linguistic quality of the output provided by online MT services represents one of the factors that can be taken into account, without however being the main focus of attention, because other non-linguistic aspects are also deemed to be of great importance in serving the needs of Internet users and meeting their expectations.

1.4 Methodological Approach to the Study

This study is carried out within a wide framework that encompasses and brings together areas as diverse as computational linguistics, natural language processing (NLP), language engineering, web localisation, web usability and human computer interaction (HCI) to address the key challenges of using MT in the online environment. Whilst some of these fields share overlapping interests and are closely

related to the well-established tradition of mainstream research in MT (i.e. computational linguistics, NLP, language engineering and web localisation), the disciplines of web usability and HCI have never been considered in direct connection with MT. However, in the light of the increasingly important role and potential usefulness of online translation technology, the methodological approach adopted in this thesis emphasises the contribution that these two disciplines have to make in a serious investigation of the key issues that are germane to the deployment of MT on the Internet, thus offering a promising avenue to tackle research issues that have remained unexplored.

Of particular interest in this context, for example, is the systematic study of the level of usability and of the interaction design of free web-based MT facilities that are seamlessly integrated into monolingual websites for the purpose of multilingual dissemination. In an attempt to enhance and promote the use of MT on the Internet, this study advocates the need to adopt a user-centred and usability-oriented design for the successful application of web-based MT tools in a variety of real-world deployment and implementation scenarios, regarding the level of usability and the quality of interaction design with the users as key factors for the evaluation of their performance and effectiveness. This represents a radical departure from well-trodden paths in MT research, and poses methodological challenges insofar as the design and execution of the work presented here is a direct result of the cross-fertilisation of hitherto unrelated disciplines and research traditions.

1.4.1 Novelty and Usefulness of the Approach

A research project such as this one that is conducted in a multidisciplinary framework presents a number of procedural difficulties because the methodological rigour and the integrity of the results might be put under some strain by the intention to maximise the combined impact of merging research practices and methodologies that share little common ground. Nevertheless, this novel approach enables us to conduct experiments and gather empirical data that reveal insights into the usage patterns, preferences and perceptions of the users of online MT. The thesis reports the findings of separate surveys and experiments that represent the first attempts to study systematically the behaviours and reactions of users of online MT from a variety of angles. These empirical studies involved teams of web designers and developers who integrated online MT facilities into monolingual websites, as well as

users who tested and evaluated the MT-related design work carried out by these web developers while performing real-life Internet navigation tasks which required the use of online MT services. In addition, the surveys presented in the thesis give an indication of the behaviour and perception of users who interacted with a range of web-based MT tools.

The appeal of the approach adopted in this study lies in the fact that it provides a solid experimental and empirical basis to first describe real usage patterns, and then obtain further results by means of tests, evaluations and comparative analyses. Thanks to the careful design of the experiments that make up the extensive sets of data collected as part of this research work, the key findings of the study are presented in terms of recommendations and guidelines with a practical impact on the future developments in the field of online MT, with a view to promoting good practice at a number of levels and in the interests of a variety of stakeholders. This means that the results of the experiments and surveys conducted for the thesis can be fed back into research and development efforts, so as to apply their implications in subsequent advancements that can bring noticeable benefits to the end users in a relatively short amount of time.

1.5 Aims and Objectives of the Study

It seems unlikely that a real breakthrough in the standard of performance of MT (and, more specifically, of online MT services) can be achieved in the short term by improving the linguistic quality of the systems, also given that this has proven to be an elusive goal so far. In spite of increasingly promising approaches and frequently heralded solutions to extremely challenging problems, high expectations have usually been followed by disappointment. Furthermore, any technical advancement or sophisticated technique that might be successfully applied to a particular language pair (and even to a specific direction) of an MT system to yield improved output may not be directly applicable to other language combinations (e.g. without a significant amount of further language-specific development work or fine tuning), thus having relatively little impact on the overall field of MT and on the users of web-based services.

Whilst it is not suggested here that considerable improvements to the translation quality obtained by MT systems cannot be achieved, this research seeks to pursue practical aims that are relevant to online MT software, without focusing exclusively on specific language pairs or particular systems. The aim of this thesis is to give a contribution to making progress in online MT from an original angle that does not cover the linguistic quality of the output as such, with a view to giving users the possibility to exploit the potential of web-based MT tools to their fullest extent possible. In more general terms, the overall objective of the approach adopted here is to produce results that can be used in order to raise the profile and usefulness of Internet-based MT among its users, without directly addressing the issue of improving the linguistic quality of the output provided by web-based MT software.

1.6 Relevance and Impact of the Study

As a result, the research presented in this thesis is relevant to a variety of people who have a stake in the study and further development of online MT and who, for different reasons, are likely to benefit from the findings of this investigation. This section presents a short overview of the groups of users and interested parties on which this research has an impact, mentioning briefly the main points of connection between this study and each of the three categories concerned, namely web surfers, web designers and, finally, MT vendors and developers.

First of all, online MT services offer support for the multilingual communication needs of Internet users with different linguistic backgrounds, particularly when they require rough and quick translations of messages, passages of text or entire webpages and even websites on an on-demand basis in real time. Secondly, many web designers are aware of the possibility to offer links to Internet-based MT tools, and it is increasingly common to see MT facilities provided on monolingual websites for the purposes of multilingual dissemination, i.e. as a strategy to avoid the need for proper localisation and professional translation, for instance due to budget limitations – however, this MT-based strategy to deliver content in multiple languages often fails to be implemented successfully from the point of view of web usability and HCI. Thirdly, as far as the MT-related industry, vendors and developers of MT products are concerned, the Internet provides an ideal

platform to showcase and promote commercial software and off-the-shelf systems, whose potential impact on sales and market share cannot be overestimated – as a result, for these stakeholders it is paramount that online MT tools are presented to users and prospective buyers as effectively and successfully as possible.

1.7 Overview of the Contents and Structure of the Thesis

After this initial introduction with some background to the whole thesis, the following six chapters focus on specific parts of the research and report in more detail on the work that has been carried out. Chapter 2 offers a literature review analysing publications that deal with the topic of online MT from a variety of angles, covering mostly material that has appeared over the last ten years. In response to the fact that so far very little data has been made publicly available from the providers on the use of web-based MT, chapter 3 reports a questionnaire-based survey that was carried out among 280 students based at three British universities and reveals how 104 of them had used a range of free online MT tools. The chapter focuses in particular on the most widespread usage patterns reported by those who had taken advantage of web-based translation technology, highlighting problematic areas which have implications for the design of Internet-based MT services. The survey also tries to shed some light on the users' perception of the quality of such translation tools.

Chapter 4 is based on a case study which considers the role played by free online MT for the purpose of information assimilation, taking as an example the language pair Italian-English with a view to illustrating issues that also apply to other language combinations currently supported by Internet-based MT. The first key aim of this part of the research was to investigate the effectiveness and usefulness of free online MT services when entire webpages are translated from a foreign language into a familiar one, in the attempt to extract basic information from a monolingual website. The other main objective of this case study was to assess the users' confidence in the reliability of free online MT as a tool to assist them in the assimilation of multilingual information for everyday real-life translation tasks when language barriers are encountered on the Internet.

Chapter 5 presents a redesign project during which free Internet-based MT was embedded into an existing monolingual English-language website to disseminate

its content in more than ten other languages without the need for time-consuming human translation and labour-intensive professional localisation. The main technical and practical issues involved in this MT-based strategy to produce and manage multilingual web content are illustrated by a real implementation project. Four alternative designs were produced for the home page of the monolingual website in question according to a set of requirements, and each of them included an online MT facility. These four prototypes were later tested for usability and the effectiveness of their interfaces was evaluated by a group of 72 users which included native speakers of seven languages with different nationalities and a variety of cultural backgrounds, in order to gather experimental data about their design-related preferences, which are analysed in detail.

Building on the lessons learned in terms of good practice to integrate online MT into monolingual websites, the follow-up project covered in chapter 6 sought to apply them to the solution of a number of issues flagged up by the previous user testing and usability evaluation. This work enabled us to formulate a set of ten user-centred and usability-oriented web design heuristics, which are presented in detail, to successfully design online MT facilities as part of the interface of monolingual websites. The discussion explains the stages of the process that led to the testing and validation of these MT-specific web design heuristics, commenting on their usefulness and providing examples of the role that they can play in diagnostic evaluations of the interface designs and interaction schemes implemented by monolingual websites that offer online MT for the benefit of their multilingual visitors. The end of the chapter points out some areas that the heuristics do not currently cover, but that would enhance their overall effectiveness.

Finally, chapter 7 draws some general conclusions and summarises the main contributions of this work, discussing a number of open questions and issues that have been identified during the course of this research. The conclusion also outlines some areas for future work that stand out as worthy of further attention, advocating in particular the need for more empirical and experimental studies to expand on the body of data presented in this thesis and to explore in more detail the implications of some of its key findings. This endeavour is vital to improve our understanding of how the potential of online MT can be harnessed to meet the multilingual communication needs of today's and tomorrow's Internet users.

CHAPTER 2

ONLINE MT

2.1 Contents and Organisation of the Chapter

This chapter provides an in-depth critical analysis of publications dealing with the topic of online MT. As such, it includes mostly material referring to research and developments that have occurred in the last decade or so. Although the time span covered by most of the works presented here is a fairly limited one within the longer history of MT, and in spite of the fact that online MT has remained a relatively under-researched area, these contributions display a remarkable amount of variety and originality. Whilst online MT is the common thread that runs through all the publications that are reviewed, inevitably the extent to which these works focus on the topic varies greatly. As a matter of fact, today it is not unusual for web-based MT to be mentioned more or less in passing within complex studies addressing areas such as translation studies, computational linguistics, NLP, language engineering, web localisation and web design, among others. In compiling this literature review an effort was made to include publications belonging to a range of fields that focus on online MT from a variety of angles, regardless of the theoretical or methodological environment in which they were generated. If, on the one hand, the breadth of this approach raises the issue of a somewhat fragmented literature survey, on the other hand it gives the possibility to build a clear picture of contributions that deal with online MT from a variety of perspectives, testifying to the remarkable interest that it attracts.

In the interests of the clarity and usefulness of the discussion, the works are reviewed in separate sections according to their nature and main thrust, in order to discuss together related publications so as to offer comprehensive and detailed coverage. Although some of the works contain material that could have been included for review in more than one section, with only a few exceptions they are usually mentioned in just one of them to avoid overlap and repetition. The contributions are usually discussed in chronological order within each section, but those written by the same authors or that cover similar ground are grouped together

to facilitate closer examination of related work, and in such cases the sequence of presentation in the literature review is different from that of publication.

2.2 Online MT and Translation Studies

Although there has traditionally been little mutual interest or collaboration between the fields of translation studies on the one hand and MT on the other, interestingly in the last few years a few major works devoted to translation studies have considered online MT as part of wide-ranging theoretical discussions and scholarly debates on translation. This section covers a few recent contributions in mainstream translation studies that have specifically addressed online MT: they seem to reveal a growing interest and an unbiased stance towards the role played by MT tools on the Internet and their potential to enable multilingual communication.

Munday (2001) assesses the present state of translation studies and envisages some future developments with an emphasis on the significant changes brought about by technology. Although the primary focus is on the contribution of corpus-based approaches to the study of translation, there is a recognition that “the internet is also changing the status and visibility of translators and translation” (Munday, 2001: 191), followed by a description of the language pairs and functionalities offered by Babel Fish. The end of the discussion warns that Internet-based MT software performs a kind of translation “that conceals the human involvement and gives the impression of it being an easy and automatic process” (ibid.), without however commenting specifically on the quality issues and on the merits of web-based MT systems.

Chesterman & Wagner (2002) has the format of a long dialogue between a translation scholar and a professional translator who discuss a number of issues related to translation. Very often the debate presents polarised arguments and positions that reflect the different backgrounds and perspectives on translation of the two authors: one sits in the ivory tower whilst the other operates at the “wordface” (the analogy is with miners working at the coalface), and throughout the book they try to reconcile their points of view. The discussion touches on the topic of MT a few times (e.g. referring to the use of MT software at international institutions and to MT blunders frequently publicised by the press), highlighting the shared concern that MT

may damage the profile and reputation of professional translators, but eventually the following suggestion is put forward with regard to the perception that the general public has of translation: “we may find that, paradoxically, Babelfish generates more interest in what goes on at the human wordface” (Chesterman & Wagner, 2002: 131). It is interesting to note that in a review of this book Mossop (2003: 375) picks up on this specific point of the discussion and remarks that “the availability of free MT on the Internet may for the first time be making a large public interested in translation”.

Cronin (2003) addresses a very broad range of topics exploring the relationship between translation and globalisation, and considers their theoretical as well as practical implications. Considerable attention is given to the software and web localisation industry, where the role of translation and language professionals intertwines with issues of cultural hegemony and of global power relations at the political and economic levels. A key concern is that of the increasing impact of technology on the working practices of translators and on the tools available for translation:

a nervousness surrounding the advent of increasing automation in translation and the proliferation of free, Web-based, MT translation [sic] services [...] is related to what is perceived as a radical undermining of the status of the human translator as mediator. (Cronin, 2003: 65)

However, the author argues very strongly that today the impact of technological advances is inevitable on translation as much as it is on any other sector of human activity, and emphasises that technological developments enable translation to play a vital part in shaping the new economy in the global age (ibid.: 113).

Finally, it is interesting to note that free online MT is frequently mentioned in the first part of a book that Umberto Eco devoted to a scholarly study of translation: Eco (2003) is largely based on the author’s own experience as a prolific writer of academic works and novels that have been translated into several languages. This resulted in long-lasting collaborations between the author and many professional translators who sought his help and advice when they faced particularly challenging problems translating his works into a variety of languages. In order to illustrate some of the key theoretical issues regarding the difficulties involved in translating a range of texts belonging to different genres, the discussion focuses for example on translation options involving context-dependent meanings and interpretations of the

source text requiring real-world knowledge. To make a number of points regarding subtle translation differences, Eco (2003: 27-58) dissects the output provided by Babel Fish for translations of a variety of short passages between four languages, i.e. English, French, German and Italian, commenting on the good and disappointing aspects of the performance of this free online MT service.

2.3 Online MT and Professional or Specialised Translation

The relationship between professional translators and translation technology has always been a difficult one, particularly because since the beginning of research and development efforts in the field of MT and at least until the ALPAC report (ALPAC, 1966; see also Hutchins, 1996) many in the MT community were confident that it would be possible to achieve fully automatic high-quality MT. As a result, human translators have traditionally regarded the intervention of technology in their profession as a threat, and there is a rich literature documenting the generally negative views held by human translators towards MT over the years, e.g. Englard (1958), Hayes (1982), Gross et al. (1991), Taillefer (1992), Hutchins (1997) and Theologitis (1998), to name but a few examples. In the wake of this long-standing tradition, this section focuses on more recent works that explore the relationship between professional translators and online MT in particular.

Austermühl (2001) gives an excellent introduction to a wide range of electronic tools that are available to translators, including computer-assisted translation (CAT) software such as translation memory products and terminology management packages, as well as online term banks and other Internet-based resources. The final chapter is devoted to MT, which is referred to as “a translator’s sword of Damocles” (Austermühl, 2001: 153), and includes a discussion of Internet-based MT services (*ibid.*: 174-175). This seems to have a pedagogic focus, in that readers are invited to try out for themselves some of the free web-based MT systems and to compare their performances, so as to identify the weaknesses displayed by the output. In summary, this seems to be an attempt to raise the awareness of translators, and possibly more specifically of trainee translators, as to the level of quality that can be reasonably expected of free Internet-based MT services.

Related to this point is a suggestion made by Macklovitch (2001: 28), who claims that free Internet-based MT, which notoriously produces output of extremely variable quality, may generate more work for professional translators:

in making foreign-language Web pages (at least partially) comprehensible, [free MT on the Internet] may actually be whetting people's appetite for fully comprehensible, polished translations. Far from posing a threat to translators, MT on the Web may actually result in a substantial increase in the demand for human translation.

Interestingly, Schäler et al. (2003) focus on the use of online MT for “gisting” purposes for web content along similar lines, turning their attention to the supposed threat posed by MT to professional translators. The following remark seems to apply particularly well to online MT, and especially to the free services:

one area where MT has met a demand for translation that up to now was not being met is in the continuous updating of webpages and their translations. Thus MT has provided a solution to this new area of demand, and is not replacing translators at all, as human translation in this area and on this scale simply cannot be envisaged. (Schäler et al., 2003: 105)¹

Mossop (2001) describes in detail principles and techniques of editing and revising which are very important skills for senior translators, translation project managers and other language professionals. Although the main focus is on editing and revising human translations, the scope of the discussion is occasionally broadened so as to include examples and exercises devoted to editing for MT, which is considered of particular interest because in production environments “it poses the twin questions of intelligibility and rapidity in making changes” (Mossop, 2001: 90). As a result, examples are discussed in which Babel Fish is used to translate between English and French a few short sentences to illustrate some of the key challenges posed by pre- and post-editing for MT.

¹ Baron (2003) focuses on how language is used on the Internet and refers to the deployment of online MT as the only viable solution to cope with the amount of multilingual material posted on websites that needs translating. Interestingly, whilst much of the discussion describes the unconventional and unpredictable (and therefore non MT-friendly) style used on the Internet, there is also a realistic and pragmatic view of how people can try to overcome language barriers: “How do individuals using the Internet cope with the translation problem? Since few users are competent in more than two or three languages at best, and most of us do not work with human translators at our sides, the “poor man's solution” has been the appearance of free, online translating tools” (Baron, 2003: 118).

Fulford (2002) reports on an exploratory study conducted between late 2001 and early 2002 to investigate the uptake of MT among freelance translators based in the United Kingdom. Of the 30 individuals who were interviewed, only two (i.e. less than 7%) “were actively using MT in their work” (Fulford, 2002: 119), but no details are given as to whether they used commercial off-the-shelf PC-based MT software or online services. Interestingly, however, a further eight of the professional translators who were interviewed “stated that they had ‘occasionally’ made use of web-based MT systems to produce an initial rough draft of a translation, or to ‘get ideas’ for producing a translation, before polishing the output manually ready for presentation to a client” (ibid.). This suggests that although in general professional translators are reluctant to integrate MT software into their working practice, online MT is seen by some as a potentially valuable translation aid.

Fulford & Granell-Zafra (2004a) give a progress report on an ongoing extensive questionnaire-based survey carried out to investigate what ICT tools and language resources were routinely used by UK professional translators, and which ones were deemed to be the most useful. The data presented in this study includes 390 responses received from freelancers and analysed as part of a three-year research project. While the authors note the widespread use of Internet-based tools among freelance translators, they conclude that “[b]eyond terminology and document consultation / look-up, there was little or no actual use being made of online systems, such as MT” (Fulford & Granell-Zafra, 2004a: 59). In a separate report, the same authors provide additional data gathered from the same survey, focusing in particular on the uptake of online tools and web-based language resources, which is of particular interest here. They state that only a very small minority of the 390 freelance translators who took part in the survey made use of online MT systems as part of their work, namely 3% of the respondents. This very low figure can be compared with the percentages for the use of other Internet-based tools and resources such as e-mail (93%), search engines (85%), online dictionaries and glossaries (78%) and multilingual terminology databases (59%). It is also interesting to note that the study in Fulford & Granell-Zafra (2004b: 42) offers a cluster grouping for 241 of the responses (the others were not included because they were not deemed suitable for cluster analysis purposes). According to this further analysis, 83 of the professional translators showed some awareness of online MT systems, while 81 of them did not demonstrate any awareness of online MT services at all.

The rest of this section covers related contributions focusing on the use of web-based MT for the specialised translation of legal texts. Given the constant need for translations within the legal community and the issues that this raises for professional librarians, Yates (2005a) points out that there is a growing demand from law students, lawyers and a variety of legal professionals to find information online and in their own language. The article reports the views of a number of law librarians based in the USA on this issue, and points out that these expectations are often unrealistic, especially when library patrons require legal information, laws, court decisions, etc. contained in foreign-language sources to be made available to them in English. Due to the length and cost of professional legal translations, Yates (2005a: 8) concedes that “[f]or many translation needs, users and librarians alike are turning to Web-based [machine] translators as an alternative”, although she recognises that they cannot provide a level of quality that is comparable to that offered by trained human translators.

The consensus among the librarians whose views are reported in the article is that online MT tools can be very useful for gisting purposes and to help generate search keywords in foreign languages to interrogate multilingual databases, but should not be relied upon for the interpretation of research or for the translation of complex and sensitive legal texts, such as legally binding documents. While Yates (2005a) praises the ready availability of free web-based MT services for a variety of language pairs and their speed, their poor handling of specialised legal terminology is perceived as a particularly serious weakness that makes them potentially useless, if not counter-productive. However, the conclusion suggests that “when the general meaning of a text is all that is required, [Web translators] can be very useful. As long as they are used with their shortcomings in mind, Web translators deserve a place in every law librarian’s tool bag” (Yates, 2005a: 10).

Yates (2006) expands on these issues in a more systematic study of how helpful and reliable Babel Fish in particular can be for translating legal information if professional translation is not a viable option due to time or cost constraints. The focus is exclusively on Babel Fish because this is recognised as the leading free online MT service, and it had been particularly praised by Balleste (2001) in a review of five MT products including both online services and off-line PC-based software (with or without online demo versions for testing purposes). The review presented in Balleste (2001) rated the MT programs on a five-point scale, taking into account

price (which inevitably biased the results in favour of freely available services), convenience to users and overall quality of the output. Some tests were performed for the language pair English-Spanish, given the author's native competence in both these languages, although no details regarding the nature of the input texts used for the tests are provided. The review in Balleste (2001: 5) concludes that in spite of not being perfect, Babel Fish was the best MT software and the quality of its translations exceeded the author's expectations.

Based on these initial findings, Yates (2006) provides some background on professional translation, looks at a number of well-known challenges faced by MT, and sets out to evaluate the performance of Babel Fish specifically on legal texts. The purpose of this study is to investigate whether a high-quality general-purpose free online MT service can provide the gist of law-oriented texts, recognising that it would be unreasonable to expect the precise translation of complex legal documents. Following a criticism of flawed techniques to evaluate the quality of MT software in which the author discusses the limits of the so-called round-trip translation method (Yates, 2006: 489),² the evaluation methodology is illustrated. This consists in translating with Babel Fish ten sentences from Spanish into English, and ten sentences from German into English, evaluating the severity of the translation errors. The sentences used in the experiment were randomly extracted from the Mexican and German civil codes and from recent press releases issued by the Mexican and German foreign ministries. This enabled the researcher to compare the MT output against the official professional translations of the source texts that were available in printed form for the two civil codes and on the English-language sections of the respective government websites for the press releases. All the material considered in the evaluation (i.e. the original source texts in Spanish and German, their official translations into English done by professional translators, as well as the output in English provided by Babel Fish) is available for reference online, as documented in Yates (2005b).

On the basis of the number of severe errors found in the MT output compared to the reference human translations, Yates (2006: 494) regards 75% of the 20 sentences as failed translations (i.e. they contained at least one severe error), which is considered "a dismally high failure rate". The study also points out that none of the

² This issue is also discussed by other authors, and their views are covered in more detail in section 2.5.

20 translated sentences was error-free, and that whilst Babel Fish's performance was poor overall, the quality of the output was variable. Interestingly, for example, in the small sample of sentences under consideration the translations from German were consistently more successful than those from Spanish, with roughly half the number of errors rated as moderate or severe. Finally, considering together both source languages (i.e. without differentiating on the basis of the output deriving from texts in Spanish as opposed to German) the evaluation showed no difference between the number and severity of errors found in the MT output for the civil codes and the press releases. The conclusion of the study emphasises that Babel Fish should not be trusted if the precise meaning of translated law-oriented texts is needed. However, the author recognises that it is a very valuable tool to identify foreign-language documents and sources of potential interest for a particular purpose or a specific topic, and to decide whether to entrust a professional translator specialised in the relevant subject matter or field with their accurate translation (Yates, 2006: 500).

2.4 Online MT for Translator Training, Language Teaching/Learning and Educational Purposes

The first part of this section is devoted to studies and reports that address the issue of using online MT within translator training courses, whilst the second part focuses on the role that can be played by web-based MT in language teaching and learning. La Torre (1999) discusses the rationale and design of an innovative web-based resource for students at a UK university who were taking a one-semester module in "Introduction to Translation Theory" as part of their upper-intermediate and advanced courses of Spanish. One of the key aims in offering this learning resource was to familiarise the students with translation tools that are commonly used today, as well as to ensure that they could assess the quality of MT software and perform basic post-editing of raw MT output. To this end, the students carried out a number of guided tasks using Babel Fish and the online version of Systran, both available free of charge. The paper reports on a post-editing exercise that three students did by polishing the raw output into English of a literary passage in Spanish with some dialogue and idiomatic expressions. Overall, this innovative learning experience was seen as a positive one both by the lecturer who designed it and by the students, who

welcomed the opportunity to put to the test their linguistic knowledge and to broaden their translation skills with the support of online MT (La Torre, 1999: 48).

Gaspari (2001) focuses on a survey investigating the change in the opinions held by trainee translators on MT after attending an introductory course devoted to this subject. The study was carried out among 38 university students of translation in Italy and shows that after the end of the course they had a more objective and positive attitude towards the potential and the real role played by MT. The course involved a series of theoretical lectures followed by hands-on lab sessions in which the students used free online MT services to perform a number of guided tasks, and which proved very popular with the students (more details on the design and contents of these tasks are provided in Gaspari 2001: 37-38). Similar experiences with other sets of practical activities and assignments making use of online MT for trainee translators studying at universities in different countries are also reported in Yuste Rodrigo (2001: 46), Kübler (2002: 158) and Robichaud & L'Homme (2003: 33), and the general impression is that activities based on web-based MT software are regarded as positive learning experiences for students of translation.

The remaining part of this section shifts the focus from translator training to a related area, in that it looks at web-based MT in connection with foreign language teaching and learning. Both Yang & Lange (1998: 282) and Yang & Lange (2003: 202) make the point in a very similar way that the designers of Babel Fish never thought of it as a tool to teach or learn languages. However, evidence based on its usage and users' feedback indicates that there are indeed Internet users who wish to take advantage of this free online MT service to learn new languages and to do their foreign-language homework, and it is likely that this trend is common to other web-based MT tools as well, particularly free ones, as also noted by Niño (2005: ev). Clavier & Poudat (2001) discuss their experience of teaching MT courses to university students of foreign languages and linguistics in France, and due to the difficulty of receiving funding to purchase licensed software, the practical components of their MT courses were based on freely available online services.

McCarthy (2004) focuses on the possibility that today foreign-language students may take advantage of online MT tools like Babel Fish to avoid doing translations that are part of their homework and coursework-based assignments. The author involved a group of advanced foreign language learners in their third year at university in a discussion on how to solve this problem which might prevent students

from developing their full potential, and the paper reports their suggestions, pointing out their merits and drawbacks. The author recognises the instructional value of working with the students to explain the deficiencies of typical MT output, thus raising their awareness as to what are the potential pitfalls of relying on translation tools to prepare coursework that is assessed or represents part of the learning process. The conclusion lists a number of ideas based on sound pedagogical practice whose aim is to minimise the risk of students taking advantage of Babel Fish or other free online MT tools to avoid working on their language learning and translation assignments, along with a proposal on how to deal with cheating students who make unfair use of web-based MT services.

Somers et al. (2006) recognise the problem that the ready availability of several free online MT services makes it possible for language students to use them unfairly along the lines discussed by McCarthy (2004), and are interested in investigating whether it is possible to automatically detect the dishonest use of online MT tools by language students. They borrow a combination of methods and techniques from the fields of computational stylometry, plagiarism detection, text reuse and MT evaluation, and report a pilot experiment involving 25 intermediate learners of Spanish, Italian and German who were native speakers of English. The results of the experiment, which was carried out with school pupils and university students in the UK, suggest that there are indeed a variety of measures that can accurately indicate that a translation might have been “derived”, i.e. produced unfairly using slightly edited output provided by an online MT service, thus warranting further investigation on the part of the language teacher as to its actual source.

Niño Alonso (2006) carried out her doctoral research focusing on the implications and potential of using MT post-editing in foreign language teaching, with a special emphasis on the pedagogic challenges posed by the possibility of utilising raw MT output to develop the students’ skills in foreign language written production. Recognising that currently it is not uncommon for language students to rely on the output provided by free online MT services in the preparation of their written assignments, the overall aim of the research is to suggest how the output produced by MT software could be put to good use within the context of language teaching and learning. To this end, Niño Alonso (2006: 190) carried out a survey to investigate teachers’ perceptions of the use of MT for the purpose of foreign

language teaching. This survey involved 30 individuals, most of whom were teaching a range of languages of which they were native speakers at the university at a variety of levels, from beginners to advanced. 93% of the respondents were familiar with MT, and 60% of them had been exposed to MT on the Internet, by using online services. The survey revealed a general consensus on using MT tools for teaching purposes with more advanced students, in bidirectional translation tasks involving the students' native language and the foreign language being studied with non-technical source texts. It is interesting to note that the option of taking advantage of web-based MT services represented a distinct possibility for 30% of the teachers who took part in the study and who had never yet utilised MT software for their work, but would consider doing so at some point in the future.

Finally, this section is completed by a brief overview of other contributions that refer to the use of online MT tools for educational purposes within courses focused on translation technology in a variety of countries and different educational environments, but which were not aimed specifically at students of translation or foreign languages (these might be, for instance, undergraduate or postgraduate students of computer science, informatics, electrical engineering, artificial intelligence, etc.). In a paper devoted to using Internet-based resources and information to teach MT, Balkan (2001: 9) refers to some webpages that list online MT services that could be used for teaching MT, whilst Forcada (2000), Pérez-Ortiz & Forcada (2001) and Forcada (2002) describe laboratory assignments with different objectives that can be carried out by getting the students to test web-based MT systems, illustrating them by means of examples that focus on the language pair English-Spanish.

Kenny & Way (2001) compare their experiences of teaching MT and CAT to university students in Ireland with different backgrounds and at different levels. As part of the practical components of their courses they mention using two different kinds of MT software, namely one PC-based system and the online MT service provided by Systran on the Internet, and discuss some of the tasks that the students are asked to carry out using these two MT systems, e.g. pre-editing of the source text to improve the quality of the output (*ibid.*: 16). Gaspari (2002) is entirely devoted to the use of free online MT services to teach MT without focusing on a specific experience at a particular institution or with a certain set of students, and discusses the main advantages and disadvantages presented by free web-based MT systems

compared to PC-based offline MT software for teaching purposes. Finally, Mitamura et al. (2003) describe the contents and delivery strategy of a graduate-level course in MT for students with a background in computer science at a university in the USA, with assignments involving tasks and experiments with online MT services given to students as part of their homework.

2.5 Impact of Online MT on the Field of MT

This section reviews works that address specifically the impact of online MT on the overall field of MT from a variety of points of view which are often combined, namely those of the MT users, the research community and the MT-related industry and vendors. The earliest attempt in this area found in the literature is that of Brace et al. (1995), who in a survey of the users and usage of MT in Europe and the Americas predict the trend of an “upsurge in the use of MT on-line”, and in fact discuss separately the use of “MT on PCs” from that of “MT on-line”. They regard the latter as an “impressive development, with potentially far greater impact” than the availability of software that provides translated output in the form of synthesised speech for written input. This paper also refers to the experience of a couple of Internet-based providers offering an added-value service to paying customers requiring post-edited polished versions of output produced by MT made available online, demonstrating that in the mid-1990s the area of support services related to MT was attracting growing commercial interest on the Internet platform.

At a major international conference in 1996 there was a panel with six speakers entitled “MT Online: The Future is Now!” (AMTA, 1996: 220 ff.), and two of the contributions recorded in the proceedings are worth mentioning here. Clements (1996) presents a number of scenarios in which the availability of online MT is the ideal solution to real communication problems, but highlights that the language used in Internet-based exchanges is often stylistically and grammatically sloppy, which presents unprecedented challenges to MT. However, he emphasises that translation technology is essential to enable communication and interactions on the Internet, given that language barriers are preventing people from taking full advantage of the possibilities offered by the telecommunications infrastructure, and concludes that the “convergence of the Internet, e-mail and various online services,

as well as the increasing popularity of the personal computer over the whole world, presents the greatest opportunity yet to bring MT “to the masses” (Clements, 1996: 221). On the other hand, though, O’Neill-Brown (1996) points out the trivial but still important technical aspects that can prevent the large-scale or effective deployment of online MT tools, referring in particular to the amount of documents that are available only on paper. Before these can be processed with web-based MT, they have to be digitised by making use of optical character recognition software (with the need for someone who is familiar with the language concerned to make checks and corrections where needed), which has clear implications in terms of the time and costs involved in the whole process. In addition, O’Neill-Brown (1996: 222) also mentions encoding issues that can have an adverse effect on the MT processing of online texts.

In an overview of research and development in the field of MT in Canada, Macklovitch (1997: 204) claims that “the Internet is transforming classic MT in at least two distinct ways. On the one hand, it is facilitating general access to MT systems and MT service providers; and on the other, it is generating a tremendous new demand for translation”. He then examines the impact of this scenario on the MT industry, focusing in particular on the commercial strategy of one major Canadian-based software company that customises and re-sells MT products manufactured by other industrial players to provide a one-stop solution to the needs of corporate clients for Internet-based translation and multilingual online content management. It is interesting to note that the same author returned to this topic in a later contribution, reinforcing the same arguments on the basis of the developments and trends detected in the intervening few years:

[t]hanks to the spectacular growth and the pervasiveness of the World Wide Web, more people today have access to and are actually using MT than ever before. This democratisation of MT is very recent and [...] the result of this MT-at-a-click phenomenon is undeniable: millions of people have actually experimented with machine translation now and so have at least some idea of what the current technology can and cannot do. (Macklovitch, 2001: 27)

The author stresses in particular the role played by free Internet-based MT services, and describes briefly some of the attempts made by the MT industry to capitalise on the enormous demand for automated solutions to translation needs in the online

environment, mentioning the marketing approaches of a number of key players in this very competitive arena.

Recognising the increasing importance of the Internet in shaping the needs and requirements of MT users and therefore its impact on the attempts of the MT industry to expand its business, McLaughlin & Schwall (1998) identify the key players involved and outline the MT products and services with the greatest potential on the Internet. First they provide some general background on the increasingly multilingual content available online and on the distribution of Internet users across the world, and then present a case study focusing on a leading provider of MT solutions for the web, reporting on its customer base, tools and products. Ananiadou (1998) examines the trends in MT in Europe and Japan, and part of the study provides details on the language coverage, modes of use and conditions of service of four leading commercial providers of online MT (two based in Japan and two based in Europe), so as to illustrate the dynamism in this area.

Hutchins (1999) discusses recent developments in the use of MT systems and computer-based translation tools, and devotes an entire section to the topic of “MT on the Internet”. Although some of this overview of systems, tools and companies covers the translation of webpages or website content with offline translation tools, the final part focuses more specifically on Internet-based MT tools, mentioning for example the partnership between AltaVista and Systran to offer the free online MT service Babel Fish, as well as the activities in this area at CompuServe. Summarising the emerging trends concerning the strategic and commercial importance of delivering web-based MT services, the discussion concludes that “the potential for MT on, via and for the Internet is now being fully appreciated – no company can afford to be left behind, and all the major players have ambitious plans” (Hutchins, 1999: 11). Similar considerations are then reinforced in Hutchins (2001), in the light of further developments along these lines in a subsequent assessment of the role played by online MT services.

Allen (2000) focuses on the impact of online MT services, which are referred to as “Internet translation portals”, on the MT market in the late 1990s, and offers a perspective on their value for the users as well as for MT companies. This contribution is interesting in that it sheds light on the connections between the many free online MT services available on the Internet and the commercial strategies of a relatively small number of companies specialised in MT system development and

implementation. After Internet users are given the opportunity to try out free MT services that showcase commercial MT products, for example offered in partnership with search engines, the market opportunity exists to turn them into paying customers who for a fee receive higher-quality translation services. These consist, for example, in the possibility to translate unlimited amounts of text (whereas length limits and connection timeout constraints apply to non-paying occasional users) and in the option to activate domain-specific dictionaries to improve the quality of the translations of specialised texts (whilst free MT services typically have only general-language dictionaries that cannot be customised or augmented).

Smith (2001a) discusses the high visibility that MT enjoys as a result of being widely available on the Internet to a global audience of potential users, and emphasises the problems that may be caused by disappointing the expectations of the public due to the poor-quality results that can be produced by online MT services. In particular, mention is made of the laughable results produced by free web-based MT services translating from English into other major languages the contents of the Starr report published in 1998 regarding the “intimate dealings” of a former US President with a young female intern. Smith (2001a: 38) argues that given the “potent combination of technical and colloquial English” in the source document that would have been a challenge for a capable human translator, “MT applications were quite out of their depth”. The paper points out that the unedited raw MT output hastily produced in a number of languages using free online MT software was widely disseminated to satisfy the morbid curiosity of Internet users for the contents of the report, and given the poor quality of the results some people were quick to dismiss MT software altogether as useless. In this respect the author stresses that some uses of MT, e.g. to translate texts with sensitive content and colloquial language, are inappropriate and give a distorted picture to the public of its usefulness in supporting multilingual communication.

In a wide-ranging discussion of the latest developments in the field of MT, Somers (2003b) comments on the impact of online translation tools on MT in general, particularly with regard to the users’ community: “[t]he increased visibility of MT has had a number of side effects. It has of course increased the general public’s awareness of MT, in some cases clarifying its limits but also its benefits” (Somers 2003b: 523). In line with some of the arguments presented in Smith (2001a) summarised above, Somers (2003b) also adds that online MT services are faced with

difficult challenges because they are likely to process unpredictable (and, possibly, badly drafted) input on virtually any topic, which is a notoriously error-prone way to use MT software, and advocates the need to educate the general public as to what level of quality can be reasonably expected of web-based MT.

It is, however, undeniable that Internet users take advantage of online MT services to translate a very large variety of texts on any topic which would not get translated otherwise, and as long as MT tools are freely available on the web it is impossible to limit or control how they are used. For example, the so-called “round-trip translation” (or RTT, also sometimes referred to as “back-and-forth translation”) is a technique often used to intuitively evaluate the quality of the output provided by MT software, without however relying on solid theoretical or empirical foundations, and free online MT services are often employed in these kinds of translation exercises. Somers (2005) argues that RTT is not in fact as useful as some lay-users of MT on the Web may think, and demonstrates this by means of two separate experiments which show that the two steps involved in RTT, namely the “forward translation” and the “back translation”, actually conceal from the users the reasons why the MT processing is successful or, conversely, fails. The experiments reported in Somers (2005) are based on a range of different texts and involve five different free online MT services (i.e. Babel Fish, FreeTranslation, Systran, ProMT and Worldlingo), suggesting that although non-experts in MT might see some value in it, the RTT technique is not helpful to reveal the quality of a particular MT system or the “machine translatability” of a particular text. In a similar study, van Zaanen & Zwarts (2006) use five MT systems³ to translate between two language pairs (from English into German and from French into English) texts of 100 sentences each belonging to different genres. With this experiment they provide further evidence of the fact that the RTT method cannot be used to measure the quality of MT software.

Exploring some other issues raised by the use of MT for unconventional purposes, Gaspari (2006) presents an overview of websites that parody real online MT services, and whose sole purpose is to amuse users by offering fun translations without any practical use beyond their entertainment value. The websites that are considered are grouped into two main categories: the “impersonation” websites translate into sociolects strongly associated with certain groups of speakers, local

³ The authors do not mention the names of these systems, so it is impossible to say whether they are online MT services like the ones included in Somers (2005) or not.

dialects or non-standard accents, invented languages like Pig Latin or the alleged speaking style of eccentric celebrities and funny fictional characters;⁴ the “Chinese whispers” websites, on the other hand, translate the input into one or more target language(s), and then back again into the original source language, with each stage of the process increasing the distortion in both form and meaning between the final resulting output and the original source text (thus making use of the RTT technique mentioned above). Gaspari (2006) looks at some of the key linguistic and design issues behind the implementation of these fun translation websites, and discusses their impact on the reputation of, and users’ trust in, genuine Internet-based MT tools. The conclusion is that although in the short term fun translation websites are unlikely to seriously affect well-established online MT tools, it remains to be seen whether at some point in the future they will alter the perception of real MT among Internet users.

2.6 Service-specific Accounts and Reports on Usage and Development

This section covers accounts and usage reports focusing on individual online MT services, as well as works describing the design, development and implementation of web-based MT systems for specific language pairs that are deemed to be of particular significance because they exemplify the wide range of activities taking place in this field. As a result, in the interests of clarity the following sub-sections cover separately some of the best-known MT services and a sample of the language pairs on which substantial research and development efforts have been focused so far. Inevitably, there is a different amount of material available for each of these sub-sections, but the relevant literature is represented for the areas that are covered, and wherever possible an effort has been made to include both reports and accounts produced by those directly involved in developing the online MT tools concerned, as well as by other independent observers.

⁴ The most popular of these parody and humorous translation websites is arguably “The Dialectizer”, available at <http://www.rinkworks.com/dialect> [accessed 15 June 2007]. It is interesting to note that this fun MT-like service is mentioned in books about the Internet and web design (e.g. Wallace, 1999: 9; Shedroff, 2001: 8-9), as well as in Crystal (2001: 79), which is one of the most authoritative and comprehensive books devoted to the study of language on the Internet.

2.6.1 Early Groundbreaking Experiences at CompuServe

The first reference found in the literature since the early 1990's to developments in the area of using MT in the online environment dates back to September 1992. In the third issue of *MT News International*, the *Newsletter of the International Association for Machine Translation*, Harrison (1992) announced that CompuServe was investigating the possibility of offering MT to the subscribers of its online information service. This involved a six-month evaluation period focusing on existing MT systems for the language pair English-German (in both directions), to test the output quality and the overall performance of available software on texts typically found on CompuServe's online services: "CompuServe's basic goal for MT is to provide draft-quality translation directly to end users. [...] We suspect that there is a market for low-cost translations, even if the quality is less than ideal" (Harrison, 1992: 11). Although technically these developments were not yet in the direction of offering online MT as we know it today and as it is commonly understood in this thesis, i.e. in the form of services that users can directly log on to in order to provide their input texts, the pioneering experiences at CompuServe laid the foundations for further crucial developments in the mid-late 1990s, and for this reason they are examined here.

Flanagan & Jensen (1994) report on the early implementation of an entirely automated MT process at CompuServe whereby the messages posted in English on selected forums were periodically collected, fed through an MT system, and then the output in French and German used to produce parallel versions that could be read by users who were not familiar with English; with this approach, the original forums (in English) and the machine-translated versions (in French and German) presented the same contents and the same structure (e.g. the threading and sequence of the postings were maintained). Following these early attempts, Mary Flanagan, a computational linguist who led the Advanced Technologies Group at CompuServe from 1992 until 1998, regularly reported on the groundbreaking developments that were being pursued at CompuServe for the rest of the 1990s.

The statistics that are reported in Flanagan (1995) are staggering: MT was used for translation between English and three other languages, namely French, German and Spanish, and during the first month of operation in excess of 900,000 words were translated at a speed of over 3,000 words per minute on just one of the more than 600 specialist interest forums available on CompuServe. Details are also

given on further plans and services (e.g. a low-cost post-editing service for email translation) to be launched for CompuServe subscribers, with an assessment of the commercial opportunities offered by the deployment of MT in the online environment, as well as of the challenges that this poses. Against this background, Flanagan (1996a) focuses in particular on the usage patterns and on the reactions of the users who are exposed to MT output for the first time: 25% of them abandon the service after receiving the first translations, possibly because they are surprised by the poor quality of the raw output and find it impossible to understand or use effectively. Interestingly, in response to the launch of the online MT service, CompuServe received “hundreds of angry e-mail messages, as well as hundreds of resumes from translators” offering their services (Flanagan, 1996a: 193). However, the report goes on to say that “users were overwhelmingly satisfied with the quality of the translations [...] and several large users routinely submit jobs totalling more than 10,000 words per week” (ibid.: 194).

Flanagan (1996b: 244) summarises the philosophy of these initial attempts to offer online MT to registered users as follows:

CompuServe has taken a pragmatic approach to MT technology, focusing on finding a market niche for what it can do – generate rapid, very rough draft, information-scanning quality translations in an environment where quick scanning for content is more important than high quality.

However, retaining some quality was still a concern, in that CompuServe’s Document Translation Service offered its subscribers the possibility to upload their own documents for MT, and to request an additional optional post-editing service: the latter was charged at a rate per-word that was ten times higher than the rate for raw MT output (Flanagan, 1996b: 245). In a further report, Flanagan (1997a: 25) states that 85% of jobs were submitted for unedited translation (i.e. to receive raw MT output), with additional professional post-editing at the higher rate being requested in only 15% of the cases,⁵ and Flanagan (1997b) perceptively refers to online translations as “MT’s new frontier”.

⁵ Commenting on CompuServe’s MT-related services, Bonthron (1996: 4) reports that post-edited jobs are generally much larger than those for which only raw MT is requested. As a result, in terms of word count the ratio is more balanced, being approximately 60% raw MT output vs. 40% post-edited content.

2.6.2 MT Goes Live on the Internet with Babel Fish ⁶

Whilst the importance of the role played by CompuServe in introducing MT to many new users (more than two millions, according to *MT News International*, 1999: 15) cannot be overestimated, access to the MT services provided by CompuServe was still restricted, in that it was available only to registered subscribers. This scenario changed radically on December 9, 1997 with the launch of Babel Fish, which was made available free of charge to any Internet user as a result of a partnership between Systran Software Inc. and the search engine AltaVista, and since then Babel Fish has probably remained the most popular and best-known free online MT service. Before that, Systran was already offering a form of online MT as early as 1988 via Minitel, the network of terminals administered by the French postal service, and since 1996 it had also started to provide online translations of webpages on the Internet (Yang & Lange, 1998: 276).

However, the partnership with AltaVista, one of the most popular search engines of the 1990s, ensured unprecedented visibility for Babel Fish, and Yang & Lange (1998) describe users' feedback and usage behaviour observed during the first few months of operation of the service. It is interesting to note that they report (*ibid.*: 282) significant usage in areas that were either not anticipated by the providers of the service (e.g. as a tool to learn foreign languages), or deprecated by them (i.e. as an entertainment tool, getting it to translate idiomatic expressions or to perform back-and-forth translations). Initially the service covered ten language pairs (i.e. English in bidirectional combinations with French, German, Italian, Portuguese and Spanish), and Yang & Lange (2003) provide an update on further developments of Babel Fish and its usage by a growing community of Internet users. They report, for example, that between 1998 and 1999 the most frequently requested language pair was for translations from English into Spanish, as well as other details on the kind of content that was fed to the system, revealing an amazing variety, from chatroom jargon to X-rated material and adult content via taboo words and risqué terms.

Watters & Patel (1999) conduct a number of tests using Babel Fish to translate proverbs from English into other languages, arguing that

⁶ This is a reference to the title of the chapter on Babel Fish by Jin Yang and Elke Lange (chapter 12) contained in a volume edited by Harold Somers (Somers, 2003c).

using a set of the most commonly known proverbs in English, it should be possible to evaluate how well direct translation systems are able to process semantic information, and whether they correctly select the appropriate sense of a word, where multiple senses exist. (ibid.: 155)

Their rather informal evaluation method consists in translating four proverbs into each of the five target languages initially supported by Babel Fish in combination with English, and then back again into the original source language, trying to account for the mistranslations that have occurred in the process. The data provided by these tests is analysed in detail in spite of relying on a fairly impressionistic basis, and in general the results are considered rather disappointing, although the authors concede that they “are limited to the extent that the translation performance of expert human translators was not tested against” the online MT service (ibid.: 159). Prompted by the interest caused by the launch of Babel Fish and by the bizarre ways in which some people tend to use this service, of which Watters & Patel (1999) is a poignant example, Bennett (2000) provides a realistic examination of the merits and drawbacks of the system. Criticising the unreasonable expectations as to the level of quality that Babel Fish’s output should display, Bennett (2000) explains some of the major challenges involved in processing unpredictable input supplied by users who may not have a clear understanding of the limitations of MT (cf. Arnold, 2003).

Concluding this sub-section are three contributions that do not focus exactly on Babel Fish, but on Internet-based MT engines powered by Systran, therefore having some similarity to it in terms of the underlying technology and deserving to be mentioned at the end of the part devoted to Babel Fish. Smith (2001b) focuses on an ongoing pilot project to test the feasibility of offering an online MT application powered by Systran to the international employees of PricewaterhouseCoopers (PwC) working at different locations around the world via the firm’s intranet. The proposed MT facility covers 20 language pairs and users can select specialised dictionaries to improve the quality of the MT output. According to user feedback the quality of the results is variable, and the paper recognises the need to further fine-tune the system in order to make it more productive (ibid.: 343).

Further developments in this respect are reported in Smith (2003), which states that as of September 2003 the number of available language pairs provided by Systran has nearly doubled, rising to 37. The most popular language combination among PwC employees is for translations from English into Spanish, which is in line

with usage for the freely accessible online service provided by Babel Fish, followed by the opposite combination, i.e. from Spanish into English (which, however, received only slightly more than 50% requests compared to the other direction). The paper also describes some customisation efforts at the terminological level to tailor the MT dictionaries to the needs of the company, reporting that approximately 130,000 translation requests coming from 7,300 individuals around the world have been processed by the MT facility since it was first introduced. User feedback indicates a prevalence of positive reactions, although there is some evidence of negative responses as well. Finally, Smith (2003) includes two examples of real documentation that gets processed by the PwC/Systran MT engine and discusses some possible future enhancements under consideration.

Kübler (2002) focuses on similar issues regarding customisation efforts geared towards enhancing the performance of online MT services, but outside the corporate environment. This study addresses the challenges of combining available tools and resources to customise dictionaries used by MT systems, in an attempt to enable technical translators to become more time-efficient in their work. The experiments make use of Systranet, an online MT service supported by Systran, in which users have access to a dictionary management utility to create and augment their own personalised dictionaries, with a view to improving the quality of the translations of specialised and domain-specific documentation. The paper focuses on the translation of technical material from English into French, and shows that after an initial investment of time in mining bilingual glossaries, corpora and other publicly available online resources to identify relevant terminology and feed it into Systranet's customisable dictionaries, noticeable improvements are achieved in the quality of the raw output provided by the web-based MT system. In conclusion, this means that the output produced with the help of personalised dictionaries provides a draft of a quality that is good enough to be post-edited and polished into a final text of publishable professional standard by a technical translator, saving them time and guaranteeing productivity gains with a speedy return on investment.

2.6.3 Online MT Services for Arabic

This sub-section is devoted to works focusing on web-based MT services that support Arabic as source and/or target language. Chalabi (2000) describes the basic components of the internal architecture of a bidirectional English-Arabic online MT

system called Tarjim, dwelling in particular on the challenges presented by the processing of input in Arabic, given its morphological and syntactic features. The paper claims that the “average accuracy” of this MT engine is 65% (Chalabi, 2000: 190), but it is not clear on what basis this figure is calculated. The author then moves on to discuss some procedures that the MT system uses to handle the layout of the webpages that it translates. Chalabi (2001: 1) focuses on the bidirectional Arabic-English MT engine called Sakhr, which is said to power Tarjim, reporting an average accuracy of about 70% for the English-to-Arabic combination, and about 60% for the opposite direction, although no further details are given as to the method used to indicate this level of accuracy.⁷ The end of the paper describes briefly the integration of the Sakhr MT technology into an Internet search engine, to enable users to perform cross-language searches involving English and Arabic.

Zantout & Guessoum (2001) describe in detail the technical issues involved in the implementation of a prototype online MT system to translate webpages from English into Arabic. A number of aspects related to the processing of HTML tags are addressed, and several examples illustrate some of the key linguistic problems that are typical of translating between these two languages. Zunghoul & Abu-Alshaar (2005) discuss the history of the progress of MT software supporting Arabic from the early beginnings up to the latest developments. Whilst most of the historical background is of no interest here, the authors provide a list of existing MT software products for Arabic which include a few online services, such as Tarjim (bidirectional English-Arabic), Al-Misbar (monodirectional from English into Arabic) and Sakhr (bidirectional English-Arabic), whose main features and functionalities are described.

Finally, Izwaini (2006) reports on tests involving three free online MT services, namely Google Language Tools, Sakhr and Systran, reviewing their weaknesses when they translate between English and Arabic in both directions. The tests are based on a set of non-literary texts in English and Arabic of varying length and complexity. The discussion focuses in particular on the problems that are observed in the output provided by the web-based MT systems under consideration, trying to identify the likely causes, and a categorisation of the most common and

⁷ It should be noted, however, that the 65% accuracy given for Tarjim in Chalabi (2000: 190) might be consistent with the average between 70% and 60% for the accuracy achieved for each language direction (from English into Arabic and vice-versa, respectively) quoted in Chalabi (2001: 1) for Sakhr, as Sakhr seems to be a development of the MT technology initially devised for Tarjim.

serious mistakes is offered. The main factors that are taken into account to evaluate the target texts are their readability and fluency, but the analysis also considers the extent to which the translations preserve the informative content of the source material, judged on the basis of their similarity to ideal translations produced by a human. Following an account of the linguistic challenges that MT faces for the language pair English-Arabic, which are illustrated by means of a wide range of examples accompanied by insightful comments, recommendations are given to improve the areas in which the most glaring weaknesses are detected.

2.6.4 Online MT Services for Japanese

Nakayama & Kumano (1999) describe the design and main strengths of a bidirectional English-Japanese online MT service, in which users can enter the source text to be translated via a webpage and receive the output via email. They point out that this service enables users to semi-automatically build their own specific dictionaries, which are maintained on the system's server, by helping them with the terminology extraction. The system has six specialised dictionaries for the translation direction into Japanese and four for the opposite direction, which are available to all users. The final part of the paper discusses some data regarding the usage and performance of the system, emphasising the benefits brought to users by the semi-automatic terminology extraction facility to build customised dictionaries. Similarly, Murata & Yamamoto (1999) also describe an online MT system to translate web content bidirectionally for the language pair English-Japanese. Although they do not give many details regarding the technical implementation or the internal architecture of the system at the linguistic level, they emphasise its robustness and processing speed for the benefit of the users, who do not experience significant delays when browsing translated Internet content.

Other related contributions for the language pair English-Japanese are Sukehiro et al. (2001), Shimohata et al. (2001) and Murata et al. (2003). They all refer to a web-based MT environment (named Yakushite.Net), which includes an online MT service as well as a range of other translation-oriented tools. For example, registered members of this online environment can contribute to collaborative efforts to create, augment and update specialised dictionaries with words and phrases belonging to specific domains in which they have an expertise or an interest. Although only registered users can manipulate the dictionaries, any user of the

service, which is freely accessible, can activate them when requesting a translation. The declared aim of this service is to go beyond the use of web-based MT output for gisting purposes, and provide high-quality translation, leveraging the domain-specific and bilingual knowledge of contributing members of the online community. This web-based MT environment also provides other facilities to enable communication and distributed collaboration among community members, such as a terminology extraction tool and dictionary management facilities, bulletin boards to share information, a list of links to direct interested users to relevant resources, etc. Sukehiro et al. (2001), Shimohata et al. (2001) and Murata et al. (2003) point out on a number of occasions the advantages of this approach to the development of online MT resources in comparison to other Internet-based services that do not allow users to customise or augment dictionaries.

Finally, Yamada et al. (2005) provide a very interesting overview of the MT market in Japan, and focus in particular on the use of web-based MT systems. They report the results of a questionnaire-based online survey that collected information on MT use from about 4,000 respondents between February 2003 and February 2005. The data shows a slight but steady increase in the use of web-based MT services in this two-year period, and the authors state that the overwhelming majority of MT activity in Japan involves English and Japanese. People with a limited knowledge of English are particularly likely to use online MT to support their navigation of websites available only in English, by translating their content into Japanese. On the other hand, though, no specific information is given in the report on MT usage by people with no knowledge of English at all. Interestingly, however, the period under consideration saw a 5% rise in the number of professional translators based in Japan using web-based MT as part of their work (Yamada et al., 2005: 58).

2.6.5 Online MT Services for Korean

Choi et al. (1998; 1999) discuss the shortcomings of available MT software for the language pair English-Korean (cf. Auh, 2001), and describe a symbolic and statistical hybrid approach with a view to resolving problems and inadequacies shown by previous MT systems. They describe how this new approach providing a solution to long-lasting problems is implemented in a bidirectional English-Korean web-based MT service that has been under development since 1997. Choi et al. (1998: 253) provide a discussion of syntactic divergencies between the two

languages that are known to cause difficulties for the quality of MT output, and details are given regarding the size and scope of the dictionaries of the system for both language directions (ibid.: 254). Following a development effort to improve the initial implementation of the service, an evaluation test based on a suite of 250 sentences shows significant increases in accuracy, and some additional comprehensibility tests of the MT output provided by the updated system yield equally positive results (Choi et al., 1999: 436).

2.6.6 Online MT Services for Thai

Boonkwan & Kawtrakul (2002) describe an Internet-based English-Thai translation system. Recognising that MT software usually does not provide output of satisfactory quality for this language pair, they suggest an interactive Internet-based system, in which the user can select the best translation option from a range of possibilities that are generated, and also apply new translation rules to improve the system. Enhancements to four key areas in the performance of the MT system are reported, namely “lexicon rearrangement, structural ambiguity, phrase translation and classifier generation” (Boonkwan & Kawtrakul, 2002: 1). The system is evaluated on a test suite of 322 randomly selected sentences, and the accuracy ranges from 59.87% to 83.08%, depending on the precision of the parser. It should be noted, however, that this online implementation of an MT service relies on the interaction with a human user to operate, as stated by the authors: “[t]his project differs from the current MT systems in the point that the users have a capability to manually select the most appropriate translation, and they can, in addition, teach new translation knowledge if it is necessary” (Boonkwan & Kawtrakul, 2002: 6).

Modhiran et al. (2005) describe in detail an online MT service for translation from Thai into English, which is an extension of an existing web-based MT system that translates from English into Thai. They consider in particular some key features of the Thai language that are extremely challenging for MT, and therefore regard the pre-processing and analysis stages of the input as crucial to the success of their system. An interesting feature of this online MT system is that when users submit the input via the home page of the service they can decide whether they wish to operate the system in fully automatic or semi-automatic mode. In the former case, the output in the target language is returned to the users on the screen. In the latter case, on the other hand, users are shown the output resulting from the pre-processing

segmentation stage. If they identify any problems, they can edit the wrong segmentation performed by the system for ambiguous parts of the input, and then restart the translation process with the likelihood of getting higher-quality output in the target language (Modhiran et al., 2005: 409). The authors do not report any formal evaluation tests, but identify a number of areas where the performance of their service displays some weaknesses that need to be addressed, particularly when syntactic ambiguities need to be resolved by the system operating in fully automatic mode.

2.7 MT for Chatrooms: the Case of Amikai's AmiChat

This section discusses the use of Internet-based MT software in chatrooms, where instantaneous translation in real time is essential to enable people participating in a chatroom session without sharing a common language to have a positive interaction. If, on the one hand, the chatroom environment poses demanding challenges because of the fast exchanges that can be written in ungrammatical style, on the other hand this is an area where MT can make a valuable contribution to enable multilingual communication, because usually high-quality translation is not required for information that tends to be mostly about trivial matters, and given the synchronous nature of the interaction unclear messages can be rephrased or explained to avoid misunderstandings whenever difficulties are experienced. Given the specific challenges raised by the use of MT to translate Internet chat, a few key contributions are reviewed and discussed in this section focusing in particular on the pioneer in this area, namely Amikai.⁸

Flournoy & Callison-Burch (2000) introduce the concept of using MT to support multilingual Internet chat, which would seem an unlikely application given the substandard variety of language often employed by chatroom users. However, many of the exchanges that typically take place are predictable and repetitive (e.g. greetings or requests for information about the identity of other chatroom users at the beginning of a session), and this can help in preparing MT software to deal with the expected content of a significant quantity of postings. In addition, chat messages are

⁸ Amikai was founded in 1999 and enjoyed considerable success in the following few years, becoming one of the leading MT providers for a range of web-based MT applications, supporting a variety of language pairs. At the time of writing, however, the company is no longer in business.

produced and received at a very fast pace, and become irrelevant after they have been consumed by their recipients, so they possess only an ephemeral value. Flournoy & Callison-Burch (2000) lay emphasis on the need to educate users as to how they can successfully take advantage of the online MT facility, and also focus on the necessity to reconcile overly optimistic user expectations with the reality of the current shortcomings of state-of-the-art MT.

To this end, their system tries to train new users who are not familiar with MT to understand its strengths and weaknesses, giving them practical tips on how to constrain their input to make it more “MT-friendly”. A key role in facilitating the smooth interaction is also played by support facilities and design features on the graphic user interface of the multilingual chatroom environment – for example, users can click a button when they are not able to understand a machine-translated message, and this prompts a warning being sent to the originator of the posting with the request to rephrase it. In summary, multilingual interaction is achieved by enabling each participant to post messages in their own language, with the additional help of language-neutral icons and images that prompt remedial actions when necessary, with a view to minimising the difficulties experienced by users as a result of the MT engine supporting their communication exchanges in the chatroom.

Flournoy & Callison-Burch (2001) emphasise the importance of supporting a pleasant user experience and enabling a smooth user interaction for Amikai’s set of translation tools, particularly AmiChat.⁹ Recognising that deploying MT in the online environment, particularly in multilingual chatrooms, poses considerable strain on the capabilities of MT software, they describe additional features that enable users to manipulate the MT processing and the operation of the system in an intuitive and straightforward manner, e.g. by giving them the possibility to leave parts of the input untranslated, for instance when proper names have homographs in general language. They show and discuss some implementations of these facilities, and describe further developments along similar lines for future enhancements to the interactive features of the Amikai set of tools, whose aim is to improve the overall user experience and maximise the benefits of providing meaningful and useful feedback to users.

Flournoy (2003) reveals that Amikai provides the underlying MT engine for the language pair English-Japanese to many of the most popular Japanese websites

⁹ As a result of Amikai going out of business, the AmiChat tool is no longer available.

and online MT services, and discusses some usage statistics for the services offered by the company, which total “over a million translation requests per day across 29 uni-directional language pairs [...] with the majority of traffic consisting of translation between Japanese and English” (Flournoy, 2003: ev). Then some key technological and commercial aspects of Amikai’s MT-related operations and products are discussed, providing an insight into the philosophy and strategic priorities of the company. The fact that Amikai has emerged as a leader in the provision and development of online MT solutions for niche applications is also suggested by the attention devoted to the AmiChat facility in Somers (2003a: 206-207).¹⁰

In addition, Cerezo Ceballos (2002) proposes to apply a communicative approach to the evaluation of Internet-based MT systems, and focuses on real data from a series of multilingual chatroom sessions of AmiChat to provide a case study. This includes extensive transcripts of chat postings in several languages (original and machine-translated) exchanged by 25 participants, and presents an interesting analysis of the linguistic functions of the chat messages posted by the participants. Cerezo Ceballos (2002) suggests in conclusion that innovative evaluation frameworks are required to evaluate the quality and effectiveness of MT when translation software is deployed online in such highly interactive scenarios as multilingual chatrooms, in that poor-quality output is acceptable (which would not normally be the case in classic MT evaluation models), as long as the flow of interactive communication is maintained.

2.8 Comparative Analyses of Online MT Services

This section covers studies that compare different online MT services, either in terms of the quality of their output or in terms of their functionalities and graphic user interfaces. In this respect, Miyawaza et al. (1999) advocate the importance of studies specifically designed to evaluate web-based MT services, emphasising that traditional MT evaluation metrics (that tend to focus exclusively on the linguistic quality of the output) cover only one of the aspects that have an impact on the use of

¹⁰ A section entitled “Postscript: Chatting multilingually”, focusing on Amikai’s AmiChat facility has been added at the end of Yang & Lange (2003) (i.e. chapter 12) by the editor of the volume, Harold Somers.

online systems: “[c]ompared with off-line [MT], MT for the WWW has more evaluation factors. [...] Despite the importance of general evaluation studies on MT software for the WWW, it appears that such studies have not yet been conducted” (Miyawaza et al., 1999: 290). They therefore propose an interesting first attempt to design a systematic language-independent methodology to evaluate web-based MT services, based on 24 factors that are specific to using MT software on the web, and use it to carry out an evaluation of six online MT systems, e.g. in terms of how well they handle formatting-preservation, webpage layout, etc. Since they do not mention this explicitly in their paper, it is interesting to add that the evaluation methodology proposed by Miyawaza et al. (1999), which does not consider the quality of the MT output as one of the evaluation factors, could be supplemented with other evaluation metrics that assess the quality of the MT output produced by the web-based services under consideration for specific language combinations.

Blekhman et al. (2001) present a comparative analysis of the linguistic quality offered for a range of language combinations by two online MT services.¹¹ In addition, they also provide an assessment of the improvement in terms of the quality yielded by each of the MT services, based on tests with input texts that were also used three years earlier, so in essence repeating the same evaluation to investigate if the performance of the systems has improved during the intervening period. The first part of the paper deals with translations from French, Spanish and German into English, whilst the second focuses on translations from English into French, Spanish and German. The criteria adopted in the user-oriented evaluation are based on a framework previously proposed by one of the authors, which focuses essentially on the linguistic accuracy and grammaticality of the output. The paper includes all the input texts and the corresponding output generated by the MT software, and concludes that both systems give the highest quality for translation from Spanish into English. In addition, while the language pair German to English has visibly improved for both systems compared to three years before, the combination French to English leaves much to be desired for both systems. As far as the translations out of English are concerned, the picture is somewhat more fragmented with uneven performances, and the authors point out in particular that when translating into Spanish one of the

¹¹ Although the title of the paper claims that this study is a “Comparative Analysis of the Translation Quality Produced by Three MT Systems”, there is an inaccuracy regarding the number of systems involved in the evaluation.

two systems was not able to recognise many of the source-language words, which made this the worst language combination.

Zervaki (2002) provides some background on web-based MT services, with an indication of the language pairs supported by some of the leading free online MT systems. Then the paper examines the output into French provided by four free online MT services for a couple of very short texts in English (consisting of 23 and 45 words, respectively). Although the author recognises that such a small-scale evaluation report cannot claim to be scientifically valid, the point is made that it is still “representative” of the quality provided by online MT software. This, however, seems very objectionable, given the extremely limited amount of data that is considered and the impressionistic nature of the criteria used in the evaluation, as there are no clearly defined objective factors to rate the quality of the output. The paper simply reports how the four systems handled the layout and formatting of the input, and focuses on a superficial analysis of some linguistic issues, therefore not reaching any significant conclusion, although an attempt is made to identify the reasons for the weaknesses in the performance of the MT systems, but without a systematic approach.

Guyon (2003) presents a large-scale comparative evaluation study undertaken on behalf of the Canadian Heritage Information Network to assess the feasibility and potential cost-effectiveness of using online MT to maintain the bilingual versions in French and English of the website of the Virtual Museum of Canada (VMC). After providing some general background on MT, the report identifies eight free online MT services on which the actual comparative analysis focuses. The tests are divided into four separate phases in which both bilingual (English- as well as French-speaking) and monolingual people rate the output provided by the eight web-based MT services for translations between English and French in both directions, according to very clear sets of criteria that are grouped into three broad categories labelled “comprehension, acceptability and meaning” (Guyon, 2003: 15).

The report also measures for both translation directions the divergence recorded for a few sample passages between the MT output and the official published translation of the same source text. This is the basis for a further analysis of the level of post-editing that is typically required to make the output of the various free online services of publishable quality, and of the extent to which using MT output as the initial draft to eventually produce a polished translation affects the style of the final

target text. The 188-page report is very systematic and detailed in the description of all the stages of the experiments, and includes samples of all the texts that are used in the tests, in both the source and target languages. Based on the analysis of the significant body of data gathered in the study, the conclusions of the evaluation state that “some engines produce text that readers can understand fairly well. VMC texts are generally well written and jargon-free, which means that machine translation produces good results, despite the wide variety of subject matter the texts cover” (Guyon, 2003: 173). Interestingly, the author also makes cautious comments on the impact that machine-translated online text would have on the visitors to the website, and as a consequence on the perceived reputation of the museum:

[a]lthough running a text through a free machine translation engine gives instant results, it is no substitute for human translation. Permanently displaying a machine translation would tarnish the prestigious image the museums enjoy because of the customary quality of their content. We recommend that the museums post appropriate warnings if they wish to add links to one or more machine translation engines and that they resist the temptation to use machine translation for permanent content. (ibid.)

The report also adds that although post-editing raw MT output can be a viable option in certain circumstances, it is not a cost-effective alternative compared to human translation unless the amount of editing required is minimum, which tends not to happen frequently for translations that need to be of professional standard. Finally, and perhaps disappointingly for a well-designed evaluation study of nearly 200 pages, the recommendations at the conclusion of the report state that “[t]he results are authentic and reliable, but do not represent a scientific sample. They simply point to a trend. We absolutely cannot say that one engine is better than another” (Guyon, 2003: 174).

Craciunescu et al. (2004) provide a wide-ranging discussion of the ways in which translation technology (MT as well as CAT tools) affect translators and professional practices, creating a new working environment. Expanding on some information regarding free online MT software presented in Poudat (2001), they translate into English two sentences taken from a newspaper article written in French using two free online MT services. They do not compare the performance of the two systems against each other, but each in turn against a human translation for the same source text, and identify a number of mistakes and inaccuracies in the MT output,

drawing particular attention to the ones that cause an alteration of the meaning intended in the original. From this basis they briefly comment on the fact that MT is unsuitable to translate texts belonging to certain genres, illustrating the point with a few examples showing that minor adjustments to well-formed and grammatically correct input can dramatically affect the readability and semantic accuracy of the output.

Wießner (2004) is a comparative evaluation of seven free online MT services with two main aims: firstly, to identify the one that provides the best-quality output that can be helpful to users with language difficulties and, secondly, to understand how the style (and, indirectly, text type) of the input affects the quality of MT output. The tests take place on two source texts in English that are machine-translated into German, and the results are evaluated by only one person who is a native speaker of the target language, i.e. the author of the report. The source texts are very short, but written in different styles: one is a 57-word excerpt from a technical definition of the term “machine translation”, and the other is an instance of direct speech found in a novel (42 words).

The evaluation is based on an error analysis of the output, which takes into account both the quantity and severity of the errors, and the report concludes that whilst for both passages the performance of six of the seven free online MT services under review is quite even, one of them produces extremely poor results and stands out for the large amount of serious errors that its output displays. A couple of MT systems performed considerably worse in the translation of the literary sample with the dialogue than they did for the other passage (based on the proportional incidence of errors found in the output). This in part supports the conclusion that text type does affect the performance of MT software, as overall four of the seven services produced more errors in the translation of the dialogue than in that of the technical definition. In summary, the study concludes that some free online MT services provided reasonable output for the text samples and language direction under consideration, although one of those reviewed gave very poor results, therefore the potential usefulness of web-based MT tools is recognised alongside the likely problems in dealing with certain kinds of texts.

Uneson (2005) provides an evaluation focusing on translations between Swedish and German with one free online MT service (InterTran) and uses another free web-based system for translations from Swedish and German into English

(Systran online). The test data consists in a suite of hand-crafted input sentences that are designed to highlight key structural differences between Swedish and German, as well as to test the systems on “some classical, less language-specific MT problems, such as anaphora resolution, nominal compounds, proper nouns, homonyms, non-compositional semantics, and puns” (Uneson, 2005: 2). The translations between Swedish and German produced by InterTran are so poor that the author finds it impossible to judge their quality, which is virtually non-existent, and wonders what is the rationale for the company associated with this online MT software demo showcasing their product on the Internet.

The evaluation is much more positive for the other free online system, Systran, that is used in two separate monodirectional language combinations, i.e. to translate from Swedish and German into English. It is pointed out that a small minority of the test sentences are actually “perfect” (i.e. not requiring any editing to be of publishable quality), and the rest of the analysis provides an overview of some of the errors found in the output which are divided into the following categories, with a view to illustrating some of the most problematic areas: “nominal compounds”, “proper names”, “pronouns”, “articles”, “case”, “word order”, “agreement”, “adverb formation”, “prepositions”, “auxiliary verbs”, “tense and voice” and “complex clauses” (Uneson, 2005: 3-5). Based on the output produced by Systran online for the test sentences and text samples that are examined (which are all included in the report), the conclusion is drawn that overall translations from German into English yield much higher quality than those from Swedish.

White (2005) describes the evaluation of the performance of four free online MT systems, namely ProMT, FreeTranslation, Personal Translator and Babel Fish. The experiment consists in translating from English into French a test suite of sentences extracted from the bilingual aligned Canadian Hansard corpus, scoring the output of the systems with the BLEU and NIST automatic evaluation metrics. The test sentences are selected to investigate the performance of the online MT services based on their handling of a number of challenging linguistic phenomena, e.g. the translation of idioms, proper names, homographs and polysemous words, anaphora resolution and parsing of ambiguous structures. Overall, ProMT gives the best performance, followed by Babel Fish, FreeTranslation and Personal Translator, in this order. The author emphasises that using the automatic evaluation metrics provides only a comparative result, and it is difficult to reach an objective and

absolute evaluation of the systems' actual quality. However, the tests show quite clearly that all the systems perform quite poorly for the translation of homographs, polysemous words and certain idiomatic expressions, which are well-known difficult areas for MT software.

All the analyses reviewed in this section focus on more or less systematic comparative evaluations of the linguistic quality of the output provided by a range of web-based MT services for different language combinations. The last contribution that is included here adopts a different approach, in that Gaspari (2004b) concerns an empirical comparative evaluation of the main usability factors and features that affect the quality of the users' interaction with free online MT services. Rather than looking at the linguistic quality of the output provided by the MT software, in this case the emphasis is on the features of the graphic user interface and on the ease of online interaction, in the interest of the users' overall browsing experience when they try to take advantage of a free Internet-based MT system. A set of key usability criteria are identified, which are used to conduct a small-scale empirical evaluation of five popular free web-based MT systems, namely Babel Fish, Google Language Tools, FreeTranslation, Teletranslator and Lycos Translation. This study shows that different approaches to interface and interaction design can dramatically affect the level of satisfaction of people using online MT software.

2.9 Online MT Output Used as Benchmark for Evaluation of MT Systems

A popular trend that has emerged in the last few years and is found increasingly often in the literature consists in comparing the output produced by particular MT systems with that of online MT services, so as to have a baseline benchmark. This typically occurs with implementations of research-oriented translation models and linguistic representations or data-driven MT systems that are fine-tuned to a particular translation task or domain. This section provides an overview of some influential research papers that resort to comparisons with the output provided by online MT services to gauge the quality of specific systems, which raises some interesting issues of methodological soundness and experimental design.

Poutsma (2000) presents a statistical approach to MT that is based on the Data-Oriented Parsing model, and discusses some pilot experiments using a small amount of data taken from the Verbmobil corpus, consisting of transcribed and syntactically annotated spoken appointment dialogues in German and English aligned at sentence level. Thanks to a number of experiments for both language directions involving English and German which compare the performance of the system based on the Data-Oriented Parsing model against the output provided by Babel Fish/Systran, Poutsma (2000: 641) concludes that “[t]he evaluation showed that [the Data-Oriented Translation] produces less correct translation than Systran, but also less incorrect translations”.

Menezes & Richardson (2001) describe a blind evaluation experiment in which five human evaluators compared the translations produced by the test system whose implementation is discussed in the paper against the output produced by Babel Fish, which acts as the comparison system. The language pair under consideration is Spanish-English (monodirectional), and all five human evaluators rated the 200 test sentences forming the data set used in the experiment, using the following method:

[e]valuators were presented, for each sentence, with a reference human translation and with the two machine translations in random order, but not the original source language sentence. They were asked to pick the better overall translation, taking into account both content and fluency. (Menezes & Richardson, 2001: 40)

The experimental system that is being tested outperforms Babel Fish, and it is interesting to note that the issue of domain-specific training is recognised by the authors as a potential bias in the comparison:

the algorithm presented in this paper automatically acquires translation knowledge of sufficient quantity and quality as to enable translations that exceed the quality of a highly rated traditional MT system. Note however that Babelfish/Systran was not customized to this domain. (Menezes & Richardson, 2001: 41)

This conclusion seems to suggest that using the output provided by a general-purpose free online MT service as a baseline to rate the quality of MT systems that are trained (and therefore need to be tested) on domain-specific data sets is recognised as a questionable methodological decision.

A similar issue in terms of designing experiments that do not skew the results of comparisons between MT systems in specific domains comes up in Richardson et al. (2001), who also use free online MT as a quality benchmark for the language pair Spanish-English to evaluate a large-scale hybrid MT system under development for several other language pairs as well. Their attempt is in fact geared towards overcoming the so-called “customisation bottleneck” that is experienced to successfully apply MT to technical documentation in a specialised field, and data-driven MT research aims to resolve this issue by training MT systems on large datasets of relevant material (typically aligned bilingual corpora) with a mixture of empirical and statistical methods. Richardson et al. (2001) employ the same evaluation method as reported in Menezes & Richardson (2001) reviewed above, with the only difference that between five and seven human evaluators (instead of just five) rate the test set of sentences. In addition, Richardson et al. (2001) extend the comparisons to both directions for the language pair Spanish/English, and use output provided by Babel Fish as well as by the web-based MT service then supported by Lernout & Hauspie as baseline benchmarks. In reporting that their system has surpassed the quality of the general-purpose online MT software, Richardson et al. (2001: 15-16) recognise that

it is important to keep in mind that [our MT system] has been customized to the test domain, while the Babelfish and Lernout & Hauspie systems have not. This certainly affects our results, and means that our comparisons have a certain asymmetry. As our work progresses, we hope to evaluate [our MT system] against a quality bar that is perhaps more meaningful: the output of a commercial system that has been hand-customized for a specific domain.

Aikawa et al. (2001) describe related work, focusing on a broad-coverage application-independent natural language generation component that is applied to a multilingual MT system under development. They present the results of a comparison for the output given by their MT system for the language pair Spanish-English in both directions against output provided by Babel Fish and the online service offered by Lernout & Hauspie, showing that their hybrid system with a combination of rule-based, example-based and statistical components receives higher ratings.

A similar approach to evaluation is reported in Carbonell et al. (2006) with a focus on the translation of newswire texts from Spanish into English. They use automatic MT evaluation metrics to compare the quality of the output produced by their system based on a new paradigm, called context-based MT, against two of the leading free online MT services that showcase the products of SDL and Systran (ibid.: 25). The novelty of the paradigm presented in Carbonell et al. (2006) is that it relies on the strengths of a corpus-based approach, without however requiring extensive parallel corpora, and the evaluation shows that their MT software achieves better performances than the two free web-based MT services. Mellebeek et al. (2006) present a multi-engine MT technique that produces a consensus translation by means of a recursive decomposition algorithm that reduces the input to simple chunks that are subsequently processed by multiple MT engines. The authors carried out experiments translating an 800-sentence test set from English into Spanish and report that their multi-engine system outperforms the three baseline online MT services used as benchmarks for comparison, namely LogoMedia, Systran and SDL. Lavoie et al. (2002) describe the design of an MT system translating from Korean into English that uses transfer rules induced from parsed bitexts, and present the results of an automatic evaluation based on BLEU in which the output provided by their software is compared against three other baseline systems, including Babel Fish, over which they report an improvement of nearly 20%. In addition, they also mention the results of a human evaluation performed by two native speakers of English, in which again their system performed better than Babel Fish.

Finally, at the end of this section Hutchins (2003a; 2003b)¹² should also be mentioned, in that this work compares the translations provided by current free online MT services and other commercially available systems with output from older MT software, in order to assess the improvement in the quality of MT output for different language pairs historically over the last few decades. Hutchins (2003b: 2) mentions that the Russian-English examples have been compared with output by Babel Fish, Lycos and the online version of ProMT. For the French-English language

¹² Hutchins (2003a) is a paper entitled “Has Machine Translation Improved? Some Historical Comparisons”, given at the *MT Summit IX* (New Orleans, LA, USA, 23-27 September 2003) and included in the proceedings of that conference (pages 181-188). Hutchins (2003b), on the other hand, is an extended version of the paper with a slightly different title (i.e. “Has Machine Translation Improved? Historical Comparisons”), and includes a greater number of longer examples, as well as a section focusing on the English-French language pair. Hutchins (2003b) is available at <http://www.hutchinsweb.me.uk/HasMTImproved.pdf> [accessed 15 June 2007].

pair, the free online MT systems FreeTranslation and Reverso provided output for comparison. Finally, translations involving German and English were compared to output provided by the free online services Reverso and FreeTranslation.

2.10 Online MT for Multilingual NLP Tasks

Another use of online MT services is becoming increasingly popular, similarly to that of benchmark for the evaluation of MT systems covered in section 2.9. It consists in taking advantage of the output provided by online MT services not as an end-product, but rather as part of more complex multilingual NLP tasks for a variety of purposes. Some of the key studies reporting this particular use of web-based MT services are summarised in this section, as they testify to a wide range of interesting uses that are made of online MT tools by the research community.

Bian & Chen (1997; 1998; 2000) discuss several aspects of the integration into a single cross-lingual information retrieval system of separate components, including an online MT facility to translate the queries submitted by the users.¹³ In particular, Bian & Chen (1998) report on experiments focusing on the languages English and Chinese, showing that users are generally satisfied with the performance of the system. Interestingly, they also discuss in some detail the challenges as well as the requirements of using online MT embedded into a more complex system, where for example the reliability and turnaround time of the translation are paramount for the efficient processing of the cross-lingual information retrieval task, therefore the translation component needs to be robust as well as speedy.

Lin & Hovy (1999) describe the basic architecture required to develop a prototype system that embeds an online module supplied by Systran to perform document retrieval, summarisation and then translate the information into the user's preferred language. Similarly, McKeown et al. (2003) outline the structure and components of a system that performs document clustering, summarisation and translation of news-related events. In this scenario, the input texts to be summarised

¹³ It is interesting to note that in a review of the options available to implement cross-language information retrieval systems, Kraaij et al. (2003: 382-383) point out that relying on Internet-based MT software to translate queries is likely to be counter-productive, given the poor translations that can be generated. In particular, they mention one example of a misleading translation from English into French provided by the free online version of Systran for a relatively straightforward key search term that would undermine the effectiveness of any cross-language information retrieval system.

can be in multiple languages, but the summary is generated in English, by integrating online MT provided by Babel Fish into the system.

Flank (2000) focuses on cross-language information retrieval for multimedia information, particularly images, which the author argues is an application where high accuracy can be achieved. Since the task consists in matching keywords and phrases to the caption accompanying the images that have to be retrieved, the likely poor quality of the MT module translating the original query submitted by the user is to a large extent irrelevant to the successful performance. The author emphasises that a significant contribution of the paper is “the inclusion of a variety of machine translation systems. None of the systems tested is a high-end machine translation system: all are freely available on the Web” (Flank, 2000: 14). The author reports an experiment in which Babel Fish was tested alongside other similar online MT services to provide the translation of typical queries from French, Spanish and German into English, and the conclusion is that a variety of factors contribute to making the cross-language image retrieval task an ideal one for the application of web-based MT:

[u]nlike document translation, there is no need to match every word in the description; useful images may be retrieved even if a word or two is lost. There are no discourse issues at all: searches never use anaphora, and no one cares if the translated query sounds good or not. [...] We used a variety of machine translation systems, none of them high-end and all of them free, and nonetheless achieved commercially viable results. (Flank, 2000: 17)

In a similar system to perform the same task, Clough & Sanderson (2006) take advantage of the free online version of Systran to perform the required translations:

queries [which can be accepted in French, German, Italian, Spanish, simplified Chinese, or Japanese] are translated into English and passed to the retrieval system in which the English captions have been indexed. Results are displayed as English Web pages and translated dynamically as users interact with the system by calls to SYSTRAN. This method translates [...] the image captions, and the whole interface in the user’s source language. (Clough & Sanderson, 2006: 701)

Although the authors point out some problems created by the integrated online MT facility powered by Systran, the study reports that most users found that it did an adequate job for the translation of the queries, captions and interface of the system.¹⁴ This leads to the conclusion that cross-language image retrieval is one application where less-than-perfect translation (like the output typically provided by Systran online) can still achieve good performance, which reinforces the findings of Flank (2000) reviewed above.

Zazo Rodríguez et al. (2005) explore the usefulness of two free online MT services in interactive cross-language question answering tasks performed with a standard document retrieval system: Google Language Tools for the Spanish-English language pair and Systran for the Spanish-French combination. The common scenario that is taken into consideration is the one in which users have poor skills in the language in which the documents to be searched are available, so they cannot formulate a correct query directly in the language concerned or completely understand a possible answer. The experiments that are reported show that in general the participants appreciated the support that they received from the free web-based MT systems in carrying out the cross-language question answering tasks under these conditions, although the study points out that the performance of the MT software was much better for the Spanish-French language pair than for Spanish-English.¹⁵

Online MT services have also attracted interest recently in connection with the implementation of multilingual NLP systems in other areas of research, as testified by Way & Gough (2003), who take advantage of three web-based MT tools with a double aim: firstly, to translate phrases needed to populate the database of their example-based MT system and, secondly, as benchmarks to evaluate and compare the performance of different versions of their system in terms of coverage and translation quality. In addition, Gough et al. (2002) and Gough & Way (2003) present other studies in which online MT systems are used in various ways to

¹⁴ Similar successful results are obtained in a more specific study reported in Petrelli & Clough (2005), which is a user evaluation focusing in particular on the language pair Italian-English: queries entered by users in Italian were sent to Babel Fish for translation into English. The returned translated queries were then used to perform keyword-based searches of an image collection. The authors report that in spite of some problems and inaccurate translations provided by the free online MT service (including some particularly bizarre and puzzling mistranslations), 84% of the 892 key terms used in the queries were translated correctly.

¹⁵ González et al. (2005) and de Pablo Sanchez et al. (2005) also mention interesting applications of free online MT services in cross-lingual question answering tasks and cross-lingual information retrieval systems, which however cannot be discussed here due to space constraints.

provide the linguistic resources needed to implement and evaluate different approaches to the creation of example-based MT systems for the language pair French-English.

To conclude this section, mention should also be made of a particularly popular trend at the moment for NLP research and development efforts. This consists in approaches that take advantage of the output into a particular target language provided by multiple online MT services for the same input, to obtain the best possible translation quality. The initial candidate translations are manipulated and recombined in an attempt to achieve the optimal target text by merging the various options that are generated. Different algorithms and strategies to implement these multiple-engine systems combining between three and five different online MT services are presented for various language combinations in Bangalore et al. (2001; 2002), Nomoto (2004), Jayaraman & Lavie (2005), van Zaanen & Somers (2005). Pursuing a different approach to address similar NLP problems, Mellebeek et al. (2005a; 2005b) discuss the stages and challenges involved in the development of an algorithm to improve the quality of the output offered by online MT services, based on the observation that longer input strings tend to result in output of poorer quality.

Focusing on a broader range of issues raised by the attempt to use the output provided by multiple web-based MT systems to perform a complex set of NLP tasks, Hung (2004) presents the architecture and describes the main components and technical details of a “meta system of multilingual machine translation”. Following the analysis of a heterogeneous written text (i.e. containing parts in different languages) and the identification of the homogeneous parts (i.e. those written in the same languages), the system, which is operated via a specially created webpage through which input texts can be submitted, enables the user to select the single target language into which they would like to translate the original multilingual text. Based on the source languages that have been identified in the input, the system calls on a variety of freely available online MT services to carry out the translation, and scores the output provided by each of them using automated metrics that have been devised for this application.

The best ranking translation into the target language that has been selected is used for each section of the source text (which can potentially consist of several chunks written in different languages), and finally offered to the user. One interesting aspect of this system is that if a specific language pair is not directly supported by the

web-based MT software, English is used as a pivot language, and in this scenario the output provided by different services can be combined. So, for example, if the language pair A-B is not covered, the system uses one MT service to translate from language A into English, and a different one to continue the translation from English into language B. This approach enables the system to handle as many as 55 different language pairs across eleven languages, although the author recognises that “the “double” translations [i.e. those using English as a pivot language] are definitely of lower quality than the direct translations. But the result of translation is generally still readable and usable” (Hung, 2004: 308).

In summary, the works reviewed in this section focusing on a variety of interesting multilingual NLP tasks span a wide range of useful and challenging applications. This shows that online MT has matured to the extent that it is increasingly regarded by today’s researchers as a valuable resource to conduct studies and implement ambitious multilingual NLP systems, serving the needs of the research community for a broad array of purposes.

2.11 Miscellaneous Studies and Applications Relevant to Online MT

This final section covers miscellaneous studies and applications that are relevant to online MT and provide further interesting background to the research presented in the rest of the thesis. Westfall (1996) raises a number of interesting questions regarding the legal implications of online MT, regarding in particular the potential risk of litigation and lawsuit arising from the use of web-based MT services to translate, disseminate and distribute (on the Internet or otherwise) text protected by copyright, information of a commercially sensitive nature, or content that is illegal for whatever reason. Another interesting problem among those mentioned by Westfall (1996) regards, for example, the potential liability for an incorrect translation provided by an online system that leads to safety violations.

These are all complex issues, and due to the limited length of the paper they are only flagged up to the rest of the community, without any attempt to provide solutions, although the suggestion is made that “[t]he legal issues surrounding machine translation on-line will need to be defined within the next year” (Westfall, 1996: 231). Unfortunately, this has not happened, as Yang & Lange (1998: 282-283)

and Yang & Lange (2003: 205-206) comment on a number of outstanding legal issues with regard to users of Babel Fish threatening to take legal action for specific incidents occurring as a result of mistranslations, or suggesting that the service should provide disclaimers to make it clear that it cannot accept responsibility for any liability connected with its use.

More than a decade after the legal issues and implications surrounding the use of online MT were first raised by Wesfall (1996), Ketzan (2007: 2) argues that “[t]he legal implications of machine translation have yet to be fully considered by legal scholars or technologists because the technology, in its current state, is too far from usable to create actual legal problems”. However, millions of Internet users do take advantage of online MT, and the article recognises that if translation technology ever evolves to the stage where it can offer high(er)-quality output (whenever this might happen), there would be a very strong need for a robust legal framework to regulate its use, particularly with regard to copyright infringement. The paper considers a fictitious (but realistic) case study of a copyright holder who sues an imaginary provider of online MT because someone has translated one of her works into another language, without her knowledge or prior consent.

The implications of this scenario are analysed in detail on the basis of a thorough overview of the intellectual property rights connected to (human) translation as derivative work, focusing in particular on the commercial dimension of creating and distributing multilingual information. A number of concepts that are well established in the US legal system and litigation process, such as “secondary liability” and “implied license”, are applied to the examination of the fictitious case study under consideration. The article dwells in particular on the issue of “fair use” of web-based MT services by any individual who translates texts covered by copyright, given the author’s conviction that online MT providers need to be protected from the threat of potentially endless litigation, in order to preserve the social, political and commercial benefits that Internet-based MT can bring. In addition, following a review of relevant legal cases, a number of desirable technical developments are advocated, including the creation of W3C standards and HTML tags to help regulate the acceptable and lawful use of online MT services. The reflections offered by Ketzan (2007) are interesting and stimulating, especially because they deal directly with a set of issues that have been discussed for years but still represent grey areas surrounding the use of MT on the Internet, and which might

hamper its further development. Since the study is based on a made-up case study which intends to illustrate a range of widely recognised issues, its main objective consists in shedding light on a number of areas that have been ignored so far, and its conclusion highlights an acute need for action:

[a]lthough viable MT is still on the horizon, it may arrive sooner than we think. As the present study should make clear, a variety of overlapping claims lie waiting for online MT and threaten to shoot this socially, politically and commercially beneficial technology out of the sky. We should pave the way for online MT through statutory recognition of its noninfringing nature and the creation of standards such as translation meta-tags. (Ketzan, 2007: 26)

Zajac & Casper (1997) describe the Temple Project, which has developed an open multilingual architecture and software support for the rapid creation of MT tools geared towards the assimilation of online content, focusing in particular on those languages for which NLP resources are limited or difficult to come by. They mention that a web-based front-end enables users to submit the URL of a webpage in a foreign language to the MT server, which then returns it after translating it into English. Hogan & Frederking (2000) describe the design and implementation of an interactive web-based chat-style translation system that also performs speech recognition and speech synthesis. They emphasise that all the intensive processing, including computationally demanding tasks such as the translation process itself and the speech recognition stage, is carried out remotely at the back-end, so as not to place a burden on the resources of the local user, which might be limited.

Large & Moukdad (2000) provide an overview of issues broadly related to the access to online multilingual information and tools on the Internet, and focus in particular on the availability of online MT services (*ibid.*: 47-50). They observe that the range of language pairs supported by such systems is extremely restricted and, taking as an example a webpage translated from French into English by the online version of Systran, they criticise in particular the poor quality that they usually produce. Most of their discussion is quite critical of the drawbacks of online MT services, which they argue cannot meet the standards of quality set by good human translators. However, their arguments do not seem to be particularly convincing and reveal an inaccurate representation of the way in which web-based MT software can be used when they state:

[a] different challenge is posed to MT systems by the interactive nature of the web environment. Translation software simply cannot keep pace with the speed at which the web interface typically changes as users scroll through pages or use hypertext links to jump to new sites. (Large & Moukdad, 2000: 50)

This last remark is intended as a further criticism of the weaknesses and shortcomings of online MT, but it does not seem to raise a valid point.

Lehman-Wilzig (2000) presents a complex discussion of the potential impact that Internet-based MT tools, which are referred to as “synchronous, automatic translation systems” (or SATS) in the paper, might have on future political, economic and cultural developments on a global scale. Although some of the arguments are interesting, especially because they link the practical usefulness of online MT with a range of topics that are usually outside the scope of MT-related research, the paper reveals some naivety with regard to key technical issues that are involved and to a large extent offers a vision of future scenarios that remains fairly speculative. As a matter of fact, by the author’s own admission, the conclusion of the paper is rather paradoxical:

although (perhaps *because*) SATS will lead to greater linguistic (and external-cultural) differentiation, the overall impact will be centripetal – greater integration among the world’s peoples, more international peace, and a general higher level of agreement regarding norms and values. (Lehman-Wilzig, 2000: 467, emphasis original)

With a rather more practical and utilitarian focus, Cavalier (2001) discusses the role played by translation technology (i.e. CAT tools as well as MT) in real-life situations for the translation of patent information. The paper looks in particular at English (as either source or target language) in combination with German and Japanese, and describes the translation workflows of a number of players in the patent information industry, where translation technology is heavily deployed to maximise productivity. Cavalier (2001: 369-370) describes recent developments that have resulted in free online MT services becoming available for a variety of language combinations, but regards such tools as adequate only to find out whether information in a foreign language regarding a patent is of any interest or not, i.e. simply as an initial assimilation tool to estimate the potential relevance of a document. Whilst denying that free web-based MT systems can play a significant role in handling information

of a highly sensitive commercial nature, as is perhaps understandable, the point is made that this is due largely to the impossibility to customise their dictionaries. This is a serious drawback when it comes to the translation of patent documents, which are usually of a very technical nature, and therefore need to be translated by knowledgeable and expert translators working with the help of translation memory software and extensive terminological resources.

Raley (2003) starts by critiquing the classic explanation given by Warren Weaver of MT as essentially a problem or a challenge that can be tackled as an extension of achievements in cryptography and code-breaking. From this basis, the paper reflects on the role played by readily available online MT services on the Internet, mentioning Google's MT facility as well as Babel Fish (*ibid.*: 292), and considers what impact web-based MT tools might have on the kind of language that is used online and on the dominance of English as the privileged communication medium on the Internet. The conclusion is that there are similarities between the general tendency of online MT to simplify language (e.g. ignoring stylistic issues or subtle nuances of meaning, etc.) and some features of English as the most widespread means of communication on the Internet, which tends to become simplified as a result of being used by a very large and disparate community of speakers worldwide.

Some of the concerns regarding the limitless applications of MT, particularly of services found on the Internet, that are expressed in Raley (2003) are also voiced by Bernth & Gdaniec (2001: 176) in a discussion on the notion of "MTranslatability", i.e. the extent to which texts are likely to be successfully processed (or otherwise) by MT software by virtue of their surface features:

as more and more MT systems become available on the Web for the casual user who wants to take advantage of the large amount of information posted there, [...] [a]nybody who makes documents available on the Web must be prepared for the possibility that somebody applies MT to their text without much (or any) knowledge of the source language.

It is interesting to note that recognising this situation, O'Connell (2001), Gaspari (2004c) and Korpela (2006) provide a number of guidelines and suggestions aimed at making web content more "MT friendly" in terms of layout and design as well as with regard to following a set of stylistic and linguistic norms that increase the

likelihood of texts being amenable to the processing of online MT services, that perform notoriously badly on unrestricted spontaneous language.

Habash (2003b) focuses on the online demo version of a large-scale Spanish-English MT system that uses a generation-heavy hybrid approach to translate passages of text that can be typed in or copied and pasted by the user. What is interesting is that the online demo of this research-driven MT system was made available to Internet users, so that they could have the opportunity to try it out and experiment how it performed. The paper discusses some of the key aspects of the implementation and user interface (e.g. the facilities available to input letters with diacritics for source texts in Spanish), and is an extension of the work presented in Habash (2003a), which gives a more general description of the overall architecture of the system.

In a similar vein, Sinha & Jain (2003) provide an overview of the AnglaHindi system, which was designed to translate from English into Hindi and was made available for testing purposes on the Internet for free. Likewise, Naskar & Bandyopadhyay (2005) offer an account of MT research and development in India, and focus on a range of systems and software products that have become available over the years for a variety of language combinations (some with English as source or target in combination with Indian languages, others between Indian languages). They report that some of these MT services that have been developed in India are accessible via the Internet, but they do not give any figures or statistics regarding usage or users' comments and feedback on their performance.

In an interesting study devoted to the role that can be played by translation technology in supporting the needs of subtitlers, O'Hagan (2003) investigates the extent to which amateur subtitlers could successfully perform subtitle translation from English into Japanese relying on the help provided by a free online MT service (powered by Amikai, whose translation tools for the Internet and chatroom environments are discussed in section 2.7). This experiment was "based on the "fan-sub" model where an amateur subtitler whose linguistic knowledge may be weak, tackles the challenge by drawing on genre knowledge and MT output" (O'Hagan, 2003). However, the conclusions of this study are hampered by the fact that the experimental scenario could not be implemented fully because it was impossible to find a suitable participant to carry out the task: "[t]he experiment therefore resorted to quantifying clearly unusable translations produced by MT" (O'Hagan, 2003),

which is of less interest here than the original experiment that had initially been planned.

As a result, the author (a native speaker of Japanese) performs a subjective evaluation of the performance of the chosen free online MT service in translating from English into Japanese the subtitles for two films: *The Chamber of Secrets* from the *Harry Potter* series and *The Lord of the Rings: The Fellowship of the Ring*, i.e. the first episode in the trilogy by J.R.R. Tolkien. Leaving aside here technical considerations on the expansion or compression rate of the subtitles, which is of course a crucial issue in this form of audiovisual translation, the evaluation procedure used was the following: “a rather crude method was resorted to by counting the number of unintelligible sentences. The criterion for the judgement was simply whether or not the given MT sentence made any sense on its own” (O’Hagan, 2003). The results are that although 80% of the machine-translated subtitles into Japanese were intelligible for the *Lord of the Rings*, less than 50% of the subtitles in Japanese for *Harry Potter* were acceptable. The author concludes that a likely cause of this difference might have been due in particular to the highly creative vocabulary found in the *Harry Potter* material. A similar study regarding the use of MT software for the translation of DVD subtitles, which also involves the language pair English-German and has a stronger focus on the evaluation of the results, is presented in the work of Armstrong et al. (2006), which uses Babel Fish as the free online MT service providing the raw MT output.

McDevitt et al. (2004) outline the strengths and weaknesses of three possible strategies to manage the translation of the content of an existing monolingual website into different languages. They refer to an ongoing project that aims to translate into Spanish the graphic user interface of a digital library for computing education materials, which is currently available only in English. One approach that they propose is to use a free online MT facility to translate all the linguistic elements of the interface, and consider in detail the performance of Babel Fish in some tests based on webpages that were representative of the actual material that needed translating. They observe that the output provided by Babel Fish for the translation of the webpages from English into Spanish is not good enough, and conclude, perhaps not surprisingly, that high-quality translations of the material in which they are interested can be achieved only by involving human translators with good bilingual knowledge.

Finally, Paolillo (2005) presents a general discussion of the linguistic situation on the Internet, where the overwhelming majority of the content is in English, and assesses the potential of MT, and especially web-based MT services, to redress the balance in an attempt to ensure that online text can be distributed reflecting wider linguistic diversity:

[m]any technophiles have placed hope in machine translation as an answer to problems of multilingual communication on the Internet. Already there is a high demand for translation services offered by such companies as Systran, the provider of the BabelFish translation system, and in certain situations, such as Catalan-Spanish, machine translation has been proposed as a serious solution to communication problems [...]. Will it be possible for people to access the Internet in their own languages by simply using one of the online translation systems? This question is too optimistic for several reasons. (Paolillo, 2005: 78)

The author then goes on to explain why it is unreasonable to expect that MT can provide high-quality raw output, and emphasises that in any case translation software is available only for a small minority of the languages used worldwide, which leads to the following conclusion:

[u]sers of machine translation systems have to adapt to strange residues of vocabulary and word order that merely represent a covert form of the linguistic bias that led to the translation need in the first place. Consequently, we cannot expect technological approaches such as machine translation to diminish problems of linguistic bias on the Internet in a substantial way. (Paolillo, 2005: 79)

However, the problem with this conclusion is that it reveals an inclination to dismiss as completely useless output that is not perfect. This is a misguided assumption, particularly on the Internet, where users might be prepared to tolerate MT output of a less-than-perfect quality, which might be seen as useful under certain circumstances. This can be the case in particular when human translation is not an option, which is very likely for the translation of Internet texts, but there is still a need to access the gist of online content available only in unknown languages.

CHAPTER 3

SURVEY ON THE USE OF FREE ONLINE MT

3.1 Overview of the Chapter and Purpose of the Survey

This chapter reports a survey that was carried out among students based at three British universities to investigate their use of free online MT. Little data is publicly available on the use of web-based MT, and the scant information that has been published originates from the online MT providers themselves and therefore tends to refer only to specific services (most notably, the usage reports in Yang & Lange, 1998 and Yang & Lange, 2003 focus exclusively on Babel Fish), thus presenting a limited and fragmented picture. The purpose of the survey presented here is to provide more comprehensive data on the actual use of a range of Internet-based MT engines and to identify the most common usage patterns, highlighting in particular areas in which potential problems may arise and the relevant implications for the design of web-based MT services. The survey also attempts to shed some light on the users' perception of the quality of such translation tools.

The beginning of the chapter provides an explanation of the research design and of the methodology used for the survey, followed by a description of the main demographic information of the sample population involved in the study, focusing in particular on the diverse language backgrounds of the respondents, their typical use of the Internet and their level of experience in the online environment. The central part of the chapter reports on the respondents' previous use of free online MT, covering a number of areas: which services are the most popular and most commonly used, for what language pairs, as well as other aspects of users' behaviour and interaction with web-based MT tools. The last part of the chapter addresses one particularly problematic area clearly flagged up by our survey and already mentioned in the literature referring to the usage of Babel Fish, namely the frequent use of Internet-based MT services as online bilingual dictionaries. This leads to a final discussion focusing on the implications of this widespread and questionable pattern of usage of free online MT systems, accompanied by some suggestions for further research that is needed in this area.

3.2 Design and Methodology of the Survey: the Questionnaires

The data for this survey was collected by means of questionnaires. The questions were all in English, and those on which the information presented in this chapter is based were all identical, even though they were included in three different types of questionnaires that formed part of larger studies, which are reported in more detail in chapters 4 and 5 (samples of the three questionnaires that included parts used to collect data for the survey on the use of free online MT presented in this chapter are provided in appendices B, C and F). Although these studies were designed to focus on a variety of areas and elicit different information from the respondents, they all had common sections at the beginning to collect demographic information, including data on the linguistic backgrounds of the respondents, their level of experience as Internet users, and details on their previous use of online MT, if applicable. As a result, this chapter combines information provided by the participants in different studies that were conducted during the preparation of this thesis, aggregating the subset of data in each of them that is specifically relevant to the use of web-based MT tools.

Given the scarcity of the information available in the public domain about the actual usage of Internet-based MT, it was felt that this thesis could help to fill this gap by investigating the ways in which Internet users take advantage of web-based MT tools, with a view to identifying usage patterns and trends of particular interest. In spite of a number of attempts to approach some of the leading providers of online MT since the early stages of this research, it proved impossible to obtain usage information from them or to have access to the log files of their web-based services, as they were reluctant to share potentially sensitive data. As a result, the most straightforward methodology available was to administer questionnaires eliciting relevant information from a population of users on a number of areas of interest. The initial plan was to publicise an online questionnaire to people in a number of countries via mailing lists and discussion forums, which seemed an attractive option because it would simplify the data collection process, while at the same time maximising the dissemination of the study internationally.

However, this idea was eventually abandoned since it meant sending unsolicited emails. In addition, the questionnaires shown in appendices B and C required respondents not only to answer questions to build their demographic profiles

and gather data on their previous use of online MT, but also to perform some guided tasks on the Internet, and it was felt that delivering the survey online would present too many technical challenges where technical problems might occur. Moreover, it would take respondents approximately 15-20 minutes to complete the questionnaires, and potential participants might be understandably reluctant to spend this amount of time taking part in a study whose origin and purpose may not have been completely clear to them (this is what Groves et al., 1992: 478 call “the burden of participation”). One final consideration was that respondents based in different countries might not be necessarily familiar with English, which might have hampered the actual quantity and quality of the data collected from online questionnaires.

As a result, the final decision was to print questionnaires on paper and distribute them fairly widely to students based at a handful of departments of three British universities with which the author has close links, namely Manchester, Salford and Liverpool Hope, between April and May 2005 (more details on the distribution procedure are given in section 3.3). The rationale underpinning this choice was that targeting the student population would provide a fairly homogenous sample of Internet users who would not experience any problems in following instructions to complete the required tasks and answering questions in English. It was also hoped that administering to potential respondents paper questionnaires stating clearly the origin and purposes of the research (e.g. indicating the author’s affiliation with the University of Manchester and his full contact details) might convince them of the genuine nature of the study much more than a request received via email (cf. Gillham, 2000: 45-46). Before circulating the questionnaires to the target population, preliminary versions were piloted with small groups of volunteer students of languages (mostly undergraduates), translation studies and HCI (all of them postgraduates) distinct from the sample, and slightly revised on the basis of their comments and feedback.

Following this initial pre-testing, 72 questionnaires (of the type included in appendix F) were distributed to students in a controlled environment, i.e. during lab sessions at the University of Manchester that were part of the experiments for the evaluation study that is described in detail in chapter 5; these students, who were paid a small amount of money for their time, filled in the questionnaires during experimental sessions that lasted approximately one hour and involved a number of

separate tasks. On the other hand, the rest of the questionnaires (with exactly the same questions which are focused on in this chapter and others that formed the basis for the case study presented in chapter 4, examples of which are in appendices B and C) were handed out to students following an approach similar to the one successfully adopted by Eastin & LaRose (2000), who conducted a study with nearly 200 university students in the USA: copies of the questionnaire were handed out to students in class during lectures, tutorials and seminars by the author himself and several of his colleagues working at the three above named institutions who generously agreed to collaborate in the distribution and collection of the questionnaires. As a result, the students could see for themselves what the study involved, and then decide whether to participate as volunteers or not. If they wanted to be involved in the study, they would be expected to fill in the questionnaires outside of class in their own time without supervision, i.e. in an uncontrolled environment.

3.3 Distribution of the Questionnaires and Participants in the Survey

The student population was deliberately targeted because its members have to use the Internet on a regular basis as part of their courses, for example to carry out research, access official university information and e-learning courseware prepared by tutors, etc. In addition, most students also use the Internet for personal or social purposes (e.g. reading newspapers, making online purchases, conducting e-banking transactions, sending instant messages, participating in chatroom sessions, etc.), and easy access to state-of-the-art ICT facilities is provided on campus by their universities, which by and large meant that all the students had at least reasonable Internet browsing skills and they could be assumed to reflect reasonably well the characteristics of a segment of regular and relatively experienced Internet users. This ad hoc sampling technique (Graziano & Raulin, 1997: 215) was adopted to make sure that the participants in the survey were able to carry out the guided tasks on the Internet focusing on free web-based MT systems that were involved in the tests and experiments presented in the questionnaires.

It was felt that the students might be more inclined to take part in the study if they received the questionnaires in class from their lecturers, who emphasised that they knew personally the researcher involved, making it clear that the data would be treated confidentially and was not part of any university-related assessment or test (cf. Oppenheim, 1992: 103). In addition, a small quantity of spare copies was also distributed via other channels, e.g. by asking supervisors to give questionnaires to their research students during consultation sessions or by leaving them in pigeon holes and areas on university premises frequently visited by students (e.g. common rooms, study areas in the language centre, computer labs, etc.). Each questionnaire had clear instructions informing the students on how they could return the completed copies to the researcher so as to guarantee anonymity (i.e. via the university's internal mail system, leaving them in conveniently located collection boxes or giving them back to the lecturers from whom they had received their copy).

As a result, the questionnaires included in appendices B and C were distributed following a standard self-administered procedure, which is a cost-effective and efficient method, particularly because it guarantees wide dissemination without placing unrealistic demands on the researcher's time during the data collection process (Oppenheim, 1992: 103). A potential problem caused by this approach was that students who had already used online MT services and had possibly found them useful might have been more keen to participate in the survey than others, as noted in general terms by Groves et al. (1992: 478). As a result, in order to mitigate some common weaknesses of self-administered questionnaires (cf. Dillman et al., 1999; Redline & Dillman, 2002) and to counterbalance the side-effects of self-selection bias of volunteers reported in the literature (e.g. Oppenheim, 1992: 30; Peterson, 2000: 23; Niemz et al., 2005: 564), every effort was made to prepare the questionnaires according to sound guidelines and experimentally proven principles that would maximise the validity and reliability of the data, following in particular the advice on the design of self-administered questionnaires given in Jenkins & Dillman (1997).

About 30 members of teaching staff at the three universities involved assisted the author in distributing the questionnaires to their students taking a variety of courses in a number of programmes. Because of this organisation, students taking different courses or subjects of the same honours degree programme (for instance those studying two foreign languages, say, in their first year at the university) could

receive copies of the same questionnaire from a number of their lecturers teaching different courses during separate classes in the same period of time, but of course were instructed to take only one each. When it became clear that most of the students had already received the questionnaires at some point during one of their lectures, tutorials or seminars, the distribution process stopped.

This strategy eventually led to the collection of a large quantity of data representing an excellent basis to conduct the studies included in this thesis, and in particular the survey that is presented in the rest of this chapter. In total approximately 1,500 printed questionnaires were distributed to students using the method described above, and eventually 350 of them were returned, 280 of which were usable for the purposes of this research (this figure includes the 72 questionnaires completed by volunteers in a controlled environment during experimental lab sessions), which corresponds to an overall response rate of 18.5% for the self-administered questionnaires (including those that were not deemed usable for our research) or 13.9% (taking into account only those that did provide data that was later used in the analysis). Depending on the target survey population and on the sampling technique that is adopted, response rates for printed questionnaires can vary quite dramatically as noted by Preece et al. (2002: 404), and the literature indicates that typical response rates for self-administered questionnaires fall between 10% (Frazer & Lawley, 2000: 74) and 30% (Gillham, 2000: 9), therefore our result that is around 15% (depending on whether only usable questionnaires are considered or not) is within standard expectations.

The final quantity of 280 individuals in the ad hoc sample involved in this research compares favourably with the size of the survey samples used in similar questionnaire-based studies regarding the use of a range of web-based resources and a variety of Internet-related behaviours of university students. For the purpose of illustration, the following three recent studies represent examples of questionnaire-based surveys targeting university students in the USA: Aiken et al. (2003) report the results of a survey carried out among 214 students at two universities to investigate their access to ICT facilities for purposes such as using email, downloading films and music from the World Wide Web, etc.; Barberio (2004) circulated a questionnaire among 119 students to find out how they used Internet-based resources and tools as well as online information sources to carry out the research required for coursework assignments, essays and academic projects; finally, Kim & Park (2005) surveyed 262

students to examine the shift in attitudes towards online purchases as opposed to traditional offline shopping.

In particular, the number of completed questionnaires returned for the study presented in this thesis was quite encouraging considering that most of the 280 volunteers received no reward for their participation in the survey (only 72 of them were given a small payment in cash, because they took part in longer experimental sessions). Moreover, the unpaid volunteers who participated in the survey filled in the questionnaires at a particularly busy time of the academic year for students, i.e. towards the end of the second term, a few weeks before the exam period when most of them were completing assessed coursework and starting revision. As a result, the overall response rate was particularly successful, also considering that the method chosen for the circulation of the questionnaires involved a fair amount of overlap and overdistribution, in an attempt to reach the maximum number of potential respondents, which was regarded as essential.

3.3.1 Basic Demographic Information of the Sample Population

At the time of the data collection in the spring of 2005, the majority of the 280 respondents were attending undergraduate courses (181, 65%) and the remaining 99 respondents (35%) were doing taught or research-based postgraduate programmes leading to masters and doctoral qualifications. There was a prevalence of female participants in the sample (176, 63%), and the mean age was 24.65 years (median 23.00). The youngest participant was 18 years of age and the oldest, a postgraduate student, was 66; finally, 90% of the respondents were under 30 years of age.

3.3.2 Linguistic Background of the Respondents

The 280 participants involved in the study displayed a very diverse range of language backgrounds. Although a large number of respondents were students of languages (given the links of the author with language departments at the three universities that were involved in the study), for reasons of space this sub-section focuses only on their native languages as particularly strong indicators of their linguistic background. Table 3.1 shows a summary of the 245 participants (87.4% of the entire sample) who had only one native language.

<i>Native language</i>	<i>Number</i>	<i>Percentage</i>
<i>English</i>	89	31.8
<i>Chinese</i>	34	12.1
<i>Spanish</i>	22	7.9
<i>Russian</i>	19	6.8
<i>Italian</i>	16	5.7
<i>Greek</i>	14	5.0
<i>German</i>	13	4.6
<i>French</i>	10	3.6
<i>Arabic</i>	6	2.1
<i>Malay</i>	5	1.8
<i>Gujarati</i>	2	0.7
<i>Urdu</i>	2	0.7
<i>Other (languages with 1 native speaker each)</i>	13	4.6
<i>Total</i>	245	87.4

Table 3.1: Participants with only one native language

Interestingly, Table 3.1 shows that 217 respondents (77.5% of the entire sample) indicated that they had only one native language among the following eight languages (in descending order of frequency): English, Chinese, Spanish, Russian, Italian, Greek, German and French. On the other hand, though, the sample also included 13 other languages which were represented by only one native speaker each, some of which are relatively uncommon in the United Kingdom, e.g. Kannada, Kurdish and Romanian (all the following 13 languages which had one monolingual native speaker within the sample under consideration are included in the group labelled “Other” in Table 3.1: Catalan, Czech, Danish, Dutch, Finnish, Flemish, Japanese, Kannada, Kurdish, Persian, Portuguese, Romanian and Welsh).

Since they were all students at British universities, all the participants were fluent in English, which not surprisingly was the single most common native language in the sample. However, English was also found in combination with other native languages for 25 respondents (9.2%) who claimed to be multilingual, as shown in Table 3.2.¹

¹ The actual percentage for 25 respondents in the sample population of 280 members is 8.9%. However, Table 3.2 shows percentage values that have been rounded to one decimal place, and their sum is 9.2. Here and in similar instances that follow, whenever there are small numerical differences of this kind (e.g. for the total percentage value in Table 3.3, which should in fact be 3.6%, corresponding to 10 members in a population of 280), in our discussion we refer to consistent values based on those shown in the tables or figures in question, to avoid confusion.

<i>Other native language(s) in combination with English</i>	<i>Number</i>	<i>Percentage</i>
<i>French</i>	9	3.2
<i>German</i>	6	2.2
<i>Chinese</i>	3	1.1
<i>Spanish</i>	2	0.7
<i>Arabic</i>	1	0.4
<i>German, Spanish</i>	1	0.4
<i>Malay</i>	1	0.4
<i>Portuguese</i>	1	0.4
<i>Welsh</i>	1	0.4
<i>Total</i>	25	9.2

Table 3.2: Multilingual participants with native languages including English

In addition, 10 other respondents (3.7%) indicated that they were bilingual but English was not one of their native languages, as shown in Table 3.3.

<i>Native languages not including English</i>	<i>Number</i>	<i>Percentage</i>
<i>Catalan, Spanish</i>	8	2.9
<i>Dutch, French</i>	1	0.4
<i>German, Spanish</i>	1	0.4
<i>Total</i>	10	3.7

Table 3.3: Bilingual participants without English as one of their native languages

Finally, Figure 3.1 shows the native languages that were represented in the sample (including the corresponding number of native speakers for each of them), to provide a comprehensive picture of the language backgrounds of the respondents. In this case, each of the 26 languages represented in the sample is counted separately, i.e. multilingual participants are considered once for each of their native languages, and for this reason the total count exceeds the number of individuals in the sample. In Figure 3.1 the group labelled “Other” covers all the languages which had only one native speaker in the sample (whether in combination with another language or not), and includes eleven languages such as Czech, Danish, Dutch, Finnish, Flemish, Kurdish, etc.

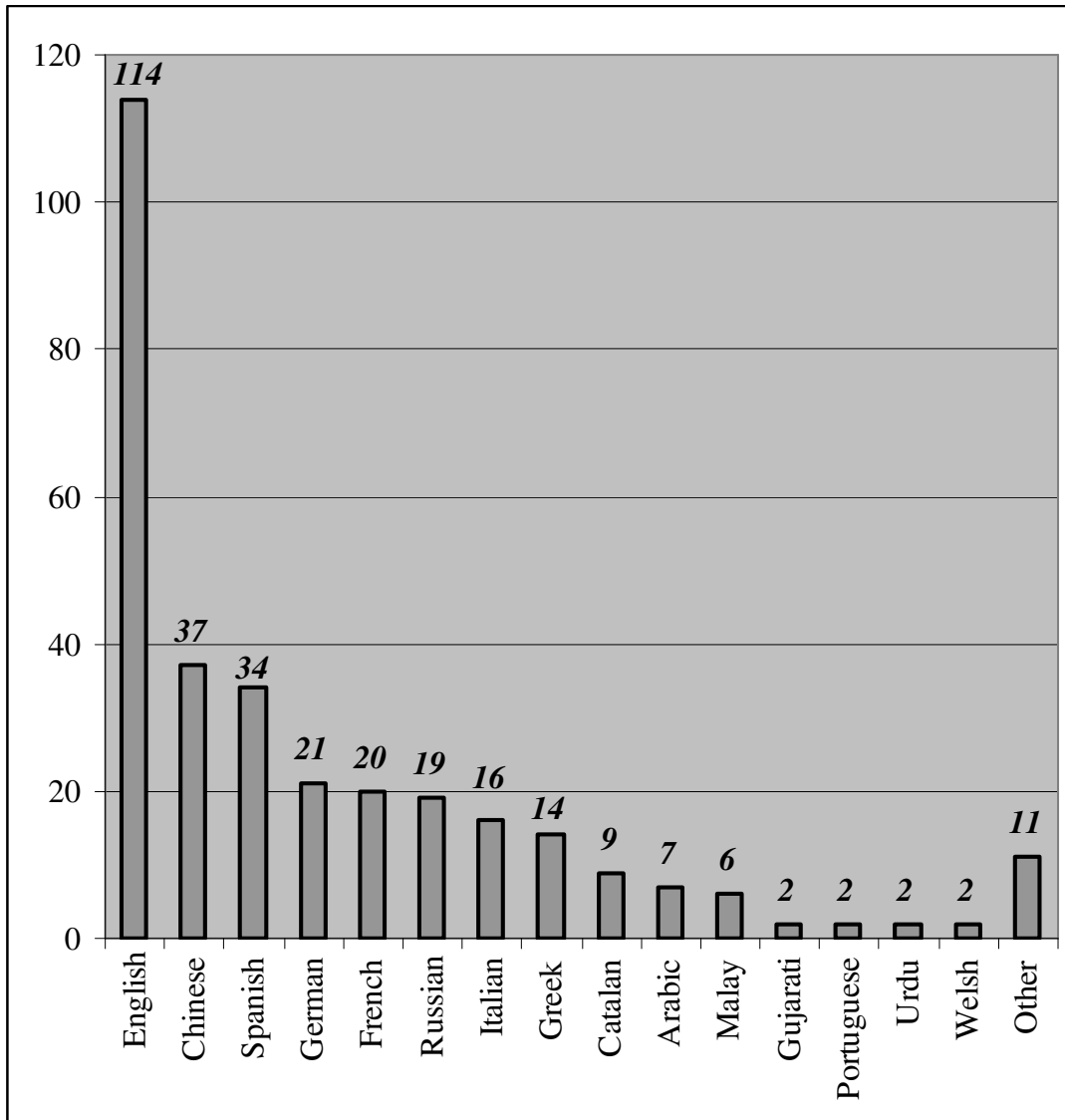


Figure 3.1: Breakdown of all the native languages of the 280 respondents

3.3.3 Level of Internet Use and Experience of the Participants

This sub-section contains information regarding the typical Internet use of the respondents and their overall level of experience with the Internet. In terms of the frequency with which the sample population accessed the Internet, as expected this was fairly high, because 174 respondents (62%) used it on a daily basis, and 69 individuals (25%) used it regularly five or six days a week. Only 8 respondents (3%) used the Internet one or two days a week or less. Figure 3.2 summarises the answers regarding the number of days in a typical week in which the respondents used the Internet.

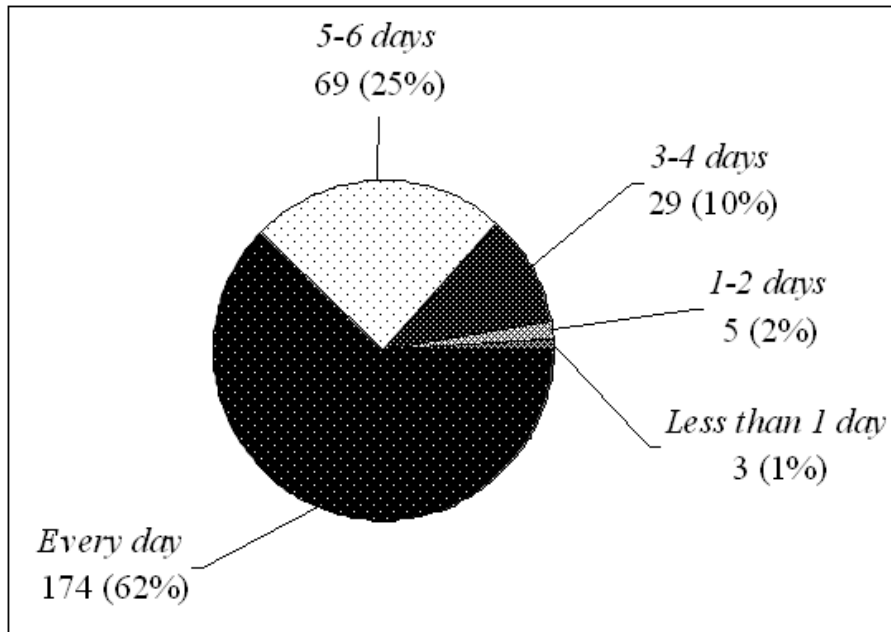


Figure 3.2: Internet use in a typical week

We also asked how many hours in a typical day the respondents used the Internet. As Figure 3.3 shows, 54 participants (19%) replied more than four hours, and overall 242 (86%) said that in a typical day they used the Internet for more than one hour. With regard to the purpose of their Internet sessions, the overwhelming majority (258 individuals, 92%) stated that they regularly used the Internet for a combination of university-related research or work as well as entertainment. Only 19 respondents (7%) claimed to use the Internet exclusively for university-related research or work, while 3 people (1%) accessed the Internet only for entertainment purposes.

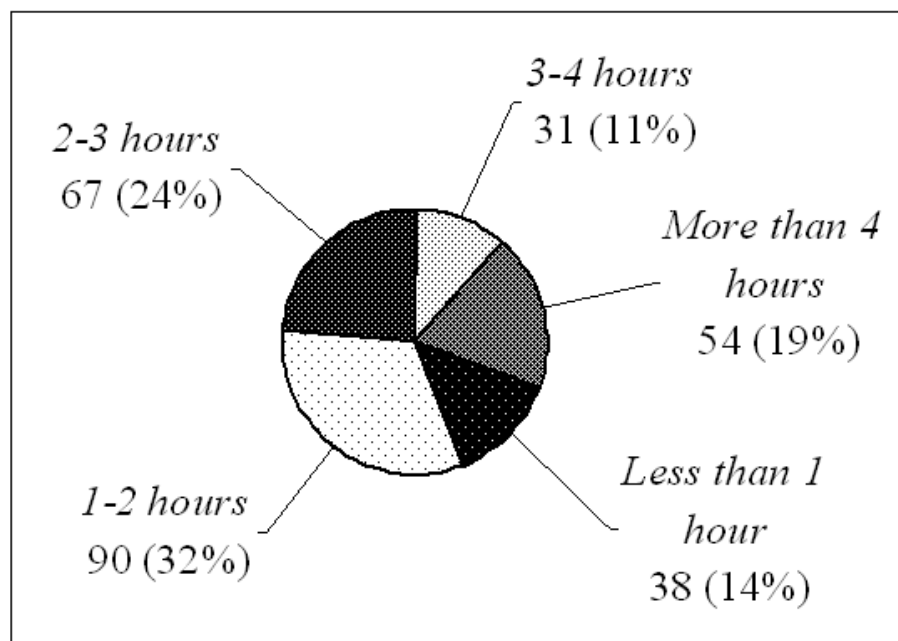


Figure 3.3: Hours of Internet use in a typical day

Another factor taken into account in the survey was the respondents' level of experience in the use of the Internet, which is a standard feature of Internet-related studies that are conducted with questionnaires and involve the execution of online tasks followed by some kind of evaluation, as noted by Preece et al. (2002: 398). There are several ways to establish the level of experience and skill of Internet users, which can be based on more or less intuitive methods. Lazar et al. (2004), for example, report an experiment designed to investigate how novice users perceive error situations when using the World Wide Web. Their study involved 78 "novice users" who were defined and selected on the basis of "not having taken formal computer training classes, not being computer professionals, and being unfamiliar with Web browsing" (Lazar et al., 2004: 204). Within the context of web usability studies Badre (2002: 76-77) discusses the usefulness of assigning users with similar levels of expertise to three broad categories labelled "novice", "experienced" and "expert". The author describes how the progression from one level to the next works in principle, without however offering a rigorous account or any clear criteria to explain how users should be assigned to each of the three levels.

Other approaches adopting more objective and formal methods to indicate the degree of experience are based on the amount of time for which individuals have used the Internet (expressed in terms of months and years), which serves a twofold objective: placing users with similar experience into the same categories, while also providing a measure to differentiate their relative skill levels. For example, Eastin & LaRose (2000: ev) adopt a time-based approach of this kind in a study involving university students, whose previous Internet experience "was measured with one item ranging from less than two months (scored 1) to over 24 months (scored 5)". Other Internet-related studies, such as Kehoe et al. (1999) and Nielsen & Loranger (2006: 25), estimate the experience of the participants according to the amount of time that they have spent online combined with the variety of activities that they have actually performed, which provides a more accurate indication of their overall browsing skills (cf. also Preece, 2000: 315).

For the purposes of the survey presented in this chapter, respondents were not asked for how long they had been using the Internet, because this does not necessarily provide a reliable measure of their actual level of experience and expertise. The rationale behind this choice was that somebody who has been using the Internet for a relatively long period of time may not necessarily be particularly

expert and familiar with a range of activities that can be performed online: one might think, for example, of a user who has had access to the Internet for eight years but only reads online newspapers; conversely, somebody who has been using the Internet for a much shorter time may be very experienced with a larger number of more sophisticated websites and online applications.

As a result, following partly the examples represented by Kehoe et al. (1999) and Nielsen & Loranger (2006: 25), and taking into account the advice given in Badre (2002: 77-78), the questionnaires that were used for our survey asked respondents to indicate from a diverse set of options how many activities they had performed on the Internet in the three months prior to the survey. These options were partly based on those used in Kehoe et al. (1999), who drew up a list of twelve online activities to establish the degree of Internet experience of the respondents according to a four-level scale. For our study their list was enlarged to include a wider range of online activities that have become available in the last few years, some of which are particularly popular among students. In order to realistically gauge their level of experience in using the Internet, as part of our questionnaire the respondents were asked to indicate which of the following 18 activities they had performed at least once on the Internet in the last three months:

- A) access course materials via virtual learning platform (e.g. WebCT, Blackboard)
- B) use email
- C) check bank account or use financial services
- D) use a chatroom
- E) consult online maps or journey planners
- F) listen to the radio
- G) sell or bid on an auction site (e.g. eBay)
- H) read online newspapers
- I) compare prices of products or services
- J) use instant messaging (e.g. MSN)
- K) check online library catalogues
- L) buy or rent goods (e.g. books, CDs, DVDs)
- M) use online dictionaries
- N) download software (e.g. trial demos, plug-ins)
- O) use a search engine

- P) download audio or video files (e.g. MP3, MPEG)
- Q) play online games
- R) buy tickets (e.g. coach/bus, train, plane, cinema/theatre)

For the purposes of our survey, then, the estimation of the level of expertise of the respondents was based on the number of activities that they had performed on the Internet over a period of three months. Although it is recognised that the 18 activities involve different levels of skills and expertise (for example, using a search engine is much simpler and more intuitive than placing a bid on an auction site), they were all treated equally and the browsing experience of the respondents was assessed according to the number of these activities that had been carried out, regardless for example of how often this had happened, or of what level of complexity was involved in the activities.

In spite of the necessary approximation entailed by this method, it was felt that this approach would provide a reliable basis to assess the respondents' levels of Internet expertise. As a matter of fact, users who had only performed a few of the 18 activities tended to have concentrated on the simpler ones (like using search engines, online email programs or library catalogues), whilst those who had performed most of the activities were necessarily experienced with a broader range of more sophisticated and advanced ways of using the Internet (which typically involved downloading software, playing online games, carrying out purchases or financial transactions via the Web, etc.).

Table 3.4 shows the number of Internet-related activities (out of the 18 options presented in our questionnaire and listed above) that had been performed by the respondents in the three months prior to the survey. This data reveals that the levels of experience varied quite dramatically in the sample, going from one participant who had only performed three of the activities (representing the least experienced Internet user in the sample, who had a fairly restricted knowledge of websites and online applications) to one who had performed all of them (therefore being the most experienced), covering all the possibilities in between. Following a slightly adapted version of the model presented in Kehoe et al. (1999), Table 3.4 also indicates a four-level categorisation of the Internet experience of the participants (novice, intermediate, experienced and expert), which is based on the number of Internet activities that they had performed.

<i>Level of Internet experience</i>	<i>Internet activities performed</i>	<i>Number</i>	<i>Percentage</i>
<i>Novice</i> (8, 3%)	3	1	0.4
	4	2	0.7
	5	5	1.8
<i>Intermediate</i> (95, 34%)	6	5	1.8
	7	10	3.6
	8	16	5.7
	9	26	9.3
	10	38	13.6
<i>Experienced</i> (143, 51%)	11	27	9.6
	12	35	12.5
	13	33	11.8
	14	26	9.3
	15	22	7.9
<i>Expert</i> (34, 12%)	16	18	6.4
	17	15	5.4
	18	1	0.4
	Total	280	100.0

Table 3.4: Number of Internet activities (out of 18) performed in the last three months and level of Internet experience of the respondents

Table 3.4 shows that overall the participants in the study had a very broad spectrum of levels of experience with the Internet, and following an adapted model of the categorisation proposed by Kehoe et al. (1999) most of the respondents can be defined as “intermediate” or “experienced” Internet users, based on the number of Internet activities that they had performed in a three-month period. The diversity of the levels of experience is clearly visible in Figure 3.4, which presents in visual form the same information given in Table 3.4.

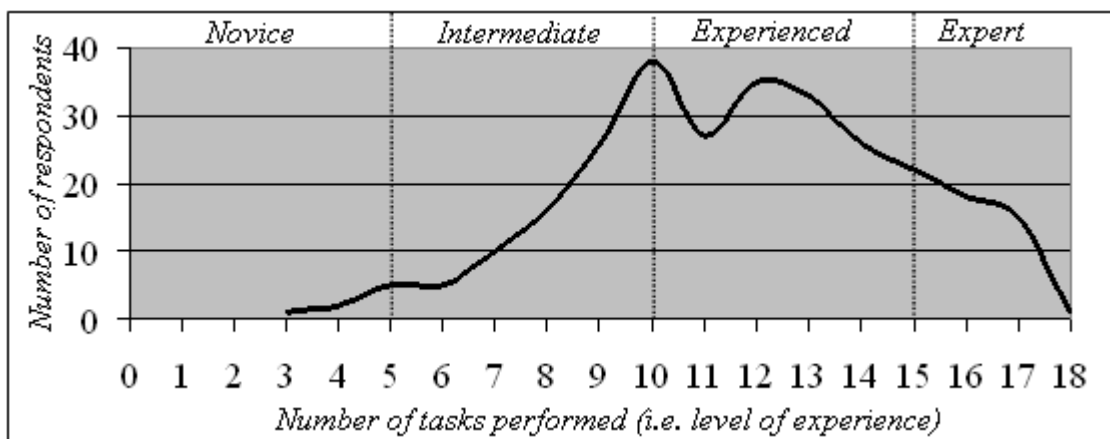


Figure 3.4: Distribution of the levels of Internet experience within the sample

Finally, in order to get an idea of how often the 280 respondents had encountered language barriers in the online environment, they were asked the following question: “In the past, have you ever wanted to access a website or webpage whose contents were only written in a language that you were not familiar with?”. To answer they could tick one option from the following set of six possibilities: “never”, “occasionally”, “sometimes”, “frequently”, “very frequently” or “don’t know”. As summarised in Figure 3.5, 60 people (21%) replied “never”, while 12 (4%) answered “don’t know”, which means that the remaining 75% of the Internet users in our sample population had experienced more or less frequently some difficulty in terms of being unable to access online content that was not available in one of the languages with which they were familiar.

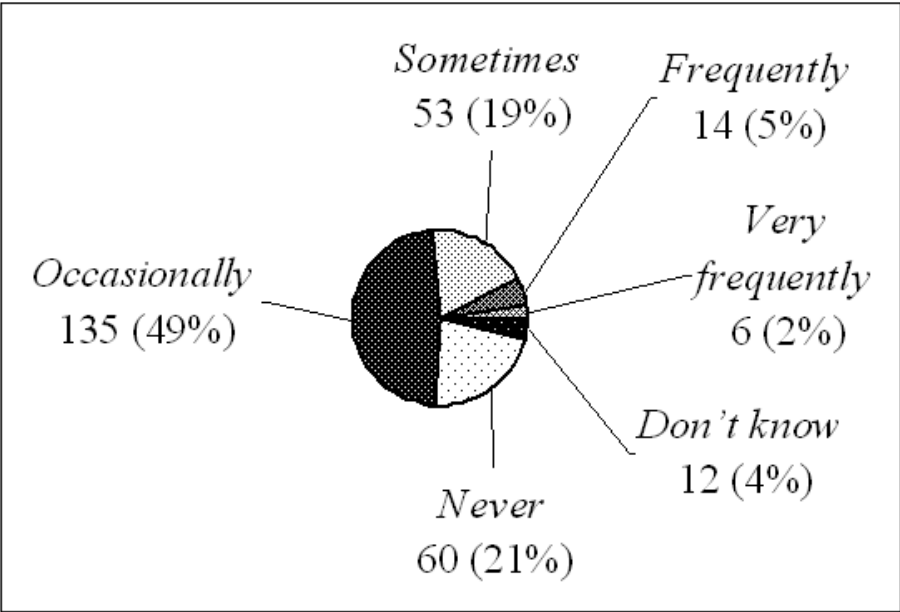


Figure 3.5: Frequency of linguistic barriers encountered on the Internet

One final consideration should be added concerning the frequency with which the respondents claimed to have experienced linguistic barriers while using the Internet, which is summarised in Figure 3.5. The participants included in the survey were all university students, therefore fairly educated individuals, and some of them had more than one native language, as discussed in sub-section 3.3.2. Apart from this, either as part of their degree programmes or their past school education, all of them had studied (and, in many cases, were also still studying) at least one foreign language. As a result, it is reasonable to argue that these students represent a relatively privileged sample in terms of multilingual knowledge compared to the rest of the

online population. This in turn suggests that the vast majority of average Internet users (for example, all the monolingual individuals or the people who cannot speak English) are very likely to experience language barriers in the online environment much more frequently than the sample of university students under consideration here.

3.4 Previous Use of Free Online MT

Out of the 280 respondents involved in the survey, 194 (69.3%) claimed that they had used free online MT at some point in the past before taking part in the survey whose results are presented here, whilst the remaining 86 (30.7%) stated that they had never used free web-based MT services before. However, a closer investigation of the responses given by the participants who claimed that they had used free online MT services revealed that some of them were in fact referring to online dictionaries, term banks, glossaries and other similar web-based lexical resources: this information was irrelevant to our study and had to be filtered out to preserve the integrity and comparability of the valid data that actually focused on free online MT. In fact, when designing the questionnaires it had been anticipated that some respondents may not be entirely clear as to what was meant by the phrase “free online machine translation”, which some might have confused with online bilingual or multilingual dictionaries, lexical look-up facilities, etc. As a result, the design of the questionnaires enabled the researcher to double-check the validity of the answers, as it was possible to cross-reference related information supplied by the respondents to verify the correctness of the data.

For example, one key question was “Have you ever used free online machine translation services on the Internet?”, and those who answered positively (194 in the sample) were also asked the following: “What free online machine translation service(s) have you used in the past? (*give their names if you remember them, otherwise tick ‘don’t know’*)”. The latter question served to confirm beyond reasonable doubt that the answers actually referred to the use of free online MT software as it is understood in this research, and to exclude answers about other kinds of web-based linguistic resources and services like bilingual dictionaries, glossaries, lexical look-up facilities, term banks, etc. As a result, we excluded from the data

analysis information provided by those who indicated that they had used websites and services like Eurodicautom/IATE (<http://ec.europa.eu/eurodicautom>), Leo (<http://dict.leo.org>), Oxford Reference Online (<http://www.oxfordreference.com>), Pons (<http://www.pons.de>), Wordreference (<http://www.wordreference.com>), because these were not proper free web-based MT services.² The answers provided by 33 people (17% of the total 194) were discarded on this basis. Similarly, it was felt that all the data provided by those who answered “don’t know” to the name of the free online MT service(s) that they claimed to have used (a further 57 out of 194, 29.4%), should also be excluded, as their information may have been potentially irrelevant to this study.

Following these preliminary checks for the validity of the information provided by the respondents, the amount of responses that was eventually considered for the data analysis presented here was reduced from 194 to 104. Although it is regrettable to have lost the usage information provided by as many as 90 respondents in this validation process, it was felt that this was an essential step to take in order to ensure that all the data discussed here was in fact relevant to the main focus of this thesis. It should also be noted that filtering out the data for those individuals who had answered “don’t know” for the name of the free online MT software that they claimed to have used might be regarded as a very drastic decision, as in fact some of those people might have really used free web-based MT services without remembering their names.

However, given that the vast majority of the questionnaires were distributed for volunteers to fill them in when they wanted in their own time without any supervision and were anonymous, there was no other way to ensure or double-check that the information provided in the answers was in fact specifically focused on web-based MT, and the choice was made to safeguard the integrity and reliability of the data, even if at the cost of eliminating a number of potentially valid responses. Therefore, the rest of this chapter discusses the results provided by the 104 questionnaires containing validated answers that were definitely about the previous use of free online MT on the part of the respondents.

² These websites are active and have been accessed 15 June 2007.

3.4.1 Free Online MT Services Used in the Past

The survey provides a comprehensive picture of which free online MT services had been used by the respondents prior to taking part in the research. The single most used system was Babel Fish, which was explicitly mentioned alone by 41 of the 104 respondents.³ The next most popular free online MT service was Google Language Tools, which was indicated alone by 21 users, while the third most popular translation tool was FreeTranslation, which had been used on its own by 12 people. In addition, all these three free web-based MT services had also been used in different combinations alongside other online translation tools (including less popular ones) by some of the respondents. Table 3.5 shows how many participants had used only one free web-based MT service or a variety of them (up to a combination of four, which was the case for one of the respondents).

<i>Free online MT services used in the past</i>	<i>Number</i>	<i>Percentage</i>
<i>Only one</i>	81	77.9
<i>Two</i>	17	16.3
<i>Three</i>	5	4.8
<i>Four</i>	1	1.0
Total	104	100.0

Table 3.5: Combinations of free online MT services used in the past

A more detailed data analysis showed that, apart from being the single most popular free web-based MT service, Babel Fish had also been used together with a number of other online MT systems by 14 respondents. Figure 3.6 shows all the free online MT services that participants reported using before taking part in our survey.⁴

³ Since the group of respondents considered here consists of 104 individuals, for the sake of brevity we refrain from giving percentages.

⁴ Each of the free online MT services mentioned by the participants has been counted separately, so the total count exceeds the number of respondents because 23 of them had used more than one system, as shown by Table 3.5. In addition, Figure 3.6 does not include four free online MT services mentioned in the responses which were active as of mid-2005, but are no longer available at the time of writing. All those that are shown in Figure 3.6 are still available at the time of writing.

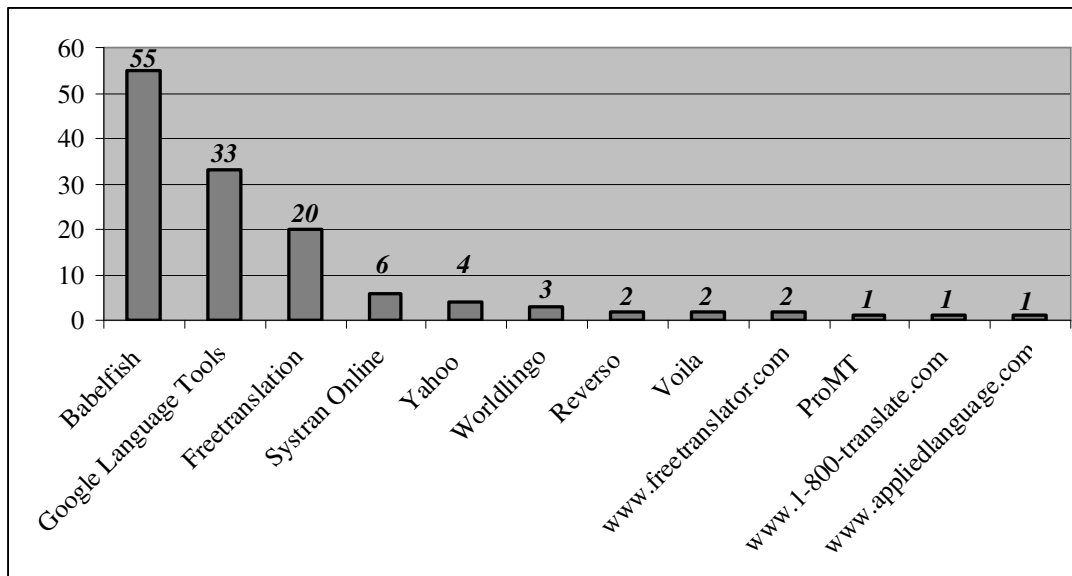


Figure 3.6: Free online MT services used in the past

3.4.2 Language Pairs with English as Source Language

We also investigated the language pairs for which the respondents had used free online MT services, and of the 104 individuals considered here, 84 had translated texts from English into other languages. Of these, 37 people stated that they had used free web-based MT to translate from English into more than one target language (up to four different target languages), and the most popular translations were from English into French (43 respondents), German (30), Spanish (23) and Italian (20). Overall, the participants indicated nine different target languages used in combination with English as source language, and Figure 3.7 summarises the relevant data (when respondents indicated more than one target language, each of them has been counted separately).⁵

⁵ The following abbreviations have been used for the languages: DE = German, DU = Dutch, EL = Greek, ES = Spanish, FR = French, IT = Italian, JA = Japanese, KO = Korean, PT = Portuguese, RU = Russian, ZH = Chinese (the abbreviations JA and KO are used in Figure 3.8). In addition, “Unsp.” stands for “Unspecified”, which means that respondents indicated that they had used free online MT services to translate from English into other languages, but did not indicate what the target languages in question were; “None”, on the other hand, shows the respondents who indicated that they had never used free online MT services to translate from English into other target languages, as a term of comparison.

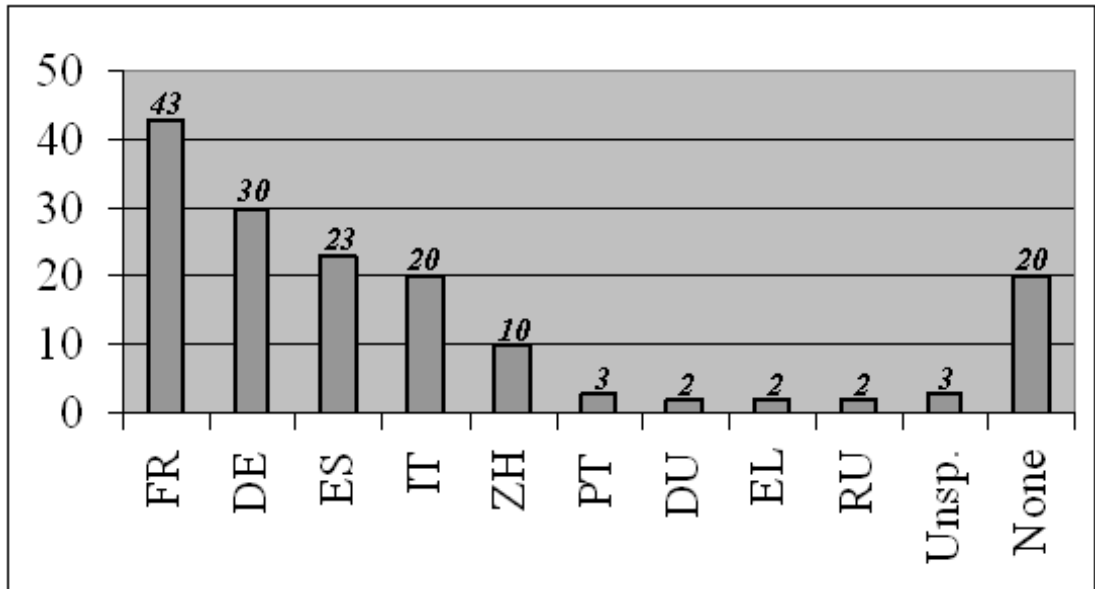


Figure 3.7: Target languages with English as source language

3.4.3 Language Pairs with English as Target Language

This sub-section looks more closely at the use of free online MT to translate from a range of source languages into English, according to the data provided by 89 of the 104 respondents, who claimed to have used free web-based MT for translations into English. 40 participants had translated from more than one source language into English (in one case, from as many as six different source languages), and as was the case for the opposite language directions, the most frequent translations were from French (48 cases), German (29), Spanish (27) and Italian (20). In total, the respondents indicated that they had used free online MT to translate from eleven different source languages into English, as shown by Figure 3.8.

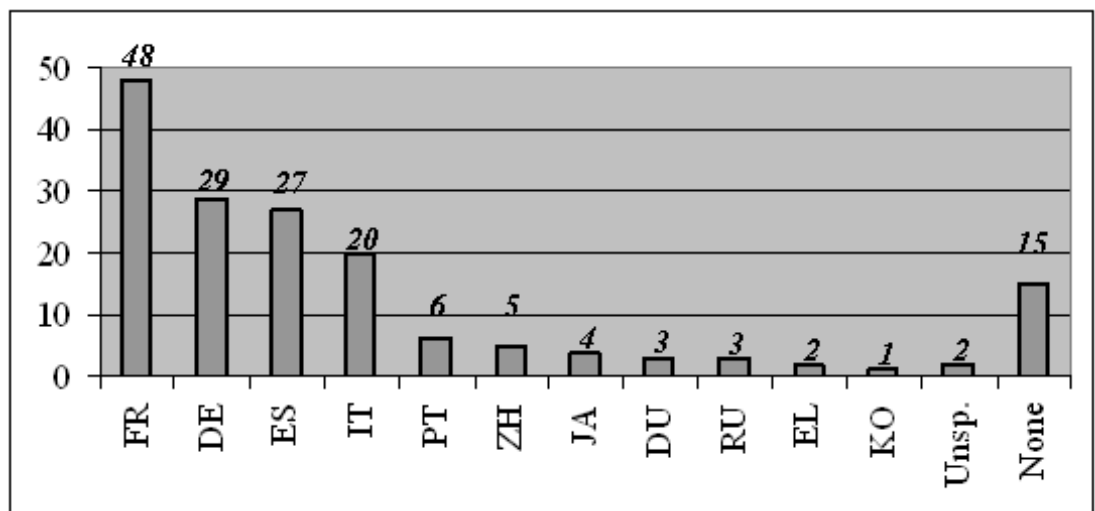


Figure 3.8: Source languages with English as target language

3.4.4 Other Language Combinations without English

We also elicited information on the other language pairs not involving English as either source or target language for which the respondents had used free online MT. This investigation revealed that 19 of the 104 participants had in fact made use of free web-based MT for translations involving seven different language pairs without English (in both directions, therefore giving rise to 14 separate language combinations in total). The most popular of these language pairs was French-Spanish (mentioned 10 times in total, 5 in each direction), followed by French-German (8 times overall, 6 from French and 2 from German). Figure 3.9 summarises the relevant information, covering all the 14 language combinations mentioned by the participants in their responses.

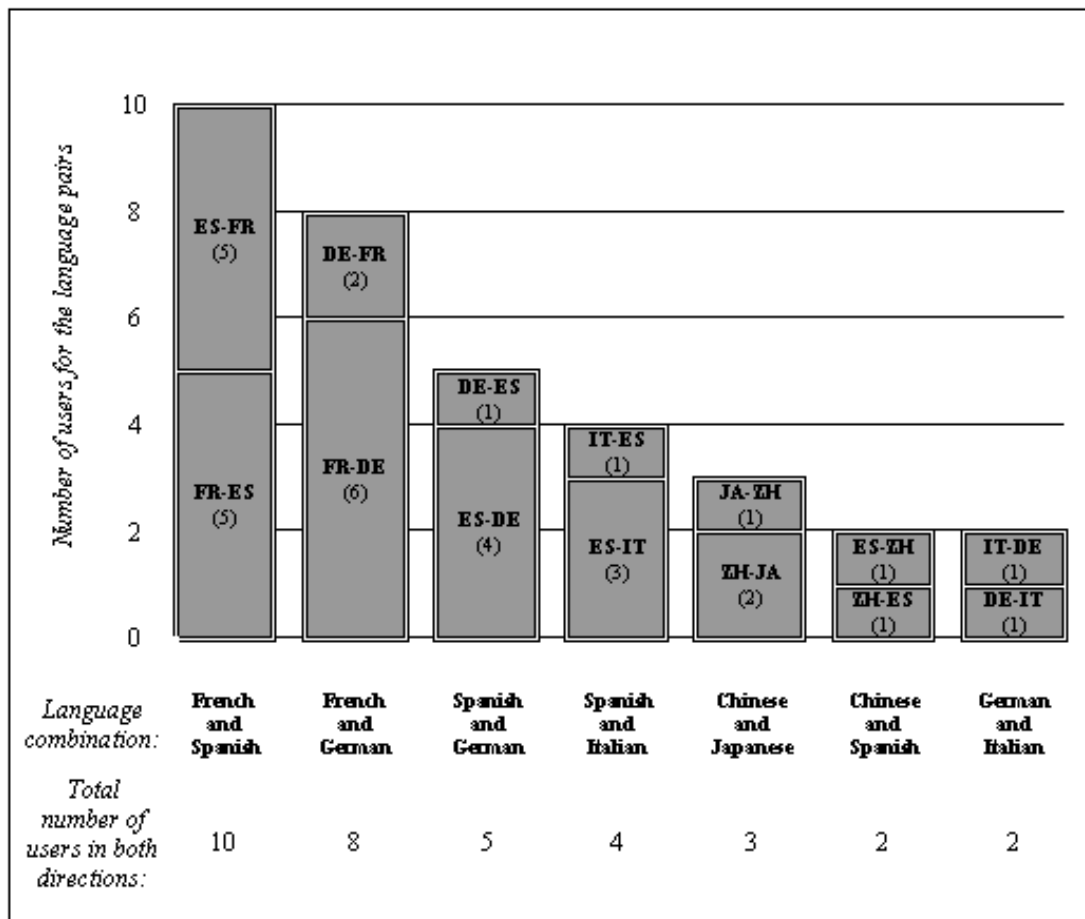


Figure 3.9: Language combinations without English as either source or target language

3.4.5 Translations from vs. into Users' Native Language

Considering those who had declared themselves multilingual (cf. sub-section 3.3.2) separately for each of their native languages, 33 of the 104 respondents had used free online MT services to translate from English into their native language(s). However, nearly half of those who had actually used free online MT services (51 individuals) had listed English as (one of) their native language(s). As a result, since translations from English can only be performed into other languages, these users should not be considered for this calculation, which brings down the number of individuals to 53. If one focuses only on these people who did not have English as one of their native languages, then, the 33 respondents who translated from English into their own native languages represent 62.3% of the reduced sample population to whom this piece of data could apply.

Table 3.6 shows the seven target native languages concerned, and although there is no space to include the details here, it should be noted that most of the time these translations were for assimilation purposes (sub-section 3.4.6 focuses more specifically on a discussion regarding the use of free online MT tools for assimilation vs. dissemination purposes).

<i>Users' native language</i>	<i>Number</i>
<i>Chinese</i>	7
<i>Spanish</i>	7
<i>French</i>	6
<i>Italian</i>	6
<i>German</i>	4
<i>Greek</i>	2
<i>Dutch</i>	1
<i>Total</i>	33

Table 3.6: Translations from English into users' native language

Conversely, of the 51 people who had English as their native language, 45 (88.2%) had used free online MT to translate from English into a variety of other languages, whereas only 5 had not used web-based MT for translations from English into other target languages, and 1 additional user did not specify the exact target language(s) for which they had used free online MT. It should also be noted that a number of

these 45 respondents had in fact translated from English into more than one target language. Table 3.7 lists all the target languages that were mentioned, and each of them is counted separately, therefore the total exceeds the number of users who supplied this information.

<i>Target language</i>	<i>Number</i>
<i>French</i>	27
<i>German</i>	18
<i>Spanish</i>	13
<i>Italian</i>	10
<i>Portuguese</i>	5
<i>Russian</i>	2
<i>Chinese</i>	1
<i>Dutch</i>	1
<i>Japanese</i>	1

Table 3.7: Translations of English native speakers from English into other languages

As mentioned in sub-section 3.4.4, only 19 respondents provided data regarding translations for language combinations not involving English as either source or target language. Since the relevant seven language pairs without English had only been used by a few individuals (as few as 2, or 10 at the most), due to space constraints the data regarding specific language combinations without English is not discussed here because it would reveal only very limited additional information.

3.4.6 Using Free Online MT for Assimilation vs. Dissemination Purposes

A question in the survey focused specifically on the purpose in the use of free online MT services, to understand whether they had been employed by the respondents for assimilation or dissemination purposes. An effort was made in the design of the questionnaires to ensure that the questions were clear and understandable to people who were not experts in MT, avoiding the use of technical expressions and phrases. To describe the purpose for which they had used free online MT services, the participants were asked to choose between the following two possibilities: “I wanted to understand something written by others” (which refers to assimilation) and “I

wanted others to understand something written by me” (i.e. dissemination). If appropriate, the respondents could indicate that both options applied to their past use of free web-based MT tools, if this involved a mixture of both assimilation and dissemination.

The data reveals that out of the 104 respondents considered here, the majority (60 individuals in the sample) had used free online MT for assimilation purposes only, whilst 40 people had used web-based MT for a combination of both assimilation and dissemination purposes. Finally, only 4 respondents claimed to have used free online MT exclusively for dissemination purposes. As a result, in summary the survey reveals that the vast majority of the respondents (96.1%) took advantage of free web-based MT for assimilation purposes, which was quite often also accompanied by dissemination tasks, while the use of online MT tools exclusively for dissemination purposes was extremely limited.

3.4.7 Ways of Using Free Online MT Services

There are a few different ways of using free online MT services based on the following factors: whether the input is a whole webpage (of which the user provides the URL) or a passage of plain text; in cases when plain text is translated, the source text can either be manually entered by the user (i.e. typed in word for word), or otherwise copied and pasted if it is already available in digital form (e.g. from a Microsoft Word file, the body of an email message, etc.); and, finally, the user can access the translation software directly from the website of an online MT provider (which usually has a default page in which the user has to supply the input and select the language combination for a particular translation job), or via a more complex environment which embeds Internet-based MT as one of its components (typically a search engine that offers options of multilingual and crosslingual information retrieval supported by an MT application, like for example Google or AltaVista – Glossbrenner & Glossbrenner, 2001: 63 and Hock, 2004: 84-85 discuss this feature that is available in AltaVista and is supported by the Babel Fish online MT engine).

Based on these possible variables, the survey intended to find out in what ways the respondents had used free online MT, asking them to indicate what modes of use applied to their past experience from a choice of four possibilities. Only 29 of the 104 users selected just one of the four possible ways of using online MT, while all the others indicated a combination of at least two, and quite a few people

responded that they had experienced at some point three or even all four of the options available, as shown by Table 3.8 (since all the options indicated by several respondents have been counted separately, only absolute numbers are given without percentages).

In what way(s) have you used free online machine translation? (<i>tick all the options that apply</i>)	
Manually typed in text to have it translated into another language	83
Copied and pasted text to have it translated into another language	79
Entered a URL (Internet address) to have a whole webpage translated into another language	24
Clicked on links provided by search engines to translate relevant hits into another language	24

Table 3.8: Ways of using free online MT services

The two most frequent ways of using free online MT are those in which users either manually type in the source text, or copy and paste the input when this is already available in digital form into the appropriate field of the service’s home page. As a result, there is a strong preference for translations of passages of plain text, rather than entire webpages with the user providing the URL, which only 24 respondents in our sample ticked (this is consistent with the findings for Babel Fish reported in Yang & Lange, 2003: 203). Equal frequency was recorded for the use of free online MT that is provided as an integrated feature by some search engines, with links that can be clicked by users who want to be presented with search results machine-translated into a language of their preference.

3.4.8 Kinds of Materials Translated

Another important area that this survey aimed to investigate focused on the kinds of material and texts that were fed by users into free online MT services. This was one of the few questions of the questionnaire which did not have a multiple-choice set of options to guide the respondents’ answers. Instead, the question provided a few examples and suggestions to clarify to the participants along what lines their answers were sought. This is how the whole question was phrased in the questionnaire: “Give details about the kind of information, texts or webpages that you have translated using free online machine translation services (*e.g. commercial/technical documents,*

informal letters, business correspondence, email messages, sentences or single words to find out their meaning, etc.)”). Although it is recognised that this list of examples might have led some individuals to provide partly guided answers, this was the only way to achieve clarity, while at the same time leaving the freedom to comment on any relevant aspect, in the hope of gathering varied and interesting data.

This aim was achieved, because the answers provided rich information which in some cases was fairly detailed, and the specific responses went well beyond the examples mentioned for illustration purposes. The data provided by the users covered mainly the two following areas, as was expected on the basis of the intention and formulation of this particular question: firstly, the nature of the materials that had been translated (in terms of text types or genres, with indications for instance of their degree of technicality, level of formality, specific topic, etc.); and, secondly, the length of the source texts (e.g. whole documents, paragraphs, sentences or single words). Most participants listed a number of elements that contributed to provide the information that was sought, so in the data analysis each item of interest was identified and recorded separately and independently of the others mentioned by the same respondent. For example, if somebody stated that they had translated individual words taken either from personal letters or from business documents, all these pieces of information were recorded once separately (counting for the categories “emails/letters/correspondence”, “business/commercial documents” and “individual words” in the case of this example). The rest of this sub-section summarises the main common patterns in terms of usage, focusing on the most frequent and most unexpected results.

Table 3.9 presents the number of answers indicating for what text types and genres free web-based MT software had been used by the respondents (textual material of similar nature has been aggregated into the same category, showing all the labels and definitions used by the respondents in their answers).

<i>Technical texts, business/commercial documents, academic papers, scientific articles</i>	31
<i>Emails, letters, correspondence</i>	18
<i>News</i>	10
<i>Songs, song lyrics</i>	5
<i>Literature, poems</i>	3

Table 3.9: Text types and genres for which free web-based MT services had been used

Table 3.9 shows that slightly less than one third of the respondents (31 out of 104) had used free web-based MT to translate a variety of technical and (semi-)specialised texts, such as business and commercial documents, academic papers and scientific articles (various fields were mentioned, e.g. medicine, engineering, etc.). Fairly frequent (18 responses) was the use of free Internet-based MT to translate letters or emails (mostly for informal and personal correspondence), and news reports from online newspapers and magazines (particularly about sport) were also mentioned. Finally, 5 respondents said that they had used online MT to translate songs or song lyrics, and interestingly 3 others to translate literature: 2 for literary passages (of French literature in both cases) and 1 for poems (not better specified).

The remaining part of this sub-section focuses on a very surprising finding that shows a clear pattern of usage that deserves close consideration. Most respondents indicated that they had translated input texts of variable lengths, ranging from whole webpages (whose density in terms of textual content can vary quite dramatically) or entire texts down to individual paragraphs, sentences, or even words. In fact, most respondents indicated a variety of combinations of these possible lengths for input that they had translated. However, as many as 65 participants (62.5%) explicitly stated that they had translated “single words” or “individual terms”, thus showing a very frequent user behaviour that may not be entirely suitable to the standard design and capabilities of most free online MT services.

It should be remembered in this respect that the data provided by the 104 survey participants analysed and discussed here refers only to those who had explicitly mentioned the name of at least one of the actual free online MT services that they had used. As already explained, this was done to exclude from this discussion the people who had in fact used online dictionaries, glossaries, term banks or look-up facilities, and might have wrongly considered them examples of web-based MT systems. Given the number of sample members who stated that they had used proper free web-based MT tools to translate single words taken out of context, this specific area is focused on in more detail in the concluding part of this chapter in section 3.5, with a discussion of the main implications.

3.4.9 Ratings of the Performance of Free Online MT

After eliciting information on various key factors related to the usage of free web-based MT services, the final part of this survey looked at the users' perception of the quality of the output provided by free online MT software. After gathering data on usage, the last question was the following: "Overall, how would you rate the performance of the free online machine translation services that you have used in the past?". Interestingly, the results were quite varied, and the impressions of the participants in this respect are summarised in Figure 3.10.

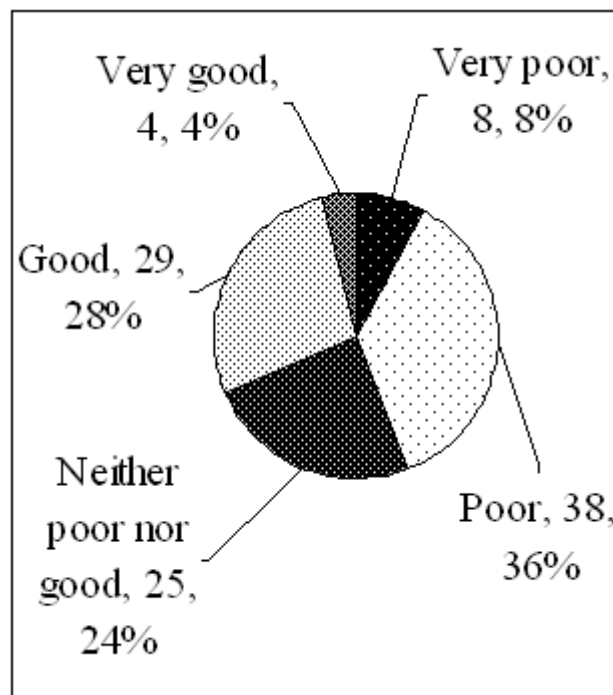


Figure 3.10: Ratings of the performance of free online MT services

Very few respondents (12% in total) gave extremely negative or positive judgements of the quality of the performance of the free online MT services, branding it either as "very poor" or "very good", and slightly more than one third of the sample regarded it as "poor". On the other hand, however, 24% of the participants were neutral, whilst perhaps surprisingly a slightly higher number of individuals (28%) considered the performance of the free online MT services that they had experimented with to be "good". In summary, although the picture regarding the perceived quality of free web-based MT tools is somewhat varied and fragmented, a portion of the user population included in the survey was happy with the level of their performance.

3.5 (Mis-)Using Free Web-based MT Services as Online Dictionaries

This section focuses specifically on the data of the survey that revealed the common and widespread use of free Internet-based MT services for a purpose for which they were not designed, i.e. the translation of single lexical items taken out of context, whereby such systems are improperly used as online bilingual dictionaries or lexical look-up facilities. Out of the total 104 students who stated that they had used free web-based MT services in the past, 65 participants (62.5%) had taken advantage of these systems to translate single words. This data, which shows even higher figures than those reported in Yang & Lange (2003: 199-204) for Babel Fish (more details on this are given in sub-section 3.5.3), is likely to be reflected in the wider general population of Internet users. The rest of the chapter looks at the issues raised by these questionable usage patterns of free Internet-based MT systems and discusses their implications for the design of online MT tools, identifying areas where intervention is needed to find some possible solutions.

3.5.1 Online MT and Lexicography

The two areas of MT and lexicography have historically been closely linked (Steffens, 1995; Wanner, 1996), and lexicography has traditionally played a key role in the development of successful operational MT systems with the provision of machine-readable lexical components (Meekhof & Clements, 2000; Gdaniec & Manandise, 2002; Koeling et al., 2003; Zajac et al., 2003). However, producing lexicographic resources and rules for MT systems is a laborious and expensive process (Kilgarriff & Tugwell, 2001: 187), and a number of approaches have been proposed in MT-related research and development to overcome the challenges posed by what Farwell et al. (1992: 532) call the “lexical acquisition bottleneck” (e.g. Mel’čuk & Wanner, 2001). These consist, for example, in reusing already existing lexical resources to design new MT systems (Bond et al., 2001) or to fine-tune existing software to specific domains by adding the relevant terminology to augment or refine coverage (Ayan et al., 2003). In particular, cost-effective approaches that rely on repurposing available lexical components have been successfully applied to the development of MT systems covering low-density languages, as reported in Diaz de Ilarraza et al. (2000), Weerasinghe (2002) and Karagol-Ayan et al. (2003).

In recent years the Internet has spurred and enabled the appearance of a host of tools and resources that rely on intensive lexicographic work, including mono- and multilingual online dictionaries and lexical look-up facilities, browsable term banks as well as web-based MT systems. At the same time, over the last decade or so, the advent of the Internet has had a considerable impact on the ways in which translation software on the one hand and lexicographic resources on the other are offered to, and deployed by, the public. In addition, the growth of the World Wide Web has also reshaped to some extent the mutual relationship between MT and lexicography (Dillinger, 2001: 85): the migration of already existing services, resources and tools onto the new Internet platform has taken place with varying degrees of adaptation and consideration of the requirements that are germane to online interaction, giving rise to unprecedented and multi-faceted usage patterns, some of which may not have been fully anticipated and accounted for by the designers of the online applications concerned.

Against this background, the rest of this chapter addresses the issues raised by the distorted use of free web-based MT services, which a substantial number of users employ as dictionary-like look-up facilities, to find out or check the semantic bilingual equivalence of individual isolated lexical units out of context. This trend represents one of the latest, and arguably one of the most surprising, developments in the long-standing collaboration between the two traditionally related areas of MT and lexicography.

3.5.2 Overview of Research into Internet-based Dictionaries

The presence of dictionaries of various kinds on the Internet has attracted substantial scholarly attention over the last few years, and a number of studies have approached this topic from a variety of angles and with different levels of detail, mainly looking at the potential of these online resources and the advantages that they offer compared with traditional paper-based or offline lexicographic works (e.g. Docherty, 2000; Harley, 2000; Geisler, 2002; Menagarishvili & Coggin, 2003; Li, 2005). In an early study, Storrer & Freese (1996) look at dictionaries available on the Internet combining qualitative and typological considerations to present a wide-ranging overview of this emerging field which links it with the long-established tradition of printed dictionaries. They identify a number of criteria to classify online dictionaries, and analyse in detail 216 web-based dictionaries offered on the Internet in mid 1996.

Their survey suggests that on the whole bi- and multilingual dictionaries were much more widely available than monolingual ones, and that overall there was a higher number of general dictionaries than specialised ones. In particular, the report presented in Storrer & Freese (1996) emphasises that English was by far the most common language offered in combination with German by online bilingual dictionaries.

Another early example of the interest in the new possibilities offered by the Internet as a medium to provide and consult dictionaries with a clear emphasis on lexicographic issues is represented by Carr (1997). This paper is a forward-looking attempt to raise lexicographers' awareness of the opportunities and challenges presented by the Internet, and also provides an overview of online sources of mono- and bilingual lexicographic information. Nesi (1998) is particularly concerned with mono- and multilingual electronic dictionaries for learners of English, and argues that the role played by such works becoming available on the Internet can be expected to grow, in spite of the pressures exerted by market forces in slowing down this process. Interestingly for the discussion presented in the rest of this chapter, the conclusion of Nesi (1998: ev) argues that "[a]s we receive more and more of our daily supply of information on-line, it will become an increasingly obvious alternative to access word knowledge on-line too, using whatever search routes suit our needs". This prediction seems to be substantiated by the strong inclination of the students involved in our survey to use free online MT services when looking up the meaning of individual words.

De Schryver (2003a) discusses the benefits offered to dictionary making by present-day technological advancements, emphasising the advantages of mono-, bi- and multilingual electronic dictionaries over traditional paper-based ones, and devotes one section specifically to the reasons for the appeal of Internet-based dictionaries (*ibid.*: 157-160). De Schryver (2003b) is an overview of online dictionaries available for nearly 120 languages grouped under the umbrella definition of "African languages", revealing that 182 of them are bilingual or multilingual, and that only one is a monolingual dictionary (*ibid.*: 9). De Schryver & Joffe (2004) discuss the issues involved in the design of a freely-available online bilingual dictionary for the language pair English and Sesotho sa Leboa; they emphasise the benefits of providing feedback forms and of implementing an unobtrusive log file analysis system to reveal usage patterns and difficulties experienced by users, so that

lexicographers can improve the compilation of the dictionary, as needed. In a similar vein, Kiatisevi et al. (2003) present an ongoing project geared towards the creation of a multilingual online dictionary service for Thai in combination with a range of other languages, discussing issues related to the implementation of the system on the Internet and how users' queries can be fed back into the development process to improve the overall performance of the service.

In spite of the interest of these studies, however, it should be mentioned that it is not clear according to what criteria web-based lexical resources are classified and considered as dictionaries by the authors. The literature is surprisingly silent on the factors that contribute to drawing the line between "proper" online dictionaries on the one hand and "amateur" websites which provide some sort of lexical information but cannot be considered dictionaries as such on the other (e.g. word-lists, glossaries, etc.). This distinction is far from obvious, and is particularly crucial for less-resourced languages, especially in the case of web-based lexical resources that are not associated with well-established publishers or providers of printed dictionaries; as noted in Somers (1997), for example, there are several webpages and websites claiming to give access to "online dictionaries" for a number of minority languages, which however turn out to consist of a few hundred entries, and appear to be prepared by keen amateurs without professional training in lexicography. Many of these Internet-based resources are of questionable usefulness, and can hardly be considered dictionaries in their own right.

Finally, Wooldridge (2004) deals with lexicography in the era of the World Wide Web within a more general overview of computer-assisted lexicography, including the latest developments in Internet-based dictionaries. Summing up the discussion, the author argues that the "most radical effect that the computer has had on lexicography [...] has been to supplement the limited number of paths for information retrieval determined in advance by author and publisher with the infinite number of paths chosen by the dictionary-user" (ibid.: ev). This conclusion draws attention to the key issues flagged up by our survey regarding the questionable use of free web-based MT services as dictionary-like providers of bilingual lexicographic information and semantic equivalence for single lexical units taken out of context.

3.5.3 Relevant Usage Reports for Babel Fish

Part of the motivation to conduct the survey reported here and for its strong focus in particular on the translation of single words by means of free web-based MT services came from the information in Yang & Lange (2003). They reveal some data on the usage of Babel Fish for two randomly chosen census days in mid 1998 and late 1999. This is of special interest here because Babel Fish is arguably the most well-known online MT system (which is indicated by the results about its popularity found in our survey and reported in sub-section 3.4.1), and was the first MT service ever to have been made available on the Internet free of charge for unrestricted use, when it was launched in late 1997 by the popular search engine AltaVista in partnership with Systran Software Inc. (more details on the pioneering experience of Babel Fish are provided in sub-section 2.6.2). Yang & Lange (2003) provide information focusing on the users' general demographic profiles, their reactions to the quality of the service based on feedback sent to the developers, the most frequent language combinations that are requested, and the kind of input that gets translated, i.e. plain text vs. entire webpages, which is constantly in favour of the former option.

In particular, they explain that “more than 50% of translations are of one- or two-word phrases” (Yang & Lange 2003: 199), which leads the developers of Babel Fish to consider “adding a button to the web page [of the service] to distinguish dictionary look-up from translation. One-word translation requests would be treated as dictionary look-up, and a list of alternatives, perhaps with glosses, will be returned” (ibid.). At the time of writing, i.e. roughly four years after the information about Babel Fish contained in Yang & Lange (2003) was published,⁶ no look-up facility separate from the translation option for running text is as yet offered by Babel Fish, which provides only one equivalent lexical item in the target language when a single word is entered as source text or input, as indeed do all the other major free web-based MT systems.

It seems reasonable to suggest that the unorthodox use of online MT as a dictionary-like look-up tool to check the meaning and translation of individual lexical items reported in Yang & Lange (2003) is also to be found among the competitors of Babel Fish, although no official information on their usage is publicly available. Part of the survey carried out for this thesis set out to investigate this

⁶ Yang & Lange (2003) is an extended and updated version of a paper by the same authors that was originally published five years earlier (Yang & Lange, 1998).

hypothesis, in order to understand more accurately how widespread this dictionary-like use of free online MT tools actually is. The results of this study are presented in the rest of this chapter, which also discusses the challenges that the Internet poses in terms of unanticipated usage of free web-based MT with a bearing on online dictionary use and lexicography.

3.5.4 Results of Usage Data Provided by the Survey

The results of our survey confirm and reinforce the findings presented in Yang & Lange (2003), according to which users routinely interrogate the service with single-word translation requests. The data gathered in our survey shows in fact that 62.5% of the respondents in the sample had used a variety of free web-based MT services in the past to translate single words. Figure 3.11 shows in more detail the free Internet-based MT tools used by the 65 respondents who claimed that they had taken advantage of online MT to translate single words in the past.⁷

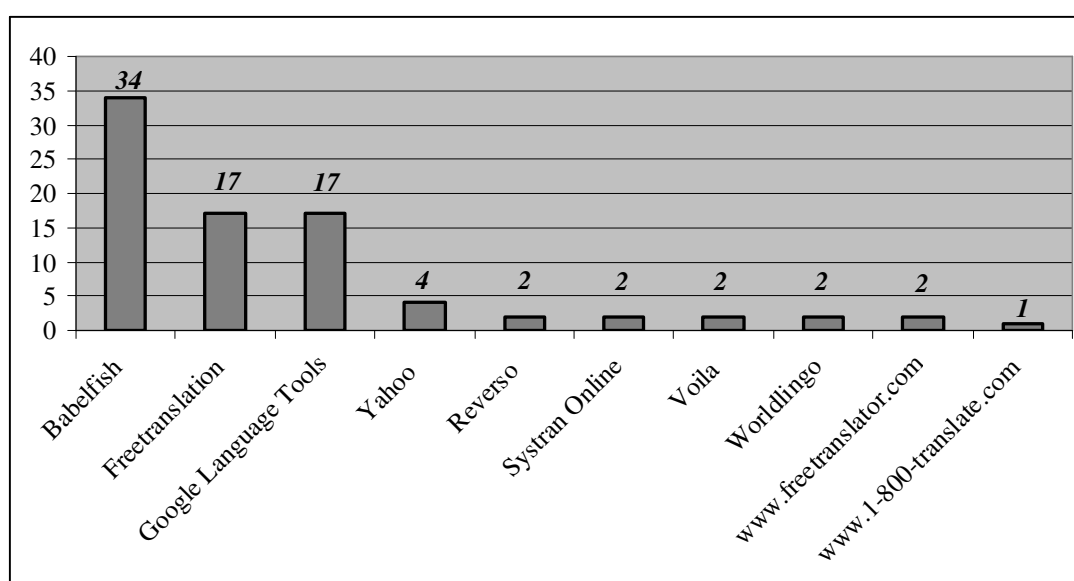


Figure 3.11: Free online MT services used to translate single words

It should be pointed out that in the majority of cases this mode of use was also mentioned alongside others involving longer passages of text. In fact, only 4 users indicated that they had taken advantage of online MT services exclusively to translate “single words” or “individual terms”, whilst in all the other cases this

⁷ Each of the free online MT services mentioned by the participants has been counted separately, so the total count exceeds the number of respondents because 16 of them reported using more than one system to translate single words.

specific usage was mentioned explicitly alongside others as well (e.g. “sentences”, “paragraphs”, “articles”, “letters”, etc.). It is also interesting to compare the use of specific free online MT services employed to translate single words (which applies to 65 members of the sample population) against the MT systems used by all the respondents in the sample who had accessed Internet-based MT before taking part in the survey (104 in total).

Table 3.10 presents such comparison, and for ease of consultation it includes exclusively the respondents who stated that they had had experiences of using only one free online MT service (and not a combination of them). In spite of the inevitable variations, Table 3.10 shows that the distribution of the free online MT services that were used is comparable in terms of percentage between both sets of users. In particular, Babel Fish turns out to be the single most used free online MT service by both groups of users, followed by FreeTranslation and Google Language Tools. However, whilst Google Language Tools is the second most popular service in the total sample (20.2% of users), it ranks third for frequency among the users in the sub-sample, with a lower percentage of 12.3%. Likewise, in percentage terms FreeTranslation has more users in the sub-sample (16.9%) than is the case for the total sample (11.5%), where in fact it is the third most popular service after Babel Fish and Google Language Tools. In spite of these small differences, the general picture emerges that a range of free online MT tools are routinely used to translate single words, not only the most popular amongst them, i.e. Babel Fish, for which this pattern of users’ behaviour had already been identified by Yang & Lange (2003).

<i>Free online MT service used</i>	<i>Total sample of users (104 people)</i>		<i>Sub-sample of users for single words (65 people)</i>	
	<i>N</i>	<i>Percentage</i>	<i>N</i>	<i>Percentage</i>
<i>Babel Fish</i>	41	39.4	24	36.9
<i>FreeTranslation</i>	12	11.5	11	16.9
<i>Google Language Tools</i>	21	20.2	8	12.3
<i>Reverso</i>	1	1	1	1.5
<i>Voila</i>	1	1	1	1.5
<i>www.1-800-translate.com</i>	1	1	1	1.5
<i>www.appliedlanguage.com</i>	1	1	0	0
<i>www.freetranslator.com</i>	1	1	1	1.5
<i>Yahoo</i>	2	1.9	2	3.1

Table 3.10: Comparison of free online MT services (whole sample vs. sub-sample)

3.5.5 Discussion of the Results

These findings seem to reveal a lack of understanding on the part of the users regarding the kind of service that online MT software is designed to provide. As discussed in sub-section 3.5.2, the large number of online bilingual dictionaries that are available on the Internet covering a wide range of language combinations, some of which can be accessed free of charge, would seem the most suitable tools to find out the meaning of single words and isolated lexical units. As a matter of fact, online dictionaries provide users with detailed lexicographic information and semantic insights that are meant to guide them towards a thorough understanding of the meaning and correct use of the lexical items by offering definitions, glosses, explanations, part-of-speech information, possible target-language equivalents based on sense disambiguation, examples of typical in-context occurrences, unmarked collocational patterns, frequent metaphorical uses, idiomatic expressions, etc. All these features derive from long experience in dictionary making and development, and proper online bilingual dictionaries disseminate over the new Internet medium essentially the same kind of lexicographic information that traditional high-quality paper-based dictionaries have been supplying to their users (e.g. language learners, translators, technical writers, etc.) for a long time.

On the other hand, in spite of relying on a significant amount of lexicographic work and lexical processing to operate, as explained in sub-section 3.5.1, typical free online MT services are designed to hide lexicographic processing and information from users, and simply to provide target-language output for any input, so much so that for any single word in the source language they will provide a supposed equivalent in the target language strictly on a one-to-one basis. In order to interpret the data provided by the survey and discuss the potential problems that it reveals, one can differentiate scenarios in which this modus operandi might not affect users badly after all, as would for instance be the case when they are simply checking or reminding themselves of the meaning and translation of a word between two languages with which they are already familiar to some extent. If the users have at least a basic knowledge of both the source and target languages concerned, then a straightforward one-to-one correspondence for a particular lexical item between the two languages might serve the purpose of backing up the user's intuition or assumption about its possible meaning(s) and translation(s), because they should be able to vet the system's suggestion.

However, the straightforward equivalence provided by free web-based MT services when individual lexical items without context are given as input in effect hides the range of context-dependent senses (and therefore different possible translations into the target language), and at the same time cannot provide accurate or reliable information for such cases as homography or polysemy (Hutchins & Somers, 1992: 86-87), for which a proper online bilingual dictionary would be able to account much more rigorously, for example thanks to cross-references to related entries. Pérez-Ortiz & Forcada (2001) present a laboratory assignment expanding on these issues and designed to raise students' awareness of how commercial MT software actually works. Taking as an example the language pair English-Spanish, they use a simple technique to demonstrate that real MT programs are not designed to translate on a word-for-word basis, but that context-dependent target-language lexical choices producing good-quality translations are selected depending on the analysis of larger units such as phrases found in source-language sentences.

In summary, it seems reasonable to suggest that in some cases for users familiar with both languages involved in the translation process using free web-based MT services for simple lexical look-up may be a valid technique, because their bilingual knowledge would enable them to be in control of the process and vet the acceptability and correctness of the output provided by the system for an individual lexical item. On the other hand, however, naïve monolingual users or those with a weak understanding of either or both of the languages involved in the translation process should be very wary of taking at face value the straightforward translation on a one-to-one basis offered by free online MT systems for individual words. This is due, in particular, to the lack of extra lexicographic details that prevents users from appreciating crucial subtleties, which might give rise to misinterpretations and translation errors. Unfortunately, the design of the questionnaires that we used did not make it possible to investigate thoroughly under what circumstances the users had taken advantage of free online MT services to translate single words (i.e. what was the level of their bilingual knowledge, if the translation direction involved translating individual words into a target language with which they were very familiar or did not know at all, etc.). As a result, it is not possible to expand on these issues in more detail here on the basis of the data gathered in the survey.

3.6 Summary and Recommendations

On the basis of the data discussed above regarding the widespread use of free online MT services as dictionaries, this concluding section summarises the main findings that emerged from the survey. It identifies some areas where further research is needed and puts forward recommendations concerning the implications of this study for the design of the user interface of free web-based MT services.

3.6.1 Need for Further Research

The findings of our survey reinforce and confirm the information about the usage of Babel Fish presented in Yang & Lange (2003), showing that in fact Internet users frequently make a questionable use of a range of free online MT services. Deploying web-based MT software like online bilingual dictionaries or lexical look-up facilities is a misguided strategy that is liable to provide users with partial and misleading information. In particular, this common behaviour raises the question of why Internet users would rather rely on web-based MT services to translate individual words, although bilingual dictionaries exist on the Internet and some of them, including those associated with high-quality prestigious printed dictionaries, are free of charge. Even though this survey did not investigate the reasons behind the usage patterns reported by the respondents, one reasonable possibility might be that web-based MT systems represent convenient “one-stop shops”, in that they cover a wide variety of languages pairs, particularly in combination with English as source or target language, whilst on the whole online bilingual dictionaries tend to be specific to one language pair.

However, users may not realise the shortcomings associated with using free web-based MT software for a purpose that it is not designed to serve, and it is difficult to assess the practical consequences of this inappropriate usage (e.g. in terms of misunderstandings, incorrect interpretations, wrong translations, etc.), given that the survey did not go into this level of detail. The data gathered with the questionnaires shows that this is an interesting topic worthy of further research and additional experimental observation, to look deeper into the motivations for the choices made by Internet users in this area at the intersection between Internet user behaviour, MT, dictionary use and lexicography. In this respect, addressing some of the issues raised in Pérez-Ortiz & Forcada (2001) and Forcada (2002), it would be

interesting to carry out some additional empirical research into the practical consequences (e.g. problems in terms of potential mistranslations, misunderstandings, misinterpretations, etc.) that occur when people with different linguistic abilities (e.g. language students at beginners', intermediate or advanced levels) read or translate a text using free online MT simply as a look-up dictionary-like lexical resource to translate single words during the process. For example, a set of experiments could be designed to evaluate the performance of a range of language learners working under these conditions against that of control groups that instead are allowed to use proper online (or printed) bilingual dictionaries to perform the same reading or translation tasks (an empirical study involving online MT along similar lines, but with a focus on post-editing activities to produce polished translations, is described in Somers et al., 2006).

In conclusion, it is hoped that closer investigations will address the issues raised by this survey in the future, following up on some of the suggestions put forward here. The ultimate goal of this further research work would be to increase the users' awareness as to what Internet-based tools can best serve their linguistic needs. This would ensure that their choice of the lexicographic resources, reference works and MT services that are available on the Internet is properly motivated and carefully selected on the basis of the most appropriate tools that can be used for the tasks that the users wish to perform and for which they need linguistic support.

3.6.2 Implications for the Design of Free Web-based MT Services

Finally, the issues raised here are also of direct relevance to the developers, designers and providers of free web-based MT services. Due to the large number of requests for the translation of input consisting of one- or two-word phrases revealed by their monitoring of usage, Yang & Lange (2003) had already suggested that the default webpage through which users access Babel Fish should provide a clear distinction between the proper translation service (for passages of running text or entire webpages) and a separate dictionary look-up facility offering more detailed lexicographic information (for individual words). However, no developments in this direction have as yet been seen in Babel Fish or indeed in any of the other popular free web-based MT services, whilst users seem to be consolidating their habit of using them as online bilingual dictionaries.

This survey has revealed that users tend to take advantage of a range of free online MT services to translate single words, and it seems likely that this pattern of usage would not stop unless the users are informed and educated about the potential and capabilities of web-based MT software, so that they are aware of its limitations and understand how best to use it. This in turn should enable users to take advantage of the most appropriate linguistic resources that can meet their needs, particularly online dictionaries, lexical look-up facilities, multilingual glossaries and term banks, when they require translations of single words and isolated terms or lexical items without context. The findings of this survey suggest very strongly that the designers and developers of online MT services should seriously consider taking a proactive approach towards raising the awareness of the users with regard to the most appropriate (or, otherwise, deprecated) ways of using free web-based MT software. Steps in this direction could consist, for example, in alerting potential users to the availability of other online resources and services that are best suited to the translation of single words. After all, it would seem to be in the interests of those who have a stake in offering and promoting web-based MT (e.g. system designers, developers, and ultimately the MT vendors themselves) to manage the expectations of naïve users, informing them of the types of usage with which MT software is not capable of dealing well and for which it can provide, at best, only a service of questionable quality.

CHAPTER 4

USING FREE ONLINE MT FOR ASSIMILATION PURPOSES: A CASE STUDY FOR THE LANGUAGE PAIR ITALIAN-ENGLISH

4.1 Overview of the Chapter and Aims of the Case Study

This chapter reports a case study with two main aims: firstly, to investigate the effectiveness and usefulness of free online MT services when entire webpages are translated from a foreign language into a familiar one to extract basic information from a monolingual website; and, secondly, to assess the users' confidence in the reliability of free online MT as a tool to assist them in the assimilation of multilingual information for everyday real-life translation tasks when language barriers are encountered on the Internet. There is a significant body of recent research focusing on the issues of users' perception of websites, confidence and trust in online providers of products, services and information in a wide range of areas, e.g. e-commerce (Lee & Turban, 2001; Corritore et al., 2003), online banking (Kapoulas et al., 2004) and health advice (Silence et al., 2004), to name but a few. However, although free web-based MT is a relatively well established resource on the Internet, as shown by the survey presented in chapter 3, to date no research has been carried out to investigate how reliable it is perceived to be by its users. The study presented in this chapter aims to shed light on this crucial area with an experimental case study focusing on the language combination Italian-English, with a view to illustrating issues that also apply to other language pairs covered by currently available free Internet-based MT tools.

The rest of this chapter describes the experiment that was carried out, starting with a discussion of its overall design and of the monolingual websites in Italian that were selected for the case study under consideration. This is followed by a description of the profile of the participants in the study and an explanation of the criteria according to which they were divided into a control group and two experimental sub-groups. Next, the focus is on the scope, structure and distribution of the questionnaires that were filled in by the participants during the research, with an explanation of what free online MT services they used to perform the information

assimilation tasks involved in the case study. After describing the overall experimental design and setup, the main results are presented and discussed. The chapter ends with a summary of the key findings and an outline of open issues worthy of further research that have been identified.

4.2 Design of the Experiment and Candidate Monolingual Websites in Italian

Discussing the potential and usefulness of Internet-based MT services, Quah (2006: 86) claims that “[s]ince most online machine translation systems are for general purposes, the translations generated may not be of the highest quality but there is enough information for the end-users to at least understand the overall content”. The same author goes on to say that for Internet users wishing to read web-based texts in multiple languages “free online machine translation services are the window on another cultural and linguistic world” (Quah, 2006: 164). To achieve the two-fold objective of the case study described above, the experiments that were carried out were designed to reflect as closely as possible real-life situations that are experienced by linguistically-challenged Internet users.

Given the linguistic background of the researcher involved in the design and execution of the experiment, the upfront decision was made to focus on Italian and English for the case study, because these are the languages with which he is most comfortable. In addition, the survey reported in chapter 3 showed that this is the fourth most popular language pair among the users of free Internet-based MT services (in both directions), as shown by the students who were included in the sample, and other sources of published data also confirm that requests for translations between Italian and English are among the most frequently submitted to free web-based MT systems (e.g. Yang & Lange, 2003: 204 for Babel Fish). Finally, since the experiments included in this chapter targeted university students in Great Britain, it could be safely assumed that all of them were fluent in English, while their knowledge of other languages, particularly Italian, varied quite dramatically, and this variable was key to the objectives of the case study as well as to its design.

The tasks involved in the experiment consisted in using four of the leading free online MT services to translate from Italian into English entire webpages belonging to monolingual websites in Italian. The URLs of the home pages of the websites concerned were provided to the participants in the experiment, who were asked to extract some basic information from the websites that they were visiting, to test the effectiveness of free web-based MT as an aid for comprehension and navigation during information assimilation tasks on the Internet. A number of basic preliminary decisions had to be made with regard to which monolingual websites in Italian should be selected for this purpose. A list was drawn up of fifteen possible candidates identified by the researcher, all of which met the following criteria, as they were deemed crucial to the success of the experiment:

- the websites were strictly monolingual and did not have a translation in another language (e.g. a section with information in English);
- their content was written in good standard Italian (i.e. without typos, using everyday written language with correct grammatical structures, etc.);
- the websites consisted of text-intensive webpages, with a reasonable amount of non-technical content covering various topics, but not relying on extensive graphic design, since this would have hindered the MT processing (for instance, Flash sites were excluded from consideration because they were not “MT-friendly”);
- the websites had a list of contact details, including at least one telephone number, on a separate page that was directly accessible through a link located on the home page;
- the nature and the contents of the websites were not identifiable in any way from their URLs and they were not popular sites (so the websites of famous companies with strong brands or Internet addresses including recognisable words were not considered);
- the URLs for the home pages of the websites were as clear and short as possible (maximum 25 characters), so as to be easy to type, minimising the chances of mistakes.

4.3 Pilot Study and Final Selection of the Monolingual Websites in Italian

Following the preliminary selection of fifteen candidate monolingual websites in Italian for the experiment carried out by the researcher according to this set of criteria, the number of websites was later reduced to five, based on a pilot study which involved seventeen volunteers with a procedure similar to the one described in Fink & Laupase (2000: 47-48). Within the context of our study this stage was essential to avoid any bias in the design of the questionnaires which were going to be administered to the participants in the experiment (section 4.5 gives more details on the scope, structure and distribution of the questionnaires). In order to neutralise cultural and linguistic biases, the seventeen people who helped in this further selection of the websites during the pilot study had diverse backgrounds and were all either native speakers of English or very fluent in this language. Table 4.1 shows details about the language backgrounds of the seventeen individuals who volunteered to take part in the pilot study to choose the final five monolingual websites in Italian that were eventually used in the experiment.

<i>Initials of volunteer</i>	<i>Native language</i>	<i>Knowledge of Italian</i>	<i>Knowledge of languages other than English or Italian</i>
AA	Italian	Native	N/A
EM	Italian	Native	N/A
EP	Italian	Native	N/A
LC	Italian	Native	N/A
MM	Italian	Native	N/A
MS	Italian	Native	N/A
HP	English	Excellent	N/A
NL	English	Excellent	N/A
LW	English	Excellent	N/A
LCC	Spanish	Excellent	N/A
MH	Czech	Excellent	N/A
AG	English	None	French (good)
KH	English	None	French (advanced), German (advanced)
MJ	English	None	French (advanced), Spanish (good)
ZH	English	None	French (advanced), Spanish (good)
KK	Chinese	None	None
YLT	Chinese	None	German (basic)

Table 4.1: Details of the seventeen volunteers in the pilot study to select the final monolingual websites in Italian used in the experiment

These seventeen people with different linguistic and cultural backgrounds checked that the fifteen candidate websites in Italian identified by the researcher were not actually recognisable from their URLs and that they were not popular ones with which ordinary Internet users might be already familiar. For the pilot study we administered the questionnaire in appendix A to the volunteers. In fact, none of them had ever visited, or knew about the existence of, the five monolingual Italian websites that were eventually selected for the experiment, nor could they guess what they were about by only looking at the Internet addresses of their respective home pages. Table 4.2 shows the URLs of the home pages of the fifteen candidate websites that were checked by the volunteers, and the titles that appeared on the browser window for the respective home pages during the pilot study.¹

<i>URL of home page</i>	<i>Title of the home page</i>
www.gdmland.it	La Gazzetta del Mezzogiorno
www.bccfc.it	Indice
www.siesi.it	Atelier Si & Si
www.areadragon.com	AdreaDRAGON, il sito web dell'Associazione Polisportiva DRAGON
www.castelthun.com	Castel Thun
www.laviadellestreghe.com	La via delle streghe
www.aima.it	Accademia Italiana Musica e Arte
www.marconionline.it	Il sito 2005 del LSS Marconi
www.querinistampalia.it	Fondazione Querini Stampalia
www.zenson.it	Rete civica del Comune di Zenson di Piave – Provincia di Treviso
www.osapp.it	O.S.A.P.P. Organizzazione Sindacale Autonoma Polizia Penitenziaria
www.pumilano.it	Partito Umanista – Milano
www.siriogatto.it	Siriogatto.it: Il Collezionismo On-Line!
www.rmfi.it	RMF – Radio Missione Franciscana – Varese
www.lestrie.it	Azienda Vitivinicola Le Strie

Table 4.2: URLs and titles of the home pages of the fifteen candidate websites in Italian

¹ These were all monolingual websites in Italian that were identified by the researcher and were active online between March and June 2005.

Following the approach taken in the extensive usability evaluation reported in Visciola (2000: 159-163) that focused on a number of Italian websites representing a wide range of categories, the seventeen volunteers were also asked to log on to each of the fifteen websites in Italian listed above and to browse them, in order to propose a short description consisting of up to three keywords in English that would summarise the contents and the nature of each website. Based on their suggestions, a consensus was reached on a short description in terms of keywords in English that captured fairly the actual essence of each website and also reflected the views of the majority, including the volunteers with no knowledge of Italian. This approach was adopted because at this stage it was essential to avoid any linguistic or cultural bias in the formulation of the keyword-based descriptions to identify the websites.

As a result, the consensus was based on the highest number of similar proposals for relevant keywords in English to describe the Italian websites, regardless of whether they had been put forward by the six individuals who were native speakers of Italian, by the five people who had an excellent knowledge of this language, or by the remaining six who did not know it at all. In this way, the keywords could be assumed to represent a fair and objective indication of what the websites were about for any visitor who might be browsing them, regardless of their linguistic or cultural background. This step was crucial to enable us to use these keywords in English for the actual experiment, during which participants with various levels of knowledge of Italian (including none) were asked to identify the correct definition of the contents of these websites from a set of options after machine-translating their pages from Italian into English using free online MT services. The descriptions formulated in the pilot study were later used in the multiple-choice questions of the questionnaires that were administered during the actual experiment (these questionnaires are available in appendices B and C).

Following the initial pilot study, five websites were finally selected for the experiment, and the tasks presented in the rest of this chapter are based on them. The other candidate websites were discarded because a lesser degree of consensus had been reached with regard to a set of keywords in English to describe them. The five monolingual Italian websites selected on this basis for the experiment were quite diverse both in terms of content and design. Table 4.3 shows the URLs of their home pages with the keyword-based descriptions suggested by the majority of the volunteers in the pilot study that were used in the questionnaires to identify them.

<i>URL of home page</i>	<i>Keyword-based description of the website</i>
www.areadragon.com	Sports centre
www.marconionline.it	School
www.pumilano.it	Political party
www.siriogatto.it	Collectors' items
www.rmfi.it	Radio station

Table 4.3: URLs and keyword-based descriptions of the five monolingual websites in Italian

Figures 4.1-5 show the home pages of these monolingual websites in Italian that were selected to carry out the experiment, as they appeared during the pilot study described above, as well as during the actual experiment for the case study discussed in the rest of this chapter (i.e. throughout the spring of 2005).²



Figure 4.1: Home page of sports centre website (URL: www.areadragon.com)

² To ensure that the websites would not be substantially redesigned, extensively updated or significantly changed in terms of content and appearance during the experiment, they were monitored by the researcher over a period of approximately two months prior to the pilot study, to ensure that they were relatively stable and unlikely to be removed from the Web. In fact, the websites showed only minor marginal changes between the time of the pilot study and the conclusion of the actual experiment, which did not affect the validity of the results and findings discussed below.



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Liceo Scientifico Statale G. Marconi - Milano

Home page

<p>Ultime notizie e circolari</p> <p>OnLine i risultati provinciali delle Olimpiadi di Matematica (scarica il file pdf da 86KB)</p> <p>Consigli di classe di marzo 2005</p> <p>Colloqui pomeridiani con i docenti</p> <p>Sportello help 2004/2005</p> <p>Colloqui 2004/2005</p>	 <p>Il nuovo sito</p> <p>A partire dall'a.s. 2004/2005 il sito del Marconi ha cambiato radicalmente volto ed è diventato accessibile a tutti i navigatori Internet, indipendentemente dalla loro dotazione hardware e software, come vuole la Legge Stanca (04/2004) per i siti della Pubblica Amministrazione.</p>	<p>Info generali</p> <p>Dov'è il Liceo [d]</p> <p>I numeri [n]</p> <p>Strutture e servizi [s]</p> <p>A.S. 2004/2005 [a]</p> <p>PAA 2004/2005 [y]</p> <p>Il POF 2004/2005 [p]</p> <p>Colloqui coi docenti [c]</p> <p>Mailing list [l]</p> <p>Orientamento terza media [k]</p>
	<p>Le novità</p> 	<p>Supporto alla didattica</p> <p>Scuola aperta [f]</p> <p>Sportello Help [h]</p>

Figure 4.2: Home page of school website (URL: www.marconionline.it)



PARTITO UMANISTA MILANO

IL PARTITO DELLA NONVIOLENZA E DEI DIRITTI UMANI

<p>HomePage</p> <p>Documenti</p> <p>Comunicati Stampa</p> <hr/> <p>L'Umanista On-Line</p> <p>Successo del Partito Umanista in Cile</p> <p>Boicottiamo la Nestlé</p> <p>Ogni anno 5 milioni di bambini muoiono di fame</p> <hr/> <p>Newsletter</p> <p>Web umanisti</p> <p>Link</p>	<p>Regionale Europea dell'Internazionale Umanista</p> <p>Secondo congresso a Budapest il 27 e 28 novembre 2004</p> 	<p>NO ALLA LEGGE "SALVA PREVITI"</p>  <p>Lunedì 20 dicembre ha avuto luogo una manifestazione davanti al Palazzo di Giustizia di</p>	<p>Il Partito Umanista italiano verso il congresso</p> <p>13 marzo 2005: congresso cittadino a Milano</p> <p>10 aprile 2005: congresso nazionale a Torino</p> <p>Il prossimo 10 Aprile si terrà a Torino il congresso</p>
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Figure 4.3: Home page of the political party website (URL: www.pumilano.it)



Figure 4.4: Home page of the collectors' items website (URL: www.siriogatto.it)



Figure 4.5: Home page of the radio station website (URL: www.rmfi.it)

4.4 Profile of the Participants in the Case Study

In total 208 people completed and returned the questionnaires that were designed for the experiment that is presented in this chapter. All of them were fluent in English, as they were all undergraduate or postgraduate students at three British universities (Manchester, Salford and Liverpool Hope) during the time of the experiment, i.e. between April and May 2005. All these students were unpaid volunteers, and most of them received paper copies of the questionnaires in class from their lecturers, with the distribution procedure described in section 3.3 (further details are also given in section 4.5). The final sample population considered for the case study presented in this chapter, however, had to be reduced initially to 169 individuals because, for the purposes of the data analysis, all the questionnaires that were only partially filled in were excluded (e.g. those with sections that were not completed or with missing answers for the information on which this chapter focuses).

This had happened, for instance, when the participants had experienced technical difficulties or network-related problems that prevented them from carrying out the Internet-based tasks involved in the case study, and therefore they were not able to supply the information that was required by some of the questions, which happened to 39 respondents in total (18.75%). In addition, 6 students who were native speakers of Italian had completed the questionnaire, but the data that they provided was excluded from the analysis because typically native speakers would not use free online MT to translate into English a website in Italian, since they would be perfectly able to navigate the original content. As a result, the final sample population considered for the experiment went down to 163 individuals.

4.4.1 Experimental Group and Control Group

This sub-section gives more details on the make-up of the two experimental sub-groups and the control group involved in the experiment, along with a description of the key demographic characteristics of the participants whose responses were eventually considered. In order to elicit meaningful information from the responses collected in the case study, following the initial screening of the 163 questionnaires that were included in the data analysis, the participants were divided into two separate major groups, i.e. a main experimental group with 145 members and a control group consisting of 18 people. None of the individuals in the control group

(abbreviated to CG) had any knowledge of Italian, while the main experimental group was in turn further divided into two sub-groups, one consisting of respondents who declared that they did not know Italian at all (referred to as EGNO in the rest of the chapter, with 85 people), and another with 60 members who had some knowledge of Italian at different levels (EGIT).

None of the 60 members of the EGIT experimental sub-group were native speakers of Italian, but they had all stated in the questionnaire that they had some knowledge of this language. However, their level of competence in Italian varied very widely and included for example learners at beginners' level who had followed private courses, others who had taken informal classes or attended conversation sessions after picking up the basics of the language on holiday, as well as full-time postgraduate specialist students who were very fluent in Italian. Dividing the participants in the experiment according to their knowledge of Italian was crucial, given the focus on their reactions to the use of free online MT tools as an aid for comprehension and navigation during information assimilation tasks. As a result, it was essential to have a CG (whose members had no knowledge of Italian) and to differentiate two experimental sub-groups on the basis of their linguistic knowledge (EGNO and EGIT). Tables 4.4-6 show some additional demographic characteristics of the members of these three separate groups included in the experiment.

<i>Control group (CG): 18 members</i>						
<i>Level of study</i>		<i>Gender</i>		<i>Age</i>		
<i>Undergrad</i>	<i>Postgrad</i>	<i>Male</i>	<i>Female</i>	<i>Mean</i>	<i>Median</i>	<i>Min/Max</i>
11 (61%)	7 (39%)	13 (72%)	5 (28%)	23.17	22.50	19/30

Table 4.4: Demographic characteristics of the 18 members of the control group (CG)

<i>Experimental sub-group without any knowledge of Italian (EGNO): 85 members</i>						
<i>Level of study</i>		<i>Gender</i>		<i>Age</i>		
<i>Undergrad</i>	<i>Postgrad</i>	<i>Male</i>	<i>Female</i>	<i>Mean</i>	<i>Median</i>	<i>Min/Max</i>
57 (67%)	28 (33%)	27 (32%)	58 (68%)	25.24	23.00	19/60

Table 4.5: Demographic characteristics of the 85 members of the experimental sub-group without any knowledge of Italian (EGNO)

<i>Experimental sub-group with knowledge of Italian (EGIT): 60 members</i>						
<i>Level of study</i>		<i>Gender</i>		<i>Age</i>		
<i>Undergrad</i>	<i>Postgrad</i>	<i>Male</i>	<i>Female</i>	<i>Mean</i>	<i>Median</i>	<i>Min/Max</i>
43 (72%)	17 (28%)	15 (25%)	45 (75%)	25.05	22.50	19/66

Table 4.6: Demographic characteristics of the 60 members of the experimental sub-group with knowledge of Italian (EGIT)

A comparison of the data in Tables 4.4-6 shows that the key demographic indicators were quite similar for the groups, except for the inconsistency in the gender difference, which is predominantly male in the CG, while in both experimental sub-groups (EGNO and EGIT) there is a large majority of female members. This difference is a result of the random distribution of the questionnaires, due to which the demographic characteristics of the respondents could not be kept under control. In any case, it seems reasonable to assume that gender is not a relevant variable, given the nature of the task.

All the 163 participants performed the same tasks, which consisted in looking for basic information posted on the five monolingual Italian websites presented in section 4.3 (i.e. understanding the nature of the websites and finding a contact telephone number), with one crucial difference: the 145 members of the two experimental sub-groups used four of the leading free online MT services to translate the webpages from Italian into English; the 18 people in the CG, on the other hand, tried to answer the same questions by looking only at the original websites in Italian, without the help of web-based MT. All the participants later completed a questionnaire in English whose aim was to check the correctness of the information that they had extracted from the five (machine-translated or original) websites, and to get the respondents to rate their confidence in the accuracy of the information that they had found.

Finally, in order to keep the complexity of the study at an acceptable level, the decision was made to consider the knowledge of Italian of the members of the experimental group only in binary terms, and to rely solely on the information provided by the respondents themselves in this respect, without carrying out any additional test or verification. It is recognised that ideally the study might have used more standardised and objective methods to assess the knowledge of Italian of the respondents, investigating the role played by the very wide range of levels of

competence found in the experimental group (which varied from beginners to advanced learners). In addition, it would have also been desirable to factor into the statistical data analysis and to consider in the interpretation of the results the knowledge of languages that are similar to Italian (most commonly French and Spanish), which might have affected the way in which the members of both the experimental and control groups performed the tasks, e.g. because of the help provided by cognate and similar words in answering the questions during the navigation of the websites.

However, given the limitations in terms of time and resources under which this study took place, and to ensure that the statistical analysis of the 163 completed questionnaires involved a manageable level of difficulty, the respondents of the two experimental sub-groups were divided up according to whether they had stated that they knew Italian or not; similarly, although the questionnaires did collect information in this area, the role played by the participants' familiarity with other potentially relevant languages was ignored in the data analysis presented here, because it would have significantly increased the number and complexity of the variables that were simultaneously under consideration. Although these limitations to the study are regrettable, applying some constraints to the design of the experiment and to the analysis of the data collected in the case study still gave the possibility to achieve interesting results, benefiting at the same time the clarity and thoroughness of the report presented here.

4.5 Scope, Structure and Distribution of the Questionnaires

The questionnaires that were distributed for the experiment were all in English and focused on some basic information about the five monolingual websites. With regard to the Internet-based tasks to be carried out, first of all the participants were asked what description best defined the contents and type of each of the five websites, choosing one of the following fifteen options (cf. Visciola, 2000: 159-163):

- A) tourist information
- B) political party
- C) city council

- D) sports centre
- E) ethnic food
- F) oriental art
- G) astronomy and astrophysics
- H) pets and animals
- I) collectors' items
- J) online newspaper
- K) radio station
- L) photo club
- M) company/corporate
- N) scientist's profile
- O) school

Then the questionnaires asked to identify a contact telephone number from the pages of the websites and to write it down, without any other instructions as to how or where it might be found; in case the respondents were not sure about this piece of information, they could tick a “don't know” option. Subsequently, after performing these two tasks for each of the five websites, the respondents were asked to rate their level of confidence in the correctness of the information that they had provided for the contact telephone numbers associated with each Italian website, based on a 7-point Likert scale (ranging from “not at all confident” to “very confident”).

The format of the questionnaire and the phrasing of the questions were exactly the same for all the participants involved in the experiment, although the members of the two experimental sub-groups EGIT and EGNO performed the tasks translating from Italian into English the websites in question with free online MT services, while the participants in the CG looked only at the original webpages written in Italian, a language unfamiliar to them. This method gave us the possibility to check the actual accuracy of the answers provided by the respondents first, and then to establish a relationship with their level of confidence in the correctness of the information that they had found. The intention of this approach was to investigate any difference between the experimental sample and the CG population which might be attributed to the role played by the use of free online MT when performing the tasks, and whether the knowledge of Italian (the source language of the translations) affected the observed results.

The questionnaires for the CG (sample in appendix B), which were designed for respondents without any knowledge of Italian, were circulated among sets of students who had stated that they did not know this language. The other questionnaires for the two experimental sub-groups EGNO and EGIT (available in appendix C) were distributed randomly to the students who were targeted for the case study with the following approach: the researcher prepared the necessary quantity of printed questionnaires based on the number of students taking the courses that he was teaching or that were taught by the colleagues who had agreed to help in the circulation of the questionnaires during their lectures, seminars or tutorials. There were around twenty students in typical groups, although it was not uncommon to have much smaller or larger groups for certain subjects. The sets of questionnaires for the experimental population to be distributed to the students during each class included equal shares of questionnaires covering the four free online MT services that the participants were asked to use while completing the tasks (these are presented in more detail in section 4.6).

To preserve the randomness of the distribution, the sets of questionnaires designed for the two experimental sub-groups were given to the classes of students in equal batches for each of the four free web-based MT systems that were considered. As a result, if for example a lecturer who was distributing the questionnaires had twenty students in a particular class, he or she would be given by the researcher four sets of printed questionnaires to circulate to the students, i.e. five for each MT service, that were randomly mixed before distribution. This approach was always used regardless of the size of the particular group of students concerned, to ensure the random distribution of the questionnaires among the people who formed the two experimental sub-groups, without predetermining which students were going to use a particular free web-based MT system or their level of knowledge of Italian, if any. This also meant that by the time the circulation of the questionnaires had been completed, equal numbers for each of the four free online MT systems had been distributed among the potential participants in the case study. However, the downside of this approach was that the questionnaires that were filled in and returned by the members of the EGIT and EGNO sub-groups would not necessarily contain equal numbers of data for the four free online MT services, but this was not regarded as a major problem for the success of the experiment that would undermine the validity of the case study.

4.6 Free Online MT Services Used in the Experiment

Four of the leading free online MT services were included in the case study and used by the members of the two experimental sub-groups: Babel Fish, FreeTranslation, Google Language Tools and Voila.³ It was felt that covering these services would accurately reflect the state of the art in the field of Internet-based MT, because these tools are among those considered in the literature reviewed in chapter 2, and they also turned out to be amongst the most popular in the user survey among university students presented in chapter 3. The experiment was designed so that each of the 145 individuals in the two experimental sub-groups would use one of these four free online MT services to translate into English the home pages and the rest of the contents of the five monolingual websites in Italian that they were asked to navigate to complete the key information seeking tasks. Table 4.7 shows how many members of the two experimental sub-groups used each translation tool during the experiment.

<i>Free online MT service used</i>	<i>EGNO (85 people)</i>	<i>EGIT (60 people)</i>	<i>Total for both experimental sub- groups (145 people)</i>
<i>Babel Fish</i>	27	15	42
<i>FreeTranslation</i>	16	19	35
<i>Google Language Tools</i>	30	16	46
<i>Voila</i>	12	10	22

Table 4.7: Online MT services used by the two experimental sub-groups

The difference in the amount of individuals who used each of the four services in the two sub-groups is partly due to the fact that incomplete questionnaires or those with missing answers were excluded from the data analysis. In addition, although an equal number of questionnaires was initially distributed to the students for each of the four free online MT services, there was no way of predetermining in advance how many of them would eventually be returned, and if so whether the respondents would have any knowledge of Italian or not. Therefore, the variation was inevitable given the initial random distribution of the questionnaires and the reliance on volunteers to fill them in and return them. Still, the analysis of 145 questionnaires for both experimental sub-groups combined provides a reliable basis for an interesting statistical analysis of the results.

³ These are the main URLs for these four free online MT systems:
<http://www.babelfish.altavista.com>, <http://www.freetranslation.com>,
http://www.google.com/language_tools and <http://tr.voila.fr>.

It should be mentioned that for reasons of space in the rest of the chapter the results provided by the members of each of the two experimental sub-groups are presented together, without differentiating them on the basis of which particular free online MT services had been used to perform the tasks. A preliminary analysis of the responses to the questionnaires showed that they were by and large consistent and did not display major differences for Babel Fish and Google Language Tools, while the picture changed as far as Voila and FreeTranslation were concerned for different reasons. First of all, Voila had a graphic user interface in French, and not in English, with all the instructions on how to supply the URL of the webpage to be translated and the list of language combinations available written only in French. Although the structure and design of the default page of this free web-based MT service were very similar to those in English of the other main competitors which were most popular among Internet users, as revealed by the survey in chapter 3 (i.e. Babel Fish, FreeTranslation and Google Language Tools), respondents who did not know French (and possibly Italian) may have been very confused by the tasks at hand, which involved using a free online MT service with a graphic user in French to translate webpages from Italian into English.

It is recognised that this series of compounded linguistic challenges may have put off some potential participants, which might explain why fewer questionnaires were completed and returned for Voila than for the other three free online MT services, which all had a graphic user interface in English, i.e. the common language for all the participants in the case study, even though an equal amount of questionnaires was circulated for the four systems. Although there is no space here to dwell on the details, a preliminary system-specific analysis of the results showed that users of Voila who did not know French tended to be less accurate in completing the information-seeking tasks whose results are discussed in section 4.7, and also to give lower scores to their confidence in the correctness and reliability of the information that they had provided during the information assimilation tasks. Comments recorded by some of the participants on the questionnaires remarked explicitly on the fact that their lack of knowledge of French meant that they had somewhat limited confidence in using Voila, because its interface was entirely in this language, although some of them also thought that they had been able to complete the information assimilation tasks quite successfully thanks to the translations from Italian into English provided by the system itself.

In addition, other difficulties were also experienced by users of FreeTranslation, because this service does not enable users to automatically translate links on a webpage that has already been translated for them. As a result, in the scenario of the questionnaires, users of FreeTranslation could translate the home pages of the monolingual Italian websites into English, as they were asked to do; however, when they clicked on any links at this point (which was needed for example to explore the rest of the website beyond the home page, and to find the contact telephone numbers that they were asked to provide), the users would be directed to the corresponding original page in Italian, and not to its machine-translated version in English, as would instead happen to the users of all the other three online MT services (for a discussion of this weakness in the user-friendliness and usability of FreeTranslation, see Gaspari, 2004b: 77-81). As a result, some users were confused by this behaviour of FreeTranslation, which affected particularly badly the performance of those who did not know Italian, some of whom commented on this specific difficulty when completing the questionnaires.

In summary, although in this chapter the results of the two experimental sub-groups are presented without differentiating between the users of the four free online MT services that were included in the case study, it should be noted that participants who used Voila and FreeTranslation encountered specific difficulties that had an impact on their performance in the completion of the tasks, usually affecting negatively the correctness of their answers and undermining their confidence in the use of the online MT tools concerned, which were two key aspects of the investigation. Our experiment set out to investigate the users' reaction to state-of-the-art web-based MT, with an emphasis on getting an understanding of its actual usefulness and of its reliability according to the perception of the users. As a result, looking at the whole picture (including real problems that ordinary users may encounter when taking advantage of state-of-the-art free online MT services) is preferable to focusing on the partial details of how users regarded separately the performance of each individual service that was considered in the case study. In an attempt to provide a realistic representation of the potential as well as of the limitations of present-day free web-based MT, the rest of this chapter presents the results of the case study based on all the valid questionnaires, including those of respondents who experienced the objective difficulties outlined above with a couple of the free online MT services that were considered.

4.7 Results and Discussion

This section presents the results of the experiment and discusses the key findings of the case study. First the focus is on the performance of the participants in finding basic information about the five monolingual websites in Italian that they were asked to explore, and then the discussion addresses the issue of the level of confidence of the respondents in the answers that they provided, which in turn indicates the perceived reliability of free online MT.

4.7.1 Finding Basic Information Correctly

The first set of results presented here concerns the extent to which using free online MT services helped the participants of the experimental sub-groups to be more successful than their counterparts in the CG in finding basic information on the monolingual websites originally available only in Italian. Figure 4.6 shows the results regarding the correct answers given by the respondents when they were asked to define the contents and type of the five websites by choosing one of fifteen keyword-based descriptions in English, as discussed in section 4.5.⁴

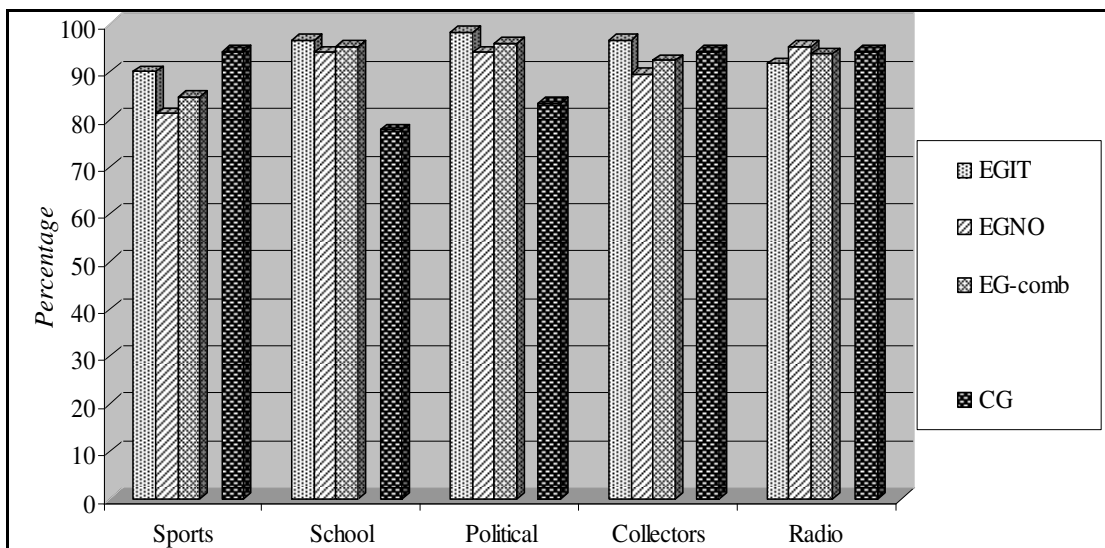


Figure 4.6: Correct answers to questions on keyword-based description of the five sites

⁴ Figure 4.6 presents the data for each of the five Italian websites separately. All the results are indicated in percentage terms within the relevant sub-group: the EGIT column represents the 60 people in the experimental sub-group with knowledge of Italian, while EGNO refers to the 85 members of the experimental sub-group without any knowledge of Italian; both these experimental sub-groups relied on free online MT services to complete the tasks. The results for the two experimental sub-groups are presented separately and also in aggregated form (EG-comb) for easier consultation. The CG column, on the other hand, refers to the 18 individuals in the control group, who knew no Italian at all and did not use free online MT during the information assimilation tasks.

The first result to note is that the members of the experimental sub-group who knew Italian (EGIT) outperformed their counterparts without any knowledge of Italian (EGNO) for all the five websites except for that of the radio station, for which however the percentage of correct answers is still very similar, as there is only a 3.6% difference between the two sub-groups. The next noteworthy comparison involves the results of the combined experimental sub-groups with those of the CG. Interestingly, in two cases (collectors' items and radio station websites) a slightly higher percentage of correct answers was given by the CG (differences of 2.0% and 0.6%, respectively), which was not expected and is difficult to explain. As far as the sports centre is concerned, the correctness of the answers decreased by 9.6% for the participants who used free online MT, which is quite surprising, but it should be said that in this particular case the problems experienced by the users of Voila and especially FreeTranslation played an adverse role in the performance of the two experimental sub-groups, which contributes to explain their higher failure rate in completing this particular task.

Finally, the tasks based on the two remaining websites, namely those of the school and the political party, showed that the users who took advantage of free online MT performed better than those who did not, with clear increases in accuracy of 17.4% and 12.6%, respectively. Although these are not dramatic improvements, it should also be noted in this respect that each of the two experimental sub-groups EGIT and EGNO taken separately performed better than the CG in the relevant task. Overall, these results are not consistent and do not allow us to draw definitive conclusions regarding the extent to which using free online MT actually helped the Internet users to define correctly the nature of the five monolingual websites under consideration. In particular, the CG correctly identified the right description of the websites with at least 77.8% accuracy, which for three websites rose to 94.4% (i.e. all but one of the 18 members of the group gave the correct answer). This strongly suggests that the visual layout of the sites (e.g. the pictures and photos) and some Italian words that are similar to English were still helpful to guess the kind of websites, although none of the respondents in the CG were familiar with the language in which they were written.

The next information seeking task consisted in finding and transcribing onto the questionnaire a contact telephone number for each of the five websites, which was always available on a separate page with a list of contact details that was

accessible through a link located on the home page. The data presented in Figure 4.7 refers to the answers regarding the telephone numbers given by the respondents (correct and incorrect answers are indicated separately; also, in this task the participants were entitled to select “don’t know” as an option if they were not sure about the answer, and this information is given as well).⁵

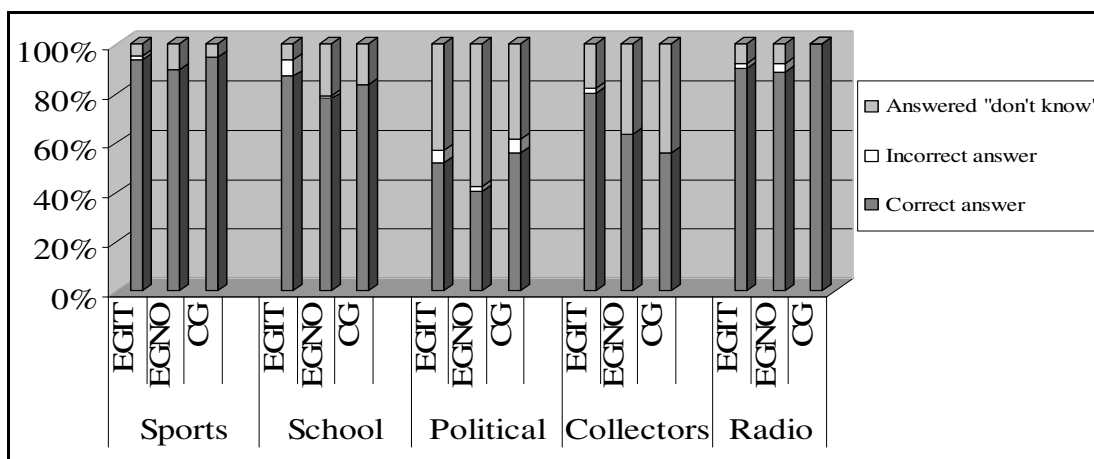


Figure 4.7: Answers to questions on contact telephone numbers for the five websites

As was the case for the previous information assimilation task, the EGIT consistently outperformed the EGNO sub-group in this task, which suggests that, as could be expected, some knowledge of the source language of the translation helps users to maximise the helpfulness of free online MT as an aid for comprehension and navigation during Internet-based information seeking tasks, for example when words or expressions that cannot be processed by the free online MT services are left untranslated. Furthermore, although space limitations prevent us from reporting all the relevant details, an investigation of the system-specific data shows that knowledge of Italian helped considerably the users of FreeTranslation, whilst those who did not know Italian in the experimental group were very often unable to find the contact telephone numbers required because they could not visit the whole website in English, since internal pages linked from the home page would not be translated for them using this free web-based MT system. This also explains why the EGNO sub-group always gave a larger quantity of “don’t know” answers in

⁵ Several respondents added some comments on their questionnaires stating that they had some technical and network-related problems when trying to access the machine-translated internal pages of the political party website at www.pumilano.it where the contact telephone number was listed. This partly explains the large numbers of “don’t know” answers provided for this website by the members of both the experimental sub-groups (EGIT: 26, 43.3%; EGNO: 49, 57.6%), as well as of the CG (7, 38.8%).

percentage terms compared to the EGIT sub-group for the contact telephone numbers of all the five websites, except the radio station one, for which there is only a 0.1 difference.

Similarly to the previous set of data that was analysed, Figure 4.7 does not show any consistent pattern that may lead to clear conclusions regarding the helpfulness of using free online MT services when looking for the contact telephone numbers in the monolingual websites. Actually, the members of the CG always performed quite well, reaching remarkable levels of accuracy for a couple of websites: 100% for the radio station and 94.4% for the sports centre website. In fact, the aggregated experimental group (consisting of the EGIT and EGNO sub-groups combined) was always outperformed by the CG, except in the case of the collectors' items website, where the entire experimental group showed an increase in accuracy of 14.7% compared to the CG. This particular result was counterbalanced by better performances in finding the correct contact telephone numbers obtained by the CG in all the other cases, with differences as high as 10.8% for the political party website and 11.0% for the radio station website. On the other hand, for the two remaining websites of the sports centre and the school, the accuracy in finding the contact telephone number is only slightly improved for the CG compared to the combined EGIT and EGNO experimental sub-groups (with increases of 3.3% and 2.0%, respectively).

In line with the previous set of results focusing on the nature and contents of the five monolingual websites presented in Figure 4.6, this data regarding the contact telephone numbers confirms that basic information can be found quite successfully by people scanning through the contents of a website even though they do not know its language and they do not use any MT facility, and arguably in the case of a set of digits this task is fairly straightforward; in addition, the words for “telephone”, “number” and “contacts” in Italian are quite similar to English (i.e. “telefono”, “numero” and “contatti”). So in conclusion, on the basis of this experiment it cannot be stated that using free online MT services to translate monolingual websites into English helped the respondents to identify and find basic information more accurately than was the case for linguistically-challenged Internet users who did not rely on MT.

Quite surprisingly, on the contrary, the results focusing on the contact telephone numbers tend to suggest that the opposite is true, i.e. that using free online

MT services might make it more difficult to find correctly basic information. In fact, for three websites (sports centre, political party and radio station) the CG managed to complete the information seeking task more accurately than both experimental sub-groups taken separately, i.e. not only EGNO but also EGIT. Only in one out of five cases (for the collectors' items website) the CG showed much poorer accuracy than both experimental sub-groups. Finally, for the school website, on the other hand, the CG performed better than the EGNO sub-group, but not as well as the EGIT experimental sub-sample.

In conclusion, the general indication can be detected that surprisingly the use of free online MT helped the respondents to perform the information seeking tasks more successfully only occasionally. Although no consistent clear pattern emerges from the data, the case study suggests that free online MT frequently hindered the accuracy of the answers regarding basic information about the monolingual websites, as summarised by Figures 4.6-7. The tasks that were chosen for this case study, i.e. identifying the nature and contents of a website from a list of fifteen possible options and transcribing a contact telephone number from one of the internal pages of the site, proved relatively easy also for the non-Italian speaking members of the CG. It is recognised that the simplicity of the tasks played a role, as the visual layout of a website and its graphic non-verbal elements go a long way towards helping the visitors to understand what the webpages are about, and to navigate through them in order to identify basic information (for instance, to find a list of contact details). However, although the actual helpfulness of web-based MT may not have been as noticeable as expected in assisting the respondents to provide the correct answers to the tasks, sub-section 4.7.2 reveals that the use of free online MT services acted as a strong confident-booster for the linguistically-challenged Internet users involved in the experiment.

4.7.2 Level of Confidence in the Answers

The other key factor considered in this investigation consisted in the perception that the users in the two experimental sub-groups had of the reliability of the free online MT services used to translate into English the five Italian websites containing the information that they were asked to find. In order to create a homogenous set of data to analyse, the decision was made to examine only the responses of the individuals who had given a correct answer to the question about the contact telephone numbers.

Those who responded “don’t know” had to be excluded from this analysis because they were not asked to rate their confidence in the information that they had extracted from the website, as this piece of data did not apply to them. Regrettably, for a couple of websites in particular this meant eliminating quite a lot of responses from this part of the data analysis, which however was inevitable given the design and structure of the questionnaires: 75 members (51.7%) of the combined experimental sub-groups and 7 others (38.8%) in the CG for the political party website had to be excluded; likewise, the data for 42 people (29.0%) in the EGIT and EGNO sub-groups combined plus 8 others (44.4%) of the CG for the telephone number of the collectors’ items website could not be analysed in this sub-section for the same reason. Although these data losses were quite substantial, for the other three websites much fewer individuals in both the experimental and CG sample populations answered “don’t know”, so that excluding them still left a substantial amount of data to be analysed.

Although those who provided wrong answers regarding the contact telephone numbers for the websites did assign a score to their confidence level, it was felt that these should also be excluded in light of their failed task. In this respect it should be noted that this exclusion on the grounds of giving wrong answers only applied to a very small minority of individuals in the two experimental sub-groups combined (this represented at the most 3.5%, corresponding to five people, for two of the websites, i.e. those of the school and the political party, and much smaller quantities in the remaining three websites). In addition, only one member of the CG gave an incorrect answer to the question focusing on the telephone number for the website of the political party – most of the time, people in the CG either managed to provide the correct information, or tended to tick “don’t know” when they were unsure about this detail, and in the latter case they were excluded from this part of the data analysis for the reasons explained above.

As a result of these preliminary constraints, Tables 4.8-12 include only the cases for each of the five monolingual websites (shown separately) for which a correct answer was provided to the question regarding the telephone number, without considering respondents in the experimental or control groups who either answered incorrectly or ticked the “don’t know” option. Hence in this data analysis the overall number of individuals is reduced compared to that of the initial sample and varies for each of the five websites (from a minimum of 75 valid responses for the political

party website to a maximum of 149 in the case of the sports centre website). Based on the analysis of this sub-set of the responses, Tables 4.8-12 present the mean values of the confidence ratings given by the respondents measured on a 7-point Likert scale (ranging from “not at all confident” to “very confident”, with 7 representing the highest level of confidence), thus providing a comparison of the mean confidence expressed in their answers by members of the two experimental sub-groups EGIT and EGNO (who used free online MT to find the telephone numbers – this information is also provided in aggregate form) and of the CG (who looked only at the original Italian websites).

<i>Group</i>	<i>N</i>	<i>Mean confidence rating</i>	<i>Std. deviation</i>	<i>Std. Error Mean</i>
<i>EGIT</i>	56	6.41	1.023	.137
<i>EGNO</i>	76	6.14	1.303	.150
<i>EGIT & EGNO</i>	132	6.26	1.196	.104
<i>CG</i>	17	4.94	1.519	.369
+1.32 (i.e. +18.85%) mean confidence when using free online MT				

Table 4.8: Confidence ratings for sports centre’s contact telephone number (149 responses)

<i>Group</i>	<i>N</i>	<i>Mean confidence rating</i>	<i>Std. deviation</i>	<i>Std. Error Mean</i>
<i>EGIT</i>	52	5.94	1.349	.187
<i>EGNO</i>	66	5.88	1.504	.185
<i>EGIT & EGNO</i>	118	5.91	1.432	.132
<i>CG</i>	15	5.07	1.534	.396
+0.84 (i.e. +12%) mean confidence when using free online MT				

Table 4.9: Confidence ratings for school’s contact telephone number (133 responses)

<i>Group</i>	<i>N</i>	<i>Mean confidence rating</i>	<i>Std. deviation</i>	<i>Std. Error Mean</i>
<i>EGIT</i>	31	6.23	1.117	.201
<i>EGNO</i>	34	6.24	.987	.169
<i>EGIT & EGNO</i>	65	6.23	1.042	.129
<i>CG</i>	10	4.90	1.912	.605
+1.33 (i.e. +19%) mean confidence when using free online MT				

Table 4.10: Confidence ratings for political party’s contact telephone number (75 responses)

<i>Group</i>	<i>N</i>	<i>Mean confidence rating</i>	<i>Std. deviation</i>	<i>Std. Error Mean</i>
<i>EGIT</i>	48	6.35	.838	.121
<i>EGNO</i>	54	6.11	1.396	.190
<i>EGIT & EGNO</i>	102	6.23	1.168	.116
<i>CG</i>	10	5.30	1.889	.597
+0.93 (i.e. + 13.28%) mean confidence when using free online MT				

Table 4.11: Confidence ratings for collectors' items' contact telephone number (112 responses)

<i>Group</i>	<i>N</i>	<i>Mean confidence rating</i>	<i>Std. deviation</i>	<i>Std. Error Mean</i>
<i>EGIT</i>	54	6.63	.708	.096
<i>EGNO</i>	75	6.55	.890	.103
<i>EGIT & EGNO</i>	129	6.58	.817	.072
<i>CG</i>	18	6.17	1.150	.271
+0.41 (i.e. +5.85%) mean confidence when using free online MT				

Table 4.12: Confidence ratings for radio station's contact telephone number (147 responses)

The data presented in Tables 4.8-12 shows very clearly that using free online MT services consistently acted as a confidence booster in terms of the perceived reliability of the information found by the participants when looking for the contact telephone numbers in all the five websites. There is a clear pattern of increased confidence (between 5.85% and 19%) for the two experimental sub-groups combined compared with the members of the CG, who performed the same focused information seeking tasks, but without the help of any free web-based MT system. In addition, it can also be observed that in all cases except one (i.e. for the political party website, where there is a 0.01 difference in the mean confidence rating) the experimental sub-group with knowledge of Italian (EGIT) always gave higher ratings to the confidence in the answers, if compared to the members of the experimental sub-group who did not know Italian (EGNO). This finding further reinforces the indication provided in sub-section 4.7.1 with regard to the identification of basic information concerning the websites, for which in all cases except one the EGIT sub-group performed more accurately than the EGNO group. Interestingly, this data also shows that the individuals in the EGIT and EGNO experimental sub-groups taken separately consistently gave higher confidence ratings to their answers than the members of the CG.

This last set of results related to the confidence ratings broken down for each of the five monolingual websites can also be presented effectively in visual form, revealing the impact that using free online MT had on raising the confidence levels of the Internet users during the tasks. Figures 4.8-12 plot the confidence ratings for

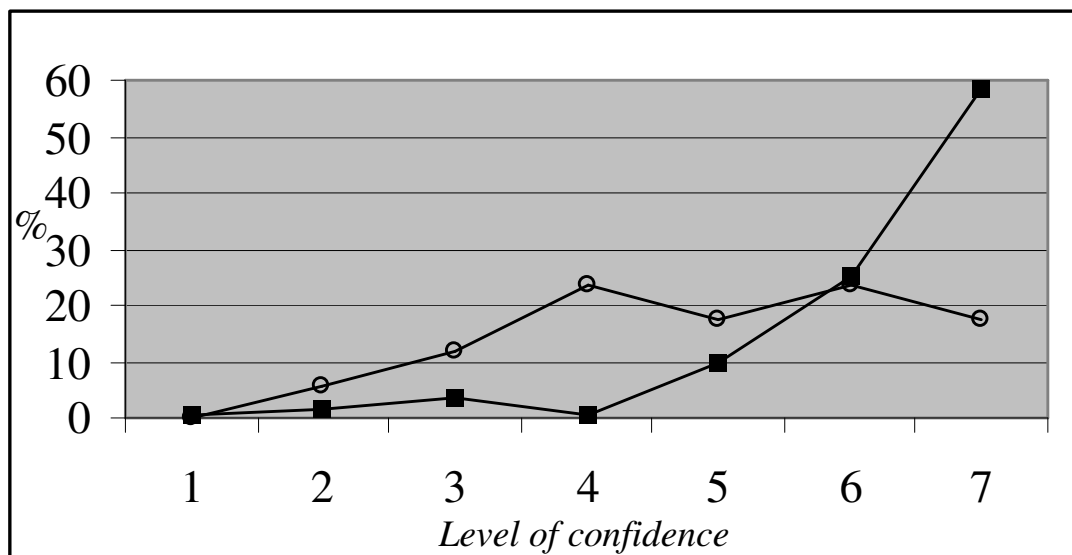
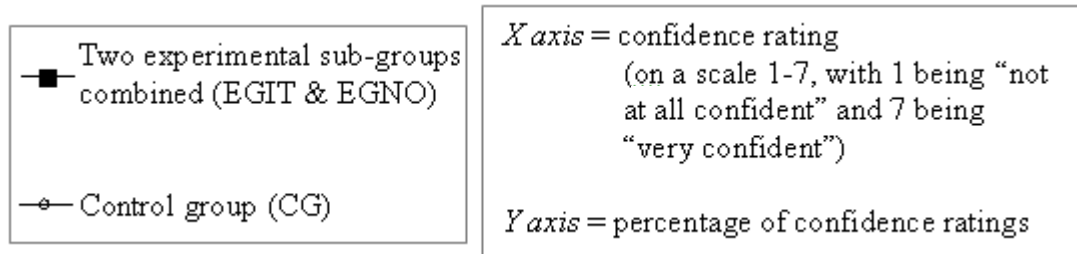


Figure 4.8: Confidence ratings for telephone number of sports centre website

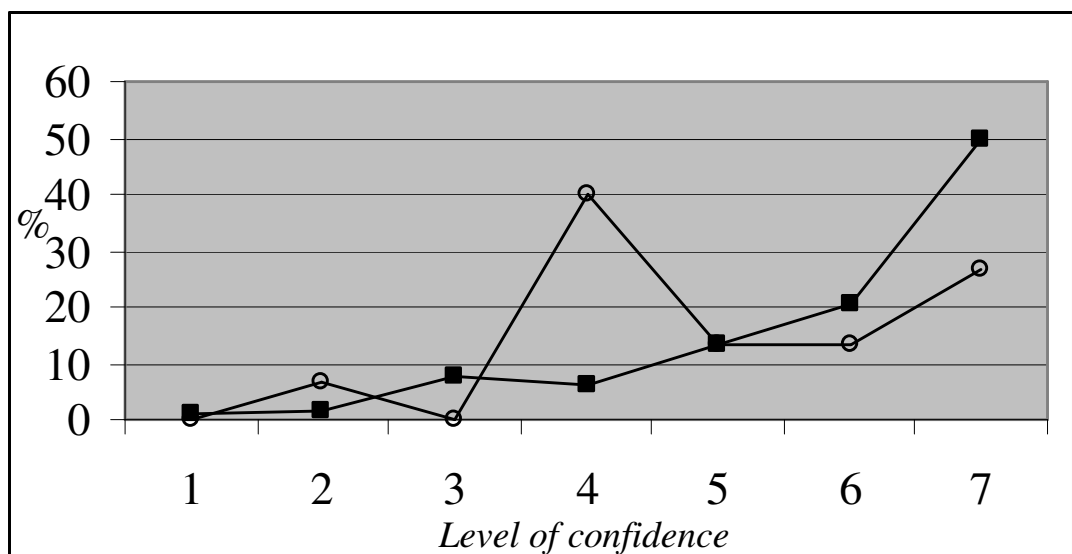


Figure 4.9: Confidence ratings for telephone number of school website

the accuracy of the contact telephone numbers found on the websites (in each figure the percentages refer separately to the two combined experimental sub-groups on the one hand and the CG on the other, and as was the case for the data included in Tables 4.8-12 participants who answered “don’t know” or gave wrong answers have been excluded).



Figure 4.10: Confidence ratings for telephone number of political party website

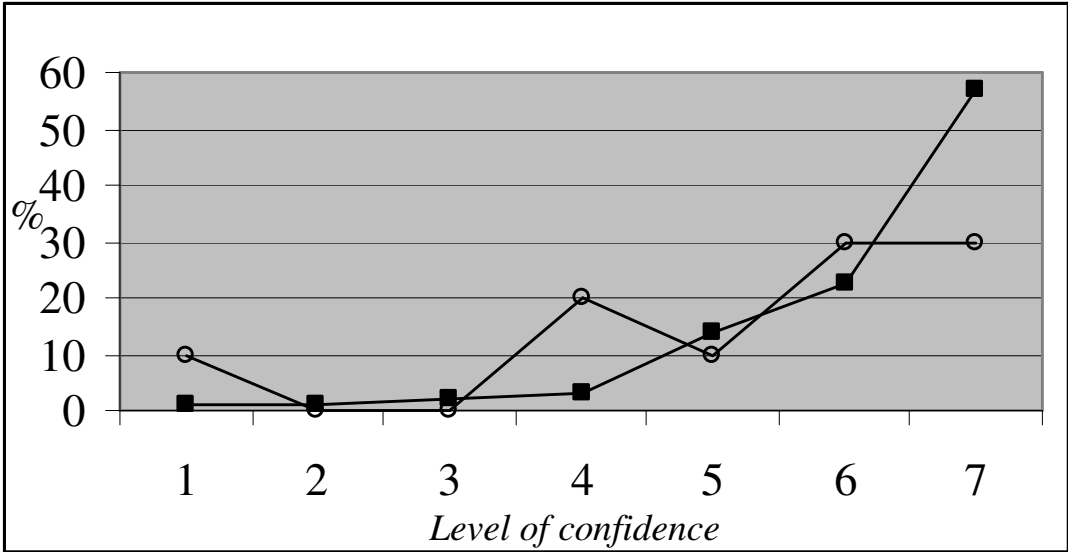


Figure 4.11: Confidence ratings for telephone number of collectors' items website



Figure 4.12: Confidence ratings for telephone number of radio station website

Figures 4.8-12 show that in percentage terms the members of the two experimental sub-groups combined (represented by the lines with black squares) consistently tended to give higher scores to their level of confidence in the accuracy of the contact telephone numbers that they had found, compared to the individuals in the CG (lines with empty circles). In other words, on the whole the majority of the participants in the experiment who did not use free online MT to perform the information seeking task gave only moderate to average scores to their level of confidence; on the other hand, a larger proportion of respondents who used free web-based MT services gave higher rankings to their confidence in the accuracy of the information that they had found. In Figures 4.8-12 this is shown by the fact that the curves representing the members of the two combined experimental sub-groups tend to peak towards the right-hand side of the graphs, reflecting a concentration of high scores for the confidence ratings in percentage terms if compared to the CG, whose curves display more moderate patterns in the same areas of the graphs.

4.8 Summary and Future Work

Thanks to the empirical data presented in this chapter regarding the actual usefulness of free web-based MT systems for information assimilation purposes and on the basis of the discussion focusing on the insights gained into the attitude of ordinary users towards the reliability of online MT, this final section summarises the key findings of the case study and suggests some areas for future research work.

4.8.1 Added Value of Free Online MT: Confidence-boosting Effect

The results of this case study offer valuable insights into the positive perception that Internet users tend to have of free online MT services, which boosted their confidence in the accuracy and reliability of the information that they found while browsing all the five monolingual Italian websites. However, the results also showed that using free web-based MT enhances the chances of identifying correctly basic online information available on a foreign language website only occasionally, and it can also lead to poorer performances in information assimilation tasks. It can be argued that the tasks covered in this experiment were narrowly focused on fairly simple questions, since the design and visual elements of a website (e.g. banners, pictures, photos, etc.) as well as some cognate words can go a long way towards revealing to the visitors the nature of its contents, and that the success in identifying strings of numbers as contact telephone numbers can hardly be attributed to the use of free online MT.

Nevertheless, the study has revealed that the experimental group taking advantage of web-based MT consistently rated more highly the confidence in the quality and reliability of their answers. These findings suggest that the community of linguistically-challenged Internet users has a positive perception of free online MT, and regards it as a helpful and reliable tool to access the multilingual information available in the online environment when language barriers are encountered. Although one would expect some healthy scepticism when it comes to relying on MT to assist in Internet navigation, the clear confidence-boosting effect seen in the members of both experimental sub-groups seems to reveal a pragmatic and well-disposed attitude towards the use of this resource. Whether or not this approach is naïve and possibly underestimates the potential pitfalls associated with using raw

unedited MT output for information assimilation and information gathering purposes is an open question which has been raised by this case study.

4.8.2 Open Issues for Further Research

More research is needed to address these issues, supported by robust experiments to collect empirical data to expand on the initial results presented here. Further investigations need to be carried out to consolidate this preliminary body of evidence, covering for example other language combinations (or, indeed, the opposite direction of the same language pair considered here) and a wider range of online MT services (free or otherwise), as well as MT systems that can process web content, on a larger spectrum of websites, including for instance e-commerce sites. Similarly, for reasons of space the discussion of the data did not focus on the role played by the different levels of knowledge of the source and target languages involved, although the members of the EGIT sub-group displayed a very diverse range of language skills and backgrounds. Other experiments could be carried out in the future considering these aspects, to investigate in detail how the level of knowledge of the source (and/or target) languages and the familiarity with related languages affects the successful use of free online MT for information assimilation purposes and the confidence that the user population has in the translation tools.

Finally, this case study has concentrated solely on using free Internet-based MT for information assimilation and information seeking tasks in a realistic but still relatively artificial setting. It would be very interesting to investigate whether a similar positive attitude towards using Internet-based translation technology would also be displayed in different scenarios, for instance when looking for multilingual information needed to make an important informed decision (cf. Resnik, 1997), when carrying out online transactions, in more interactive environments like chatrooms (cf. section 2.7 on Amikai's AmiChat Internet-based MT facility), or even for dissemination purposes, e.g. to provide details requested by electronic forms, maintain multilingual blogs or post information on personal websites with pages in several languages, etc.

CHAPTER 5

EMBEDDING FREE ONLINE MT INTO A MONOLINGUAL WEBSITE FOR DISSEMINATION PURPOSES: REDESIGN PROJECT AND USER EVALUATION

5.1 Overview of the Chapter and Objectives of the Project

This chapter presents the key stages and explores the challenges involved in a real-life redesign project whereby free Internet-based MT was embedded into the architecture of an existing monolingual website. This was done with a view to disseminating its content in a number of additional languages without the need for time-consuming human translation and labour-intensive professional localisation. The main technical and practical issues involved in this MT-oriented strategy to produce and manage multilingual web content are illustrated on a step-by-step basis by means of an implementation project based on the official website supporting London's successful bid to host the 2012 Olympic Games. As part of their assessed coursework, four groups of postgraduate students developed one working prototype each, redesigning the interface of the home page of the official website according to a set of requirements. The prototypes were later tested for usability and their effectiveness was evaluated by 72 users of different nationalities with a variety of linguistic and cultural backgrounds, in order to gather experimental data about their preferences.

The chapter explains the background and motivation of this project, whose originality consists in attempting to cover systematically an area that has never been researched so far. An introductory review of common current practice reveals a lack of understanding and consensus as to how usability-related design issues should be handled in monolingual websites that offer links to free web-based MT for the benefit of their international visitors. Some relevant studies in the fields of HCI, web usability and intercultural web design are briefly reviewed because they provided an inspiration for the project presented in the chapter. Following this, the typical development cycle involved in embedding free online MT into a monolingual website is described, emphasising the advantages of single sourcing for streamlined

translation workflow and optimised multilingual content management, particularly for highly dynamic websites that are frequently updated. The structure and overall design of the official London 2012 Olympic bid website are explored, highlighting its weaknesses due to the limited language coverage, which prompted the redesign and implementation project undertaken by the four groups of postgraduate students, with an explanation of the key features of the prototypes that they created. This is followed by the discussion of the results of the user testing and usability evaluation of these four prototypes, which involved 72 individuals with different national, cultural and linguistic backgrounds. The chapter ends with a summary of the lessons learned in this project, covering a discussion of the relevance of its key findings for the MT and web design communities and of the wider implications for the providers of professional web localisation services. The conclusion also outlines future research directions that are worth considering in this area.

5.2 Background and Motivation for the Project

The web localisation industry today represents a thriving field of professional translation in its own right, and a number of studies explain the difficulties of taking into account a range of linguistic and cultural aspects, often accompanied by technical constraints, when translating online content (e.g. Cheng, 2000; Esselink, 2000; Kohlmeier, 2000; O'Hagan & Ashworth, 2002; Yunker, 2003; Minocha et al., 2004).¹ At the same time, free online MT has carved a niche for itself as a well-established resource on the Internet, as illustrated by the results of the survey presented in chapter 3 and by the case study reported in chapter 4. Particularly interesting in the context of this research are the scenarios in which human translation and professional localisation are not viable options to disseminate the content of a website in multiple languages. This can happen, for example, as a result of budget constraints or because of the prohibitive task of coping with the translation workflow and the management of multilingual online content, particularly when highly dynamic websites need to be made available in several languages without

¹ For more theoretical discussions of the socio-cultural issues involved in translation for localisation in the light of globalisation trends, see e.g. Warschauer et al., 2002; Cronin, 2003; Pym, 2004; Schäler, 2005; Singh & Pereira, 2005; McDonough, 2006.

sufficient resources, have to be set up quickly and are subject to very rapid expansion.

Over the last few years it has become increasingly common to come across websites that are only available in one language and rely on links to free online MT services to disseminate their contents in a variety of other languages, in order to make themselves accessible to Internet users with different linguistic backgrounds. This approach to the management and delivery of digital information that bypasses professional localisation and human translation raises a number of thorny issues, and there are those who warn very strongly against the dangers of delegating the translation of mission-critical online information to free web-based MT, given the likely mistranslations that can cast doubt on the professionalism of a website and, as a result, reflect badly on the reputation of those associated with it (e.g. Ferranti, 1999: 37; Brandon, 2001: 348; Smith, 2005: 132).

In spite of these understandable caveats, though, there are also textbooks and online tutorials on web design with advice on how to develop and maintain a successful web presence that include sections explaining the advantages offered by online MT services to attract Internet users who are not familiar with the language(s) in which a website is available (e.g. Bishop, 1998: 134-136; O'Connell, 2001; Bradley, 2002: 125-126; Yunker, 2003: 233). This suggests that free web-based MT systems are regarded by some sections of the web design community as valuable tools that can help to overcome language barriers in the online environment for information dissemination purposes. The Internet seems to provide an excellent platform for the effective deployment of MT, in particular because fast processing and the need for online interaction in real time are paramount to guarantee a successful user experience, and human translation or localisation may not be reasonable propositions due to time or budget constraints. However, a review of common current practice shows that the vast majority of websites that pursue an MT-based approach to multilingual content dissemination fail to take full advantage of the potential benefits, as explained in more detail in section 5.3.

5.3 Review of Current Practice

A review of current practice in this area suggests that Internet-based MT is most of the time provided in monolingual websites as an additional feature or facility, without however paying much attention to key issues in terms of HCI, web usability and interaction design that are crucial to its successful deployment by international visitors who wish to browse the webpages of the site in their own preferred language. Gaspari (2004a) provides an overview and evaluation of how a sample of 36 monolingual websites in English belonging to three different categories (i.e. institutional, commercial and informative) incorporate free online MT services for multilingual browsing, encouraging international visitors to take advantage of translation technology to access their content. In order to evaluate the success of this MT-based content dissemination strategy implemented by the websites under consideration, the study looks at a number of key usability parameters that can be broadly subsumed under the headings of user-friendliness and interaction design. Factors taken into account for this study include the following:

- how the use of online MT is proposed to web surfers (e.g. by means of mono- or multilingual messages, as opposed to non-verbal iconic symbols like flags);
- how much relevance is given to online MT (prominent position on the home page of the website);
- the presence of disclaimers and warnings about the possible problems associated with the use of online MT;
- the overall degree of integration (i.e. how straightforward and intuitive the interaction scheme is for the user).

The sample of websites in the survey revealed a poor consideration of crucial usability issues, and an overall failure to embrace a fully committed approach to user-centred design when it comes to the subtleties of offering an online MT facility for multilingual content dissemination. Although the number of websites considered is very small and it cannot be considered representative, it seems reasonable to assume that the indications provided by this analysis, which are also corroborated by a substantial amount of anecdotal evidence, reflect some well-established trends in this area, and the study concludes that the “overall lack of a user-oriented approach

and the limited consideration of issues of user-friendliness make the integration of on-line MT into monolingual web-sites largely ineffective” (Gaspari, 2004a: 62).

This scenario suggests that improvements are needed in a number of respects, in order to take full advantage of the potential offered by free Internet-based MT when it comes to incorporating it into monolingual websites for dissemination purposes. While the role that could be potentially played by online MT to enable multilingual Internet-based communication seems to be beyond question, the feeling remains that this is still a largely untapped resource with substantial scope for development, with a need to promote best practice in terms of how Internet-based MT can be seamlessly integrated into the architecture of monolingual websites. Against this background, the project reported in this chapter aimed at exploring closely the challenges and technical issues involved in the whole development cycle encompassing the design, implementation, user testing and evaluation of the MT-based approach to the production and delivery of multilingual web content.

5.3.1 Related Work in HCI, Web Usability and Intercultural Web Design

Preliminary observations and anecdotal evidence regarding how MT-based web content dissemination strategies are commonly implemented show a very weak consideration of crucial HCI and usability principles. The aim of the redesign project reported in this chapter was to remedy these shortcomings and fill the gaps in terms of good practice found in this area, trying to leverage the experiences gained in neighbouring fields. An interesting and large body of research has addressed relevant issues in recent years, and this sub-section offers a brief overview of work focusing on intercultural web design from an HCI and web usability perspective that can contribute to a better understanding of how free online MT can be successfully integrated into monolingual websites for the benefit of their international visitors. This related work served as an inspiration for the redesign and implementation project that is presented later in this chapter, in an attempt to explore how some of the issues that had been investigated elsewhere could be brought to bear on the implementation of successful design and interaction solutions to embed a free online MT facility into the architecture of monolingual websites.

Chu (1999) focuses on a case study presenting the challenges and strategies involved in the design and development of the bilingual website in Chinese and English for a company based in Taiwan with international operations. Although this work does not focus specifically on localisation or free web-based MT, it notes the limited development of technologies supporting strategies to enable a truly multilingual Internet. The study also points out the difficulties of managing a web development project in which two languages (and the cultures that they represent) are involved, and the unknown factors determined by the potentially unlimited audience that can access the website. This gives rise to some issues in inter- and cross-cultural communication that are hard to pin down (e.g. the choice of which regional variety of a language to use for the textual content of the website). In a more extensive study, He (2001) looks at the interplay between language and culture analysing the multilingual websites of five well-known multinational companies (Cisco, Hewlett-Packard, IBM, Intel and Microsoft). The focus is on the comparison between the contents of the original versions of the websites in English on the one hand, and the translated versions in traditional and simplified Chinese on the other, taking into account the addition, omission and retention of linguistic and cultural elements. The results show differences as well as similarities in a number of areas, and the paper concludes that the adaptation of linguistic and cultural elements to the local conventions and expectations of the target audience is a key ingredient of the overall quality of multilingual localised websites.

Several other studies in HCI, web usability and intercultural web design take a contrastive approach, and are of particular interest here because, in spite of adopting different methodologies and experimental set-ups, they all contribute to highlight the design-related problems that commonly underlie multilingual web development projects in which linguistic and cultural issues are jointly foregrounded. Sackmary & Scalia (1999) examine the images and the text presented in a sample of websites of US and Mexican companies, whose contents are relatively neutral from a cultural point of view, in that they do not represent the values, norms and conventions of the respective cultures of origin. Their analysis suggests that this is achieved via a uniform style that combines simple language and images without references to local culture. They also find that in the sample of websites under consideration the Spanish and English content is nearly identical, and that almost all the large companies have

bilingual versions, while roughly half of the smaller ones offer content in English as well as Spanish.

However, in contrast to this, the study presented in Singh & Baack (2004), which looks at similar websites within a more complex framework and adopting a more systematic method, concludes that a content analysis of webpages belonging to Mexican and US websites shows significant differences in the depiction of local cultural values. They argue that no signs of standardisation can be detected from the sample of websites under consideration, whilst they identify a tendency to adapt web content according to the expectations and taste of the intended users based on their cultural backgrounds, which leads them to the conclusion that the “use of software on the Internet that offers automatic translation services may be prone to various cultural errors, and this lack of cultural adaptability may have caused some of the past marketing blunders on the Web” (Singh & Baack, 2004: ev). Zhao et al. (2003) address similar issues, but they compare the cultural dimensions of the design and content of 100 Chinese and American websites. Rejecting the notion that the Internet promotes cultural neutrality, on the basis of their contrastive analysis they put forward an argument in favour of the diffusion of what they call “cultural hybridisation”, that according to them finds fertile ground in the online environment as a result of web localisation projects.

Cunliffe et al. (2002) discuss a number of issues related to the information architecture of bilingual websites, focusing in particular on the development of a website to help speech and language therapists in the bilingual community of Wales to share resources and information. Their study is interesting in that it points out a number of subtle differences in terms of design, content management and language-related issues that are specific to a site with content that is intended to cater for the needs of health professionals in a community whose members are divided by their linguistic differences (in spite of the fact that most of them have some knowledge of both languages, in this case Welsh and English), but whose cultural profile is, by and large, fairly homogeneous. This scenario is quite different from what commonly happens when localised websites offer multilingual information to international users with very diverse cultural backgrounds and who tend to be monolingual, with access to only one language-specific version of the site.

Gould et al. (2000) is a case study comparing three pairs of US and Malaysian websites, each representing one of the following categories: rail carrier, university

and bookseller. The study finds substantial differences in all three categories between the pairs of websites that originated in the two countries. On this basis, a set of web design guidelines is proposed that takes into account the different cultural values and norms that are prevalent in the US and Malaysia, in a bid to maximise the effectiveness of messages that are conveyed on the Internet for their intended audiences. Lynch et al. (2001) report on a questionnaire-based survey focusing on the design characteristics of e-commerce websites that affect the likelihood of return visits for the purchase of goods and the loyalty of Internet users. The data on the shopping behaviour and purchase intentions was provided by 299 respondents based in twelve countries covering three regions, namely North America, Western Europe, and Latin and South America. The results indicate that the impact of the factors under consideration, such as the quality of the website and users' trust in it, varies across different regions of the world and across different product categories.

A contrastive approach is also taken in Fink & Laupase (2000) to compare the reactions of a group of 30 users from Malaysia and Australia to a set of four web design characteristics found in eight websites in the retail and services sector. Four of the websites selected for the experiment were Malaysian, the other four Australian, and the study found that the perceived attractiveness and effectiveness of the features of these marketing websites were significantly stronger for the websites representing the respective country of origin of the two national groups. Some of the key concerns investigated in Fink & Laupase (2000) are also explored in Zahedi et al. (2001), who present a conceptual framework to account for the role played by the cultural backgrounds and individual characteristics of Internet users in the different perceptions of, and reactions to, web content. In particular, they explain how by taking into account cultural as well as individual factors in a combined framework, their approach is capable of leading to improved effectiveness of the information delivered via the Internet, thus increasing the overall users' satisfaction with online communication. Similarly, Luna et al. (2002) focus on the culturally-sensitive dimension of web content that can affect the users' interaction with a website, and identify a number of characteristics that can lead to an optimal navigation experience. They propose a cognitive model to account for the effect of the users' culture on their attitude towards a site and its perceived ease of navigation. Evidence gathered from a preliminary study in which this conceptual model was applied suggests that the design of a website that matches the cultural expectations of the

users has a strong influence on a smooth interaction and a positive experience of its navigation scheme.

Several other studies look at the impact of web design on the online behaviour and purchasing preferences of culturally diverse users of e-commerce websites who are based in different countries (e.g. Simon, 2001; Singh et al., 2004) and at the way in which the design of multilingual and localised websites is adapted to (or, conversely, fails to take into account) the cultural norms of their targeted users in various parts of the world (e.g. Badre, 2000; Bourges-Waldegg & Scrivener, 2000; Sun, 2001; Robbins & Stylianou, 2003; Singh, 2003; Cyr & Trevor-Smith, 2004; Singh & Matsuo, 2004; Singh et al., 2005). Although there is no space to discuss this vast literature in detail here, in the context of this research it is worth emphasising that either as a result of empirical experiments or as part of recommendations to promote culturally-sensitive web design, all these studies suggest that the design features of multilingual or localised websites (e.g. use of colours, choice of icons and pictures, navigation scheme, etc.) should take into account the Internet-related requirements, habits and preferences of the targeted users, matching at the design level the linguistic and cultural adaptations that are applied to web content. The redesign project accompanied by the follow-up user testing and usability evaluation discussed in the rest of this chapter represents an attempt to capitalise on the insights into intercultural web design gathered by this large body of research, trying to transform them into good practice for the successful integration of free online MT into monolingual websites for dissemination purposes.

5.3.2 The Development Cycle: Typical Scenario

The typical scenario in which the development cycle under consideration occurs is the one in which the content of a website is developed and posted online in one language only, and translations are generated on the fly and on an on-demand basis via free Internet-based MT services when multilingual users wish to visit the website in their preferred language. In order to maximise the impact of this strategy and to reach the largest possible number of visitors with diverse language backgrounds, the original version of the site is usually created in English, which guarantees the coverage of a wide range of target languages – as a matter of fact, English is the most common source language in the majority of the free Internet-based MT services that are currently available.

This situation is partly determined by the undeniable status of English as the privileged medium of global communication, particularly on the World Wide Web. Therefore, the project reported in this chapter has taken into account this bias in the current provision of language pairs offered by free online MT services, in order to represent a realistic scenario for the whole development cycle, with the aim of promoting best practice in situations where it is most likely to be needed. Incidentally, the websites analysed in Gaspari (2004a) also reflect this tendency to favour English as the source language in which the “native” version of the website is maintained.

5.3.3 Advantages of Relying on Free Online MT for Dissemination Purposes

The decision to rely on free web-based MT embedded within the architecture of a monolingual website in order to disseminate its contents in multiple languages is particularly attractive because of the advantages in terms of streamlined online content management, which refers to the work and resources that are needed in order to keep the information contained in a website correct and up-to-date (cf. Budin, 2002; Holland et al., 2004). This process becomes particularly complex, time-consuming and expensive in the case of multilingual and localised websites, because a lot of effort is needed to create language-specific sections (which may or may not have to contain the same kind of information or level of detail), and to keep them “in sync” with one another, i.e. with changes and updates being reflected without delay in all the languages available on the site. In addition, no matter how large or frequent they are, localisation jobs require the involvement of staff with technical skills for web design and development, as well as multilingual expertise for the translation tasks. The difficulties of creating, distributing and managing multilingual web content are compounded in highly dynamic websites, where new information is constantly being added and modified (particularly short-lived and time-critical texts, such as news flashes or press releases), and old out-dated content needs to be removed and archived when it is no longer relevant.

Although this multilingual content management work is vital to the quality and professionalism of the information delivered by multilingual websites, it entails a number of very complex and labour-intensive tasks with which it may be impossible

to cope, particularly for websites with limited budget and scarce human resources allocated to translation and overall maintenance. One strategy that is commonly employed to reduce the overheads and difficulties of managing the updates of multilingual online copy is single sourcing, which consists in developing and maintaining the “official” validated version of a website in one primary language, with all the translations deriving from, and being based on, this same source (Chu, 1999: 208; Hackos, 2002: 295-ff.). This is particularly effective for multilingual websites that wish to have perfectly parallel multilingual versions, i.e. without the need to provide country- and language-specific information, which should not therefore be duplicated across all linguistic versions. For the sake of discussing realistic applications with practical usefulness, this strategy has been pursued in the implementation of the redesign project that is presented in section 5.4, which illustrates the salient points that emerged when grappling with the task of integrating free Internet-based MT into the architecture of the official website set up in support of London’s bid to host the 2012 Olympic Games (available at www.london2012.org).² This is followed by the discussion of the results of a design-oriented user testing and usability evaluation experiment in section 5.5.

5.4 Structure and Emphasis of the Redesign Project

The project presented here comprised two separate stages. In the first part, which spanned five weeks between April and early May 2005 and which is reported in this section of the chapter, four groups of postgraduate students doing an MSc in Computation at the School of Informatics of the University of Manchester carried out a redesign assignment as part of their assessed coursework for their module of “Human Computer Interaction”. All these 14 students had a strong background in HCI, web design, programming and software engineering, and had already completed similar hands-on group projects of comparable length to fulfil the coursework requirements for the MSc. Following this, the second stage of the study (conducted between late May and June 2005) consisted in the extensive user testing and evaluation of the prototypes produced by the MSc students in the first part of the

² Following the success of London’s bid, at the time of writing this URL is used for the official website of the London 2012 Olympic Games, providing the main gateway to access official information and online documentation in the run up to the Olympics.

project, and involved a population of 72 international users. The results of the follow-up user testing and evaluation are presented in section 5.5, whilst section 5.6 discusses the lessons learned in the project, with a summary of its key findings and an outline of future research directions.

The 14 postgraduate students who were initially involved in the redesign project were divided up into four separate working groups. It was felt that splitting them into smaller operative units would enable them to carry out a significant amount of work thanks to the possibility of sharing responsibilities and allocating tasks to individual members, ensuring at the same time a certain variety in the prototypes produced by the four groups. Given the linguistic and cultural emphasis of the redesign project, and in an attempt to guarantee visible variety across the prototypes, the only criterion according to which the groups were formed was based on the background and nationality of the students, i.e. British and Western students were grouped together in the two four-member groups, while Asian students formed the remaining two groups, with three members each.

At the beginning of the project the students were given a list of useful resources (i.e. the Internet addresses of popular free online MT services and of the official websites of past high-profile international sporting events) and a suggested schedule of group-related activities with milestones, to ensure that they would all be making progress to complete the project within the five-week time frame. In order to raise their awareness of some of the key issues involved in the work that they were expected to carry out, all the students attended an introductory session which provided background information and a basis for the redesign work to be undertaken, highlighting some of the areas and problems that had to be considered. During this session a number of multilingual websites (with their content properly localised and translated, as well as relying on free Internet-based MT for dissemination purposes) were shown to the students, in order to familiarise them with different approaches that can be adopted to indicate that the information contained in a website is available in multiple languages. Although these websites represented examples of different levels of success in offering multilingual information, the emphasis in this introductory session was on pointing out the basic features of the various approaches, without however passing any explicit judgment on their effectiveness, so as to avoid any suggestion as to the preferred options and correct strategies to be implemented in the redesign project.

Having been exposed to examples of both good and bad practice in terms of how to design the user interface of multilingual websites, at the outset of the project the students were also informed about the key marking criteria for the redesign exercise, because the assignment formed part of their coursework-based assessment: the groups were expected to demonstrate the awareness and consideration of HCI and web usability issues in the redesign of the home page of the London 2012 website, ensuring that it could cater for the needs of a global multilingual audience, so that users with different linguistic and cultural backgrounds could navigate the website in their preferred language by taking advantage of an embedded online MT facility. The redesigned home page should include a seamlessly integrated free web-based MT engine to support multilingual coverage and disseminate the content of the website in at least ten languages other than English, without the need for human translation. Another stipulation was that the redesign exercise should modify the existing original home page in terms of content and appearance only to the extent that was required to integrate the online MT facility. The coursework-related documentation also mentioned some specific key areas that were going to be looked at for the assessment, and within this fairly broad brief the four teams of students were left free to use their creativity and web design skills to implement the redesign in the way that they thought was best for the purpose at hand.

The students were asked to redesign the home page of the official website that had been set up to support London's bid to host the 2012 Olympic Games. Given the nature of this website, throughout the project reported here its contents changed on a daily basis, with the continuous addition of news stories, frequent updates on the progress of the bid, announcements of upcoming events, etc. Figure 5.1 shows the home page of the website in question as it appeared at the beginning of May 2005. The completion of the five-week project also involved other components, in particular answering two separate sets of essay-type questions - one set to be answered in writing individually by each student (questionnaire in appendix D), the other requiring collective answers written together by the whole group (questionnaire in appendix E), which are discussed in more detail in sub-section 6.2.1 - and the performance of the group members in a formal presentation of their prototypes to a panel consisting of teaching staff and postgraduate research students. However, these components are not covered in this chapter because they are not directly relevant to the work undertaken for the redesign project, as they were more focused on the

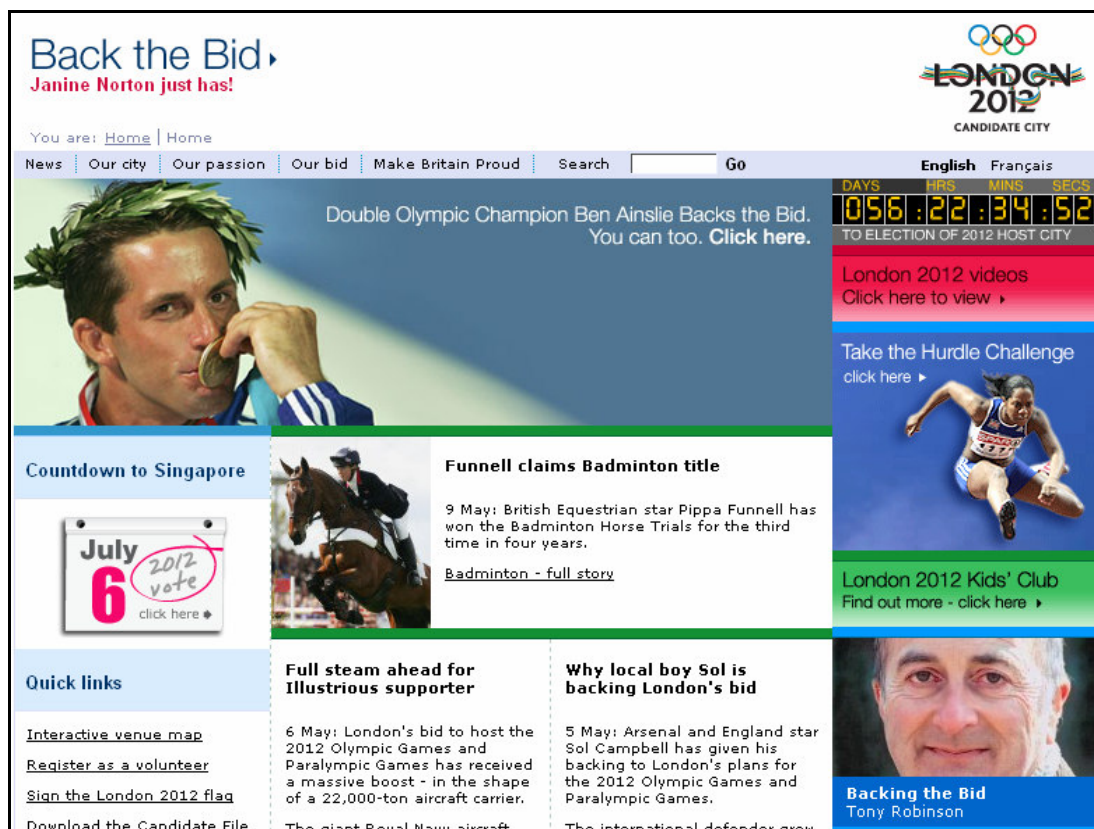


Figure 5.1: The home page of the official London 2012 Olympic bid website as it appeared in early May 2005 (www.london2012.org)

assessment of the students and aimed at receiving feedback from them on the usefulness and challenges of the group project. Some of the information provided by the students in response to the two sets of questions was later used in preparation for the work described in chapter 6, and is discussed in more detail in sub-section 6.2.1.

The whole idea behind this redesign project was to get the students to work on a realistic task, setting them goals that they could relate to and that would test their ability to come up with a redesigned prototype that could solve a real issue.³ This experience would give them valuable transferable skills in terms of user-centred and usability-oriented web design, as well as an appreciation of design-related cultural issues in Internet-based communication that they could then use in their future careers. Every effort was made to present the project as a real-life task, in a scenario

³ Nielsen (2000: 196-198; 320-322) offers a critique of the design and navigation scheme adopted for the interface of the home page of the official website of the 1998 Nagano Winter Olympics. Healy & Herder (2002) discuss the contribution of user-centred design methods to the development of a highly usable intranet-based information retrieval system made available to international media personnel, athletes, competition officials, staff and volunteers during the 2000 Sydney Olympics. Finally, Richards et al. (1986) and Gould et al. (1987) are examples of studies from the pre-Internet era focusing on the application of HCI expertise and research to the development of successful multilingual communication systems that were deployed during the 1984 Los Angeles Olympics.

that the students could be realistically working in after completing their MSc course, given the emphasis of their studies on web design, web usability and a broad range of issues related to Internet-based forms of communication (e.g. the development of e-commerce websites, web design for disabled Internet users with special needs, web accessibility, usability testing and evaluation, online security, etc.).

This first part of the project took place in the three months before the International Olympic Committee was due to announce the city chosen to host the 2012 Games, when excitement and anticipation were building up in the British media in support of (or, in some quarters, against) London's bid. As a matter of fact, until the very day on which the results of the election of the host city were announced in early July 2005, it was very much in doubt that London was in a position to overcome the stiff competition of the other candidate cities (i.e. Paris, New York, Moscow and Madrid) to secure the privilege of hosting the Olympics in 2012. A number of high-profile events and campaigns featuring prominent personalities and celebrities were promoted by the British government in the huge effort to ensure backing and gather momentum behind London's bid, which was eventually successful. The home page redesign project on which the four teams of MSc students were working was presented to them within this context, as part of a broader effort to ensure the visibility and effectiveness of London's bid campaign, with the Internet presence being a key part of the communication channels that could contribute to its international appeal and final success.

As a result, one crucial element in this respect was to outperform the other competitors bidding to host the Olympic Games, by presenting the students with an "as is" situation in terms of how London's website had been structured and developed up to that point, giving them the challenge to redesign its home page by integrating free Internet-based MT into its architecture, with a view to boosting the international impact and attractiveness of London's bid in the online environment. This MT-based solution would avoid the need for the expensive and slow human translation, so that the whole website could then be maintained only in English, with its information made available to anybody throughout the world in at least ten other languages in real time on an on-demand basis at no additional cost, by relying on free online MT. It was made clear to the students that they did not need to worry about the quality of the translations into the target languages provided by these MT services: for the purposes of the redesign project they were asked to assume that this

was not a problem, as the focus was exclusively on the success of the redesign exercise in terms of web and interaction design, rather than on the performance and output quality of the free MT systems employed to this end, which was beyond their control. As a result, this guideline ruled out the need on the part of the students to simplify the language used on the website in order to make it “MT-friendly”, or to adopt any other measure geared towards enhancing the linguistic quality of the MT output as such.

5.4.1 Linguistic Limitations of the Original Official Website

At the start of the project in April 2005 the content of the London 2012 website was available in only two languages: the whole website was in English, with only some parts translated also into French.⁴ This was regarded as a serious problem on a number of levels, which the redesign project should help to resolve. First of all, the current coverage of only two languages, one of them being the language of the prospective host country, was very limited and did not adequately reflect the international spirit of the Olympic Games and London’s determination to host such a high-profile global sporting event.⁵ Second, the current design of the partially bilingual website relied on a costly, slow and inefficient multilingual dissemination strategy, as human translation was constantly needed for some of the content to be translated into French. This was an expensive, time-consuming and error-prone process, requiring a lot of work and resources to manage the workflow of information and keep both versions of the website up-to-date and “in sync”.⁶

⁴ It should be noted that the official website of the Olympic Movement (at www.olympic.org) is also available only in its two official languages, i.e. English and French. For an interesting exchange of views regarding the use of English as opposed to French by the International Olympic Committee to conduct its business, and the relevant implications in terms of cultural and national prestige, see Lavenir de Buffon (1999) and Samaranch (1999).

⁵ A discussion of the practical as well as symbolic role played by professional translation to support the multilingual communication needs in the preparatory stages of a high-profile global event such as the Olympics as well as throughout the duration of the Games, with particular reference to the 1992 Barcelona Olympics, is presented in Pym (1998) and Pym (2000).

⁶ Chandioix & Grimaila (1996) discuss the development and application of the MT software called METEO 96®, a “made-to-measure” version based on a well-known MT system, to translate from English into French the forecasts and weather-related information issued by the US National Weather Service during the Centennial Olympic Games in Atlanta in 1996. Chandioix (1997) reports that over 16 days the software translated in excess of 305,000 words, and the MT output was post-edited by three bilingual meteorologists (see also Friedman, 1996; Hill, 1996). In addition, Magnúsdóttir (2004), Ecosplan (2005) and Liu (2005) discuss the planning of a number of applications of MT (though not online MT as such) to support the diverse multilingual communication needs during the 2008 Olympic Games in Beijing.

Third, much of the information posted on the website was time-critical, changed often and had a very limited life span, particularly the “news” section, which contained press releases and short announcements that needed to provide current information all the time and were frequently updated, with old content being removed and archived.⁷ Human translation represented a serious bottleneck in the management of the information workflow for the London 2012 Olympic bid website: owing to the delay caused by the translation, by the time some texts had been translated from English and were ready to be posted online in French, the information that they contained might have been no longer of interest or accurate. Fourth, with the exception of Paris – which until the end of the bidding process was widely regarded as London’s strongest competitor – the official websites set up to support the bids of the other cities battling to host the 2012 Olympics seemed to be dealing very successfully with the problem of multilingual coverage, since they contained more information in a wider range of languages than was the case for the website supporting London’s bid, as summarised in Table 5.1.⁸ The redesign project was aimed at resolving these weaknesses of London’s site, in order to give it a leading edge over its competitors with respect to its multilingual coverage.

<i>Candidate host city</i>	<i>Number of languages covered by the website</i>	<i>Languages covered by the website</i>
London	2	English, French (<i>partially</i>)
Paris	2	English, French
New York	3 (+6)	English, French, Spanish *
Madrid	3 (+15)	English, French, Spanish *
Moscow	7	Arabic, Chinese, English, French, German, Russian, Spanish
* <i>These are the languages in which the whole website was available. However, some limited information in support of the bid of the respective city was additionally offered in other languages (number in brackets) and could be accessed from the home page</i>		

Table 5.1: Language coverage of the official websites supporting the bids of the candidate cities to host the 2012 Olympic Games (information correct as of Monday, 11 April 2005)

⁷ See Donnelly (2001: 112-118) for a discussion of the challenges in terms of design and content management faced by the official websites set up for the 1998 Nagano Winter Olympics and the 2000 Sydney Olympics.

⁸ We refrain from providing the URLs of the websites supporting the Olympic bids of the candidate host cities mentioned in Table 5.1, because at the time of writing with the exception of the London one all the other websites are either no longer active or are hosting content that is irrelevant to the work carried out for the project.

5.4.2 Technical Issues Involved in the Seamless Integration of Free Online MT into the London 2012 Olympic Bid Website

One of the major issues pointed out by the survey presented in Gaspari (2004a), which evaluates how monolingual websites in English offer online MT for dissemination purposes, is that the large majority of the websites observed in the sample selected for that study did not offer a satisfactory degree of seamless integration and optimised interaction design, thereby failing to cater for the needs of typical users, who expect a smooth, straightforward and pleasant online interaction. What was found, on the other hand, was that most of the websites only provided a low degree of user-centred design, thus jeopardising the effectiveness of offering an online MT facility to users altogether. As a matter of fact, it was fairly common to find monolingual websites that provided a link to the default home page of a free Internet-based MT service, and left it to the users to submit the translation request, forcing them to enter the URL of the foreign language website that they were trying to access and select the relevant language pair from the list of options offered by the MT system (Gaspari, 2004a: 67-68). In order to improve on this rather disappointing approach to the integration of online MT into monolingual websites, in the redesign project presented here great emphasis was placed on ensuring that the multilingual international visitors could easily visit the London 2012 website in their own preferred language, avoiding awkward navigation schemes and complicated interaction patterns.

This requirement posed a number of technical challenges with an impact on the actual redesign and implementation of the interface for the new home page of the London 2012 Olympic bid website created by each of the four groups. In the introductory session clarifying the aims of the project and showing some relevant examples, the students had seen how other monolingual websites in English tried more or less successfully to offer an integrated online MT facility for the benefit of their non-English speaking visitors. The four teams subsequently took these MT-oriented websites as a basis to get ideas and come up with their own redesigned prototypes, and one crucial part of this exercise consisted in doing some “reverse engineering”, in order to discover from the examples some technical details that the groups needed in the development and implementation of their own prototypes.

One key element in this effort was to keep to a minimum the visibility of the MT engine enabling the operation of the translation workflow. To this end, the students had to make sure that users would be able to select their preferred language in some intuitive way, and then navigate the machine-translated website, without having to resort to cumbersome procedures, like logging on to the default webpage of a free online MT service and typing in or copying and pasting the URL of the English version of the London 2012 website into the appropriate field and selecting their chosen language combination, in order to have it translated. Whilst, as revealed by the survey presented in Gaspari (2004a), some monolingual websites do force their multilingual visitors to go through such complicated steps, clearly disregarding basic principles of user friendliness and web usability, the purpose of this project was to minimise the visibility of the MT processing. As a result, the students were expected to redesign the home page making sure that the interaction was kept as simple and straightforward as possible for the visitors.

All four groups were able to deal with this aspect very successfully, understanding how to code links to free online MT services that would keep the MT processing hidden from the visitors. In addition, as it turned out, all four groups chose Babel Fish⁹ for their implementation, given that this system was regarded as the leader in the field and it offered more than ten target languages in combination with English as source language, which was the number required for the project.¹⁰ The design choices of the groups varied with regard to how these links were presented to the users (i.e. whether they were embedded in a visual icon or shown as clickable text), but all the URLs encoded in these links shared the same basic structure, as in the following example:

```
http://babelfish.altavista.com/urltrurl?url=http://www.london2012.org/en&lp=en_es
```

This Internet address can be broken down into three separate components, each of which performs a specific role in identifying the actions that take place when the

⁹ Available at www.babelfish.altavista.com or www.world.altavista.com.

¹⁰ The only exception was the prototype produced by group B (presented in Figure 5.5), which also included Norwegian as a target language, and in their redesign this particular language which is not supported by Babel Fish was covered by FreeTranslation (available at www.freetranslation.com).

users click on a link that is coded with this URL (or, indeed, when they point their web browser to that Internet address):

A) `http://babelfish.altavista.com/`

this initial part identifies the online MT service to which the translation request is submitted, in this case Babel Fish. In other words, a request to process the translation is sent to the Babel Fish server;

B) `urltrurl?url=http://www.london2012.org/en`

this middle section specifies that the source document or input for the translation is not a passage of plain text, but a whole webpage that can be found at a specific URL. In this case the source document to be translated is the home page in English of the London 2012 Olympic bid website, for which the Internet address is given so that the current (i.e. most up-to-date) version of that webpage can be retrieved and processed on the fly (i.e. translated into the target language) by the online MT service;

C) `&lp=en_es`

in this final string of characters, “lp” indicates the language pair (or language combination) for the translation request, and in this particular case the variables for the source and target languages are instantiated to the codes “en” (for English) and “es” (for Spanish), respectively.

Figures 5.2-3 show the original home page in English of the official London 2012 Olympic bid website, as it appeared in late June 2005, and the translation into Spanish that Babel Fish provided by using the URL described above. All the groups involved in the redesign project used variations of the basic URL described above to provide translations from English into the target languages that were covered by their prototypes. For example, changing the final two characters of the Internet address given as an example from “es” (for Spanish) to “it” or “de”, would submit to the Babel Fish server requests for the translation of the home page of the London 2012 Olympic bid website from English into the target languages of Italian or German, respectively. Once this basic pattern was discovered, the codes for the other target languages supported by free online MT to be included by the students in their

prototypes could be easily found by experimenting with simple “reverse engineering” techniques.



Figure 5.2: The official home page in English of the London 2012 Olympic bid website (late June 2005)

As can be seen in Figure 5.3, the textual content of the original webpage (shown in Figure 5.2) that is not captured in graphics is translated into Spanish, whilst some parts remain untranslated (e.g. “Back the Bid”, “David Beckham and the England Football Team Back the Bid. You can too. Click here.”, “Candidate city” under the logo, etc.), because online MT services cannot process text that is part of graphic files, banners, etc. Still, in this example most of the content on the text-intensive original home page gets machine-translated into Spanish (e.g. the main navigation bar consisting of keywords and the highlights of the latest news), although the quality of the output in the target language is admittedly variable, but this was not an issue that should concern the students working on the redesign project.

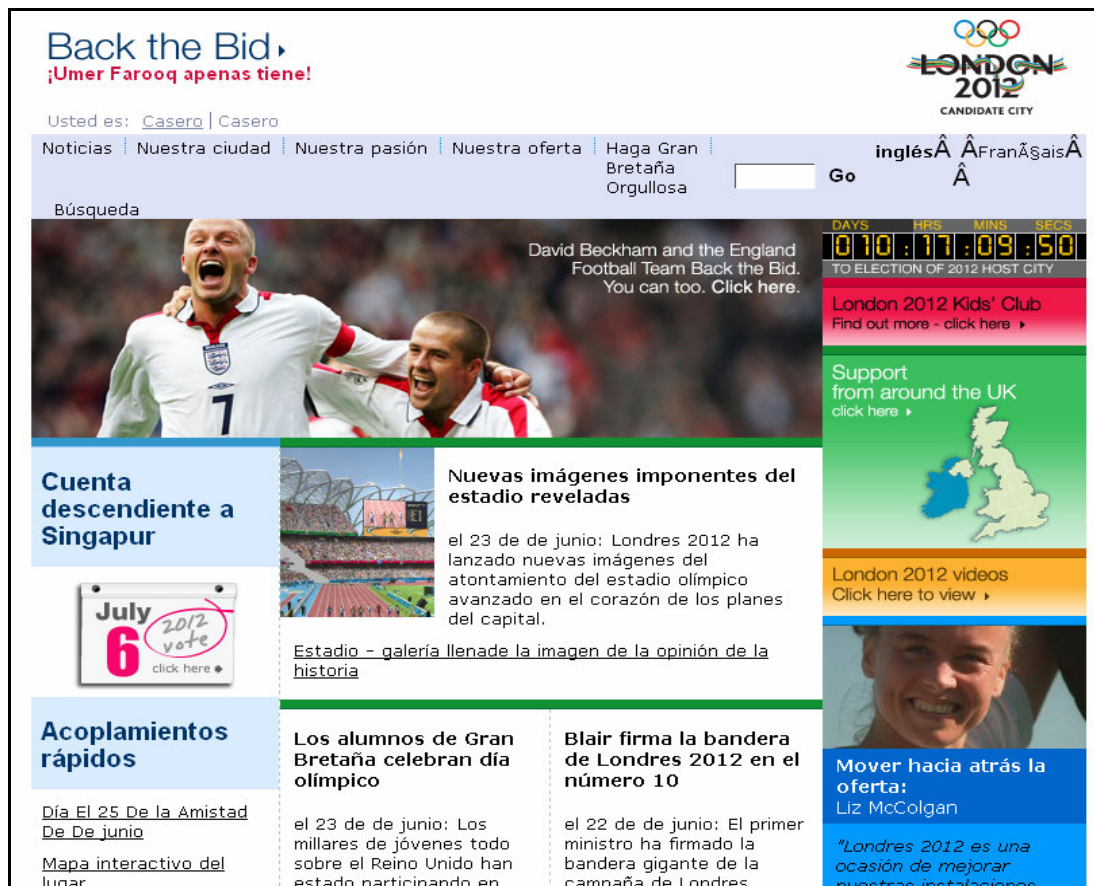


Figure 5.3: Translation into Spanish provided by Babel Fish using the URL described above

5.4.3 Design Options and Approaches to Implementation

The four groups taking part in the project were confronted with a number of decisions with regard to how their prototypes for the redesigned home page would implement the integration of the free online MT facility into the architecture of the website of the London 2012 Olympic bid. Some of the key issues are listed here (cf. Gaspari, 2004a: 66-67):

- alerting the users to the fact that the versions of the website in languages other than English were provided by free online MT, making them aware of likely imperfections in the translation with some form of disclaimer or warning;
- the use of text as opposed to visual symbols and metaphors (e.g. flags, clickable maps, etc.) in order to inform visitors that the website could be browsed in multiple languages;

- the arrangement and distribution of these language options on the home page to maximise their impact, organising them according to some sort of order;
- the provision of error-recovery paths for any mistakes made by users in selecting the wrong language;
- how much of the existing design of the official home page to reuse, i.e. adding features to the existing code to modify the original home page only slightly, or starting again from scratch for a complete overhaul of the home page.

The four groups gave a variety of responses to these crucial questions, and as a result they came up with different approaches to the implementation of their own redesigned multilingual home page for the website, as illustrated by Figures 5.4-7.¹¹



Figure 5.4: The prototype of the redesigned home page produced by group A

¹¹ There was a mistake in the welcome message in German of the prototype submitted by group C (shown in the Figure 5.6). This mistake was later rectified for the experiments involving user testing and usability evaluation which are reported in section 5.5.

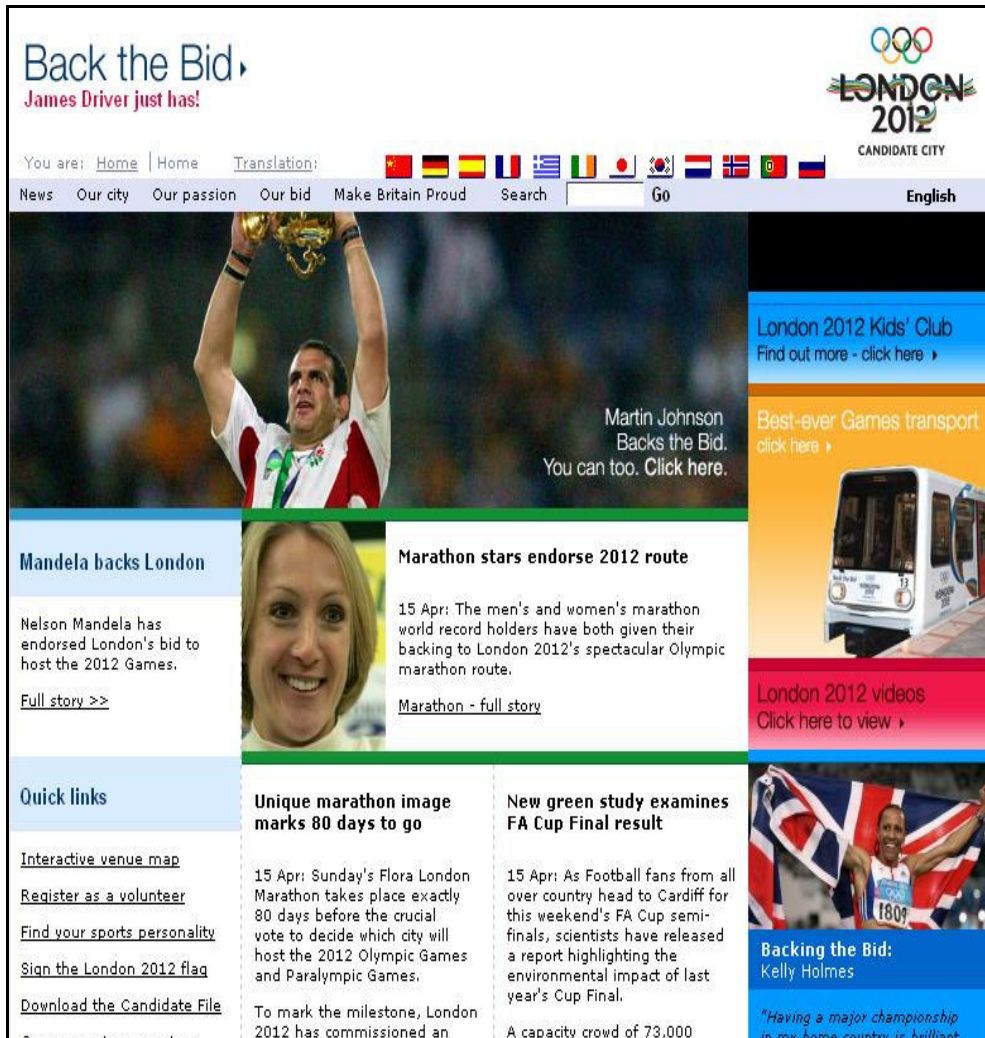


Figure 5.5: The prototype of the redesigned home page produced by group B



Figure 5.6: The prototype of the redesigned home page produced by group C



Figure 5.7: The prototype of the redesigned home page produced by group D

As a feature provided in addition to the redesigned home page, which was the key element required in the project, two groups of students (i.e. B and D) also decided to include some extra support webpages, examples of which are shown in Figures 5.8-9.

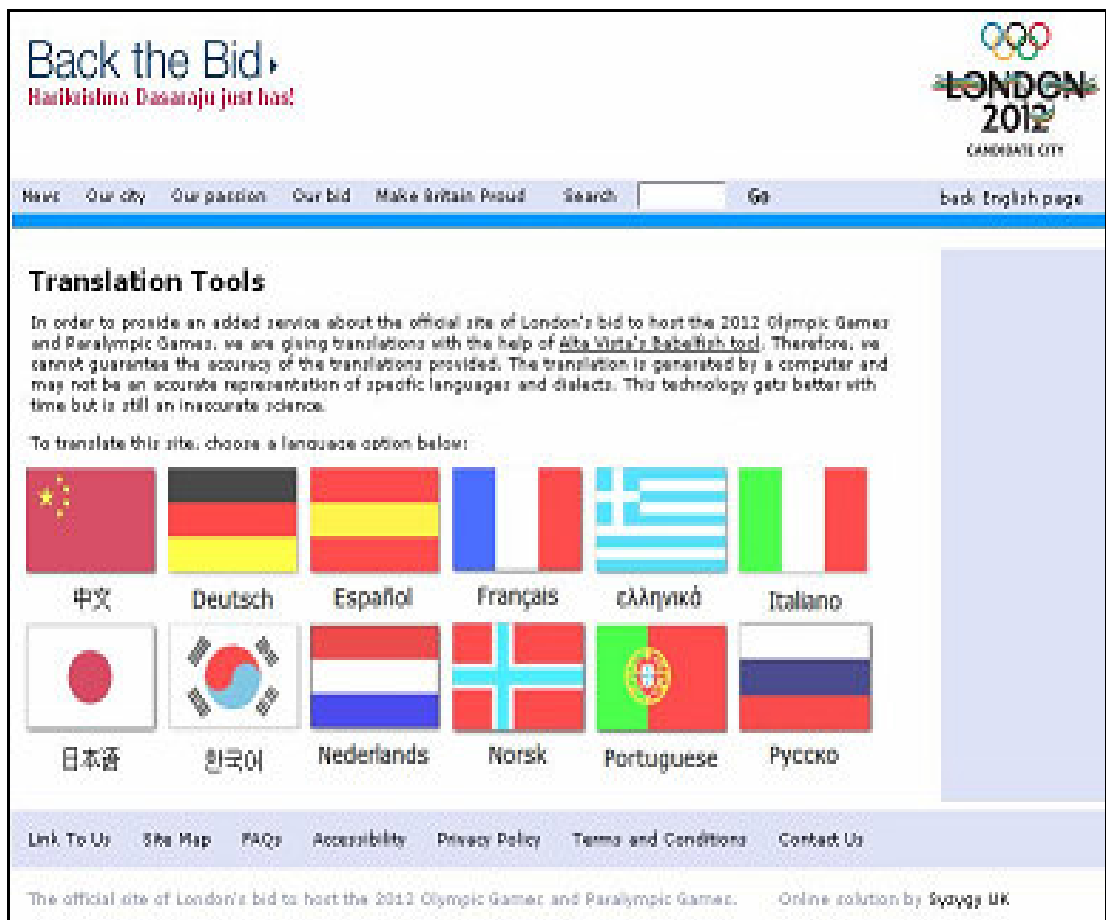



Figure 5.8: Extra webpage provided by group B in addition to their redesigned home page

The webpage reproduced in Figure 5.8 appeared when users clicked on the “Translation” link that was added to the left of the row of flags indicating the various languages offered in the redesigned home page of group B (Figure 5.5). This extra page contains a disclaimer informing visitors that the translations are provided by Babel Fish, and warning them that their accuracy cannot be guaranteed. By clicking on one of the flags it is then possible to view the machine-translated home page of the website in the relevant language. However, since this additional page with the disclaimer is only available in English, it is not clear how helpful it would be to users who are not familiar with this language. It is also interesting to note that at the bottom of their redesigned home pages, group C provided a very short disclaimer only in English (“Translations may not be exact” – see Figure 5.6), as did group A in a somewhat more understated or implicit manner (“This site uses a free online machine translation facility” – see Figure 5.4).


LONDON
2012
 CANDIDATE CITY

Negación De la Traducción

Para que la información sobre el Londres 2012 olímpico y los juegos de Paralympic hiciera una oferta esté disponible para poblar todos sobre el mundo, nosotros proporcionan un acoplamiento a la herramienta de traducción de **Babelfish Alta Vista**.

Estas traducciones son proporcionadas por la herramienta de Babelfish de Alta Vista, y no por Londres 2012. Londres 2012 no puede garantizar la exactitud de las traducciones proporcionadas. La traducción es generada por una computadora y puede no ser una representación exacta de idiomas y de dialectos específicos.

Esta herramienta se proporciona para permitir a la gente por todo el mundo aprender sobre el Londres 2012 hecho una oferta. Esperamos que usted la encuentre útil.

[Continúe](#)

English	Français	Español	Deutsch
Italiano	Português	Nederlands	Ελληνικά
汉语	日本語	한국어	Русский

Figure 5.9: One of the extra webpages provided by group D in addition to their redesigned home page (disclaimer in Spanish)

Figure 5.9 shows one of the extra webpages that group D provided in conjunction with their redesigned home page. This webpage has some information in Spanish

(i.e. machine-translated from English into Spanish – therefore itself far from perfect), and similar pages were available in the final prototype for all the other target languages covered by group D in their redesign project. This disclaimer in the language selected by the user appeared immediately after the visitor had chosen from the redesigned home page (shown in Figure 5.7) how to browse the rest of the website, thus going some way towards meeting the expectations and needs of those who cannot understand English. By clicking on the link at the end of the disclaimer (for the Spanish version “Continúe”, as shown in Figure 5.9), the user was eventually taken to the machine-translated version in Spanish of the home page of the London 2012 Olympic bid website, from which they could browse the rest of the content translated on the fly into Spanish for them.

One drawback of this implementation is that users would be forced to go through this disclaimer page every time they tried to view the Spanish version of the website (or, indeed, any other language-specific machine-translated version). This is not ideal, but was inevitable because the prototype did not include any cookie-based user authentication that would allow returning users to have their language option automatically selected for them, without having to go through the disclaimer page every single time after the first visit. A neat feature of this implementation, however, is that an error recovery path is provided at the bottom of the disclaimer page: in case users select the wrong language from the redesigned home page and wish to amend their choice, they can do so easily by clicking on the correct link for the language that they actually want from the complete list at the bottom of the disclaimer page (Figure 5.9).

5.4.4 Review of the Key Features of the Four Redesigned Prototypes

This sub-section reviews in more detail some of the key design-related features of the interfaces of the four prototypes, emphasising the differences in the redesign as well as common aspects of the implementation process, but without taking into account subjective aesthetic considerations that are hard to pin down. As shown by Figure 5.5, group B produced the redesigned home page that was most heavily based on the original, by reusing most of its code and adding the clickable icons of the flags to indicate the availability of multiple languages. This approach has the advantage of leveraging the design work already done by professional developers, whilst the other

three groups created their redesigned home pages virtually from scratch, reusing either small parts of the original home page or none at all.

The students of group B were also the only ones who incorporated the language selection facility into a fairly complex environment, by adding a row of flags at the top of the original home page which had images as well as information already provided in English (therefore not necessarily understandable by monolingual international visitors). Groups A, C and D, on the other hand, opted for a welcome page whose sole purpose was to guide the users through the process of selecting their favoured language in which to browse the content of the website.

Groups A and D (Figures 5.4 and 5.7, respectively) showed a common approach to the language selection process in their redesigned home pages, in that they provided clickable buttons with the names of the languages (each written in the respective language). These buttons consist of images, therefore there is no need for users to have the font packages for Asian languages installed on their machines in order to view these redesigned home pages correctly.¹² The drawback of this choice, however, could be that this design strategy might result in slower download, which may have a negative impact on the online experience of users who have slow Internet connections with limited bandwidth.

A difference between these two prototypes is that the “alt texts” accompanying each of the clickable buttons are left in English in the home page redesigned by group A (i.e. “German”, “Spanish”, etc.), whilst group D translated them into the appropriate language (i.e. “Deutsch”, “Español”, etc.), which is a much more user-friendly solution, particularly for international users who have the image display option disabled in their web browsers. Finally, the interface of the home page redesigned by group B (Figure 5.5) relies only on flags to convey the idea that multilingual visitors can select their own language, whilst group C (Figure 5.6) chose a hybrid approach with mixed representations of the available options, showing both a flag and a short textual welcome message in each of the languages covered by the prototype (generated using online MT). This brief comparative review of the key

¹² Figure 5.6 with the home page redesigned by group C shows the problem that occurs if fonts for Asian languages are not installed on the computer: the user can only see squares (or other unintelligible symbols) instead of the correct fonts. However, at the bottom of the prototype of group C there is a link to direct users who need to install the Microsoft language pack with the required Asian fonts. It should also be mentioned that in most cases, for example if they are logging on to a webpage from their own home computer and not, say, from an Internet café while abroad, users needing language support for specific scripts and fonts would presumably already have the required fonts installed.

design features chosen by the four groups for their implementation prototypes shows different approaches in a number of key areas. The purpose of the follow-up user testing and usability evaluation conducted in the second stage of this project, whose results are reported in section 5.5, was to investigate the preferences of a set of international users, in order to get an understanding of what are the most successful implementation strategies to embed free online MT into a monolingual website for dissemination purposes.

5.5 User Testing and Usability Evaluation

The redesigned prototypes produced by the four groups of students presented practical implementations of different approaches to the design of an MT-based architecture to disseminate the content of an originally monolingual English-language website in multiple languages, adopting a variety of choices with regard to a number of key features. Therefore, in order to complete the development cycle with an empirical evaluation of the redesigned home pages, the four prototypes represented excellent material to conduct a follow-up user testing and usability evaluation investigating more closely the linguistic, cultural and design issues addressed by the project. This would shed some light on the design and implementation strategies favoured by international users in this scenario, giving an opportunity to identify examples of best practice that should be encouraged whenever a monolingual website wishes to rely on free online MT for dissemination purposes. This section reports the results of a follow-up user testing and usability evaluation conducted with 72 international volunteers, discussing the most important findings and their impact on the multilingual and multicultural dimensions of web design that are relevant to the main focus of this chapter.

5.5.1 Tasks Involved in the User Testing and Usability Evaluation

The tasks involved in the user testing and usability evaluation that were designed for the experiment were presented to the participants (more details on them are given in sub-section 5.5.2) by means of a paper questionnaire in English with 74 questions (available in appendix F), using the experimental set-up and methodology that are described in sub-section 5.5.3. The 72 international participants had a variety of

linguistic, cultural and national backgrounds, and during the tasks they used all four prototypes of the redesigned home page of the London 2012 website, interacting with them in order to access web content regarding London's Olympic bid machine-translated into their native languages. The questionnaire that was used for the experiment guided the participants through the tasks, and asked them to evaluate their experience against a set of web usability parameters derived from key principles in user-centred web design. The general structure of the questionnaires was the same for all the participants, and the researcher was available during the experimental sessions to answer questions and provide help, if needed. The sequence in which the tasks had to be performed by the individuals and the order in which the prototypes were presented to them for the evaluation changed for each participant, for the reasons explained in more detail in sub-section 5.5.3.

The first twelve items in the questionnaire collected basic demographic information about the respondents, and the two following sections (comprising 16 questions altogether) regarded the level of Internet use and experience of the participants, as well as their previous use of web-based MT services, if any (this data was included in the survey on the use of free online MT presented in chapter 3). The remaining 46 questions formed the core of the experiment reported in this chapter, and focused on the tasks that had been designed to conduct the user testing and usability evaluation of the four prototypes. The same questions were asked for each redesigned home page, with some additional information elicited from the respondents only regarding the first prototype with which they interacted during the experiment. This was done in order to assess their reactions when they did not know what to expect from the task or in terms of the content of the London 2012 Olympic bid website, which was only of interest at the very start of the experiment, and would not have provided any insightful information once the pattern of the experiment had become clear to the respondents, given that it consisted of repeated tasks conducted to test different prototypes that gave access to the same online content.

During the tasks all the 72 international participants were asked to look at each of the four redesigned prototypes separately, one at a time, in order to evaluate their appearance and design. The respondents also rated a number of factors that contributed to the quality of their online experience and interaction with the prototypes as starting points to view the content of the London 2012 Olympic bid website machine-translated into their own native languages. Following this, the

questionnaire presented some questions focusing on a comparative evaluation of the four prototypes, in order to elicit from the participants their preferences as to the most effective and most attractive design strategies that had been implemented by the groups of students. Finally, the respondents were asked to rank the four redesigned home pages according to their overall order of personal preference, and to rate the importance of seven factors related to the design of monolingual websites that embed a free online MT facility to disseminate their contents in several languages.

5.5.2 Make-up of the Sample and Backgrounds of the Participants

Following the first part of the project described in section 5.4, which consisted in the development of the four redesigned prototypes, the next stage focused on the user testing and usability evaluation of these prototypes, and took place between late May and June 2005, in the six weeks before the International Olympic Committee announced the decision that London was actually going to host the 2012 Games. The participants in the experiment were recruited by posting an email message to the mailing list of the students of the University of Manchester, and those who had initially expressed an interest were subsequently screened to make sure that the people involved would be good Internet users and would therefore be able to carry out the tests and guided evaluation tasks with the prototypes. The experimental sessions took place in a usability lab of the School of Informatics, lasted approximately one hour, and the participants were rewarded with a small amount of money in cash for their time.

In order to carry out the usability tests, there was a need to recruit 72 volunteers who were native speakers of the following seven languages, which were all covered by the four prototypes with the redesigned home pages of the London 2012 Olympic bid website: Chinese, French, German, Greek, Italian, Russian and Spanish. Following the expressions of interest from the potential participants in the experiment that were received by the researcher, during the screening stage of the selection process to choose the actual members of the experimental population every effort was made to ensure that the language-specific sub-groups were balanced in terms of demographic variables such as gender, age, level of study and discipline studied at the university, in order to avoid any bias in the design of the experiment and in the make-up of the user population taking part in it.

This was achieved, by and large, with a few exceptions due to the fact that the participants had to be selected among those who had expressed an interest in being involved in the study, therefore some level of variation for certain demographic factors across the language-specific sub-groups was inevitable. The overall sample population was almost equally divided between undergraduates and postgraduates, with a slight prevalence of female members over males. Tables 5.2-3 summarise the key demographic information about the 72 international participants, including some details about their age at the time of the experiment.

<i>Sample of participants: 72 members</i>						
<i>Level of study</i>		<i>Gender</i>		<i>Age</i>		
<i>Undergrad</i>	<i>Postgrad</i>	<i>Male</i>	<i>Female</i>	<i>Mean</i>	<i>Median</i>	<i>Min/Max</i>
35 (48.6%)	37 (51.4%)	32 (44.4%)	40 (55.6%)	24.79	24.00	19/41

Table 5.2: Demographic characteristics of the 72 participants

<i>Sample of participants: 72 members</i>			
<i>Male undergrad</i>	<i>Female undergrad</i>	<i>Male postgrad</i>	<i>Female postgrad</i>
13 (18.0%)	22 (30.6%)	19 (26.4%)	18 (25.0%)

Table 5.3: Distribution of gender and level of study in the overall sample population

These participants were enrolled in a very wide range of courses, and the postgraduate students were attending a combination of taught programmes leading to Masters qualifications and research degrees (i.e. MPhil or PhD, either on a full-time or part-time basis). The students, some of whom were in Manchester for the Erasmus scheme at the time of the experiment, were based in 19 of the 23 different Schools across all four Faculties of the University, with slightly more than half of the sample belonging to the Faculty of Humanities (which is also the largest). The three most widely represented Schools were the School of Languages, Linguistics and Cultures (13 participants, 18%), the School of Life Sciences and the School of Social Sciences (each with 6 participants, 8%). Table 5.4 shows that there was some variation in terms of the distribution of gender and level of study across language-specific sub-groups, which however can be assumed not to have undermined the integrity of the data and the validity of the results provided by this population.

<i>Language-specific sub-groups</i>													
<i>Language</i>	<i>Gender</i>		<i>Level of study</i>				<i>Combinations of gender and level of study</i>						
	<i>Male</i>	<i>Female</i>	<i>Undergrad</i>		<i>Postgrad</i>		<i>Male UG</i>	<i>Female UG</i>	<i>Male PG</i>	<i>Female PG</i>			
French	3	5	7		1		3	4	0	1			
German	4	4	5		3		3	2	1	2			
Italian	5	3	4		4		2	2	3	1			
Russian	3	5	5		3		0	5	3	0			
Spanish (European)	1	7	6		2		0	6	1	1			
Spanish (International)	5	3	2		6		2	0	3	3			
Greek (Hellenic)	2	2	0		4		0	0	2	2			
Greek (Cypriot)	2	2	2		2		1	1	1	1			
Chinese (PRC)	4	4	1		7		1	0	3	4			
Chinese (Other)	3	5	3		5		1	2	2	3			

Table 5.4: Distribution of gender and level of study in the language-specific sub-groups

In order to avoid any country-specific bias in the experiment, in the selection of the participants it was crucial to be as inclusive as possible to investigate the culturally-motivated variation of design-related preferences among Internet users with the same native language, but different national and cultural backgrounds. This is the reason why the eight native speakers of Greek were divided in half according to their nationality: four of them had Hellenic nationality, and the other four were Cypriot nationals. In a similar attempt to represent within the language-specific sub-groups the regions and countries of the world where more widely used languages are officially spoken, the native speakers of Spanish belonged to two separate groups with eight members each (i.e. Spanish European and Spanish International), as was the case for those who had Chinese (Mandarin) as their native language (People's Republic of China and Other). Figure 5.10 shows the final make-up of the sample of the 72 international participants who took part in the user evaluation.

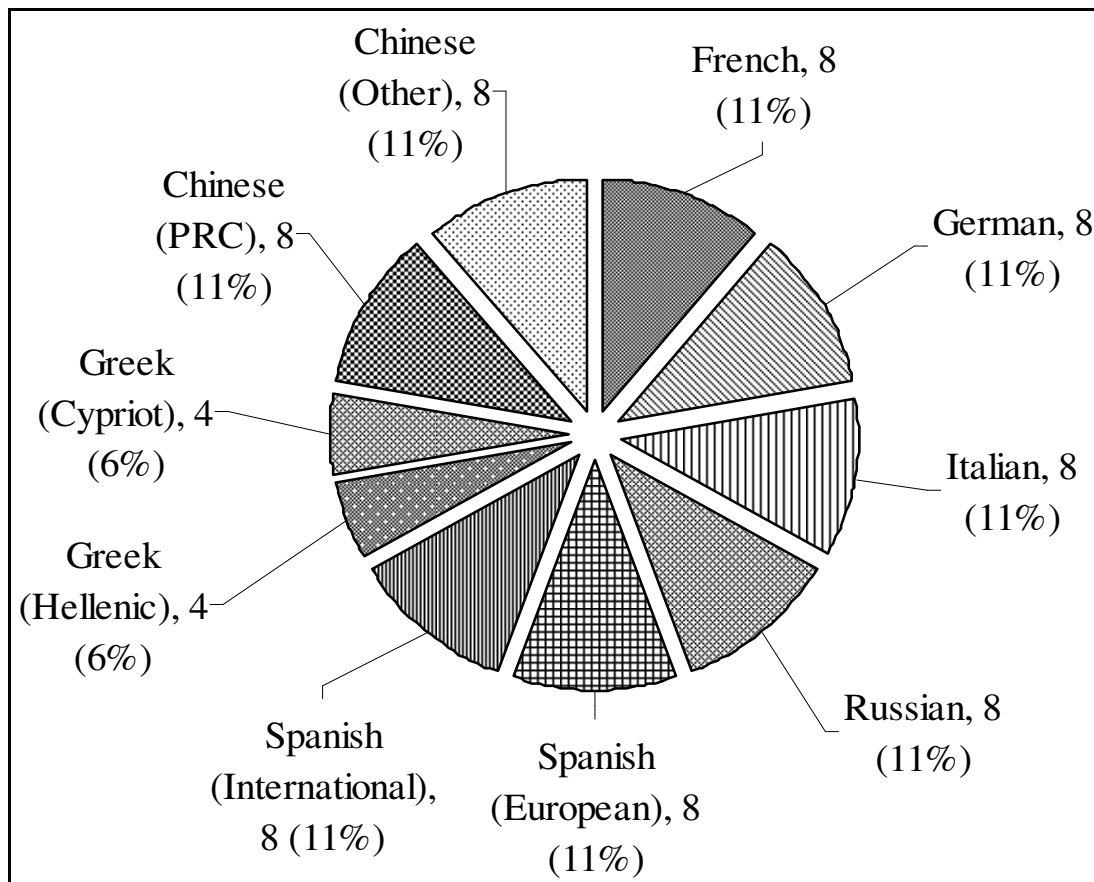


Figure 5.10: The language-specific sub-groups into which the 72 participants were divided based on native language and nationality

Within the constraints of the students who had expressed an interest in being involved in the experiment, the actual participants were selected in such a way that each language-specific group of native speakers represented as wide a range as possible of nationalities, which were taken as strong indicators of the cultural backgrounds of the individuals concerned. A mixture of nationalities was achieved not only for the native speakers of Greek, Spanish and Chinese, but also for French, German and Russian, which are also languages that are officially spoken in different countries around the world.¹³ Table 5.5 shows details regarding the nationalities of the members included in each language-specific group.

¹³ Regrettably, although Italian is also officially spoken outside the territory of the Italian Republic, only native speakers of this language with Italian nationality could be found to participate in the experiment.

<i>Language-specific sub-groups</i>		
<i>Native language</i>	<i>Nationality</i>	
French	Belgian	1
	British	2
	French	1
	French/British	1
	Haitian	1
	Seychelloise	1
	Swedish/British	1
German	Austrian	1
	British	1
	German	4
	Liechtensteinian/British	1
	Swiss/British	1
Italian	Italian	8
Russian	Belarussian	2
	Russian	5
	Ukrainian	1
Spanish	Bolivian	1
	British	1
	Chilean	1
	Colombian/British	1
	Mexican	3
	Peruvian	1
	Spanish	8
Greek	Cypriot	4
	Greek	4
Chinese	Hong Kong	2
	Chinese	8
	Malaysian	3
	Taiwanese	3

Table 5.5: Nationalities of the members of each language-specific sub-group

Although 17 of the participants were bilingual, for the purposes of the experiment they were required to perform the tasks using only one of their native languages, which they chose on the basis of which one they felt most comfortable with, or the one that they used most often in their daily lives. In this respect, it should be noted that twelve of the bilingual members of the experimental sample had English as one of their native languages, and since English was not involved in the testing, they used the other one. This applied to five people for French, four for German, two for Chinese, and one for Spanish. In addition, four other participants were bilingual speakers of Spanish and Catalan (they all used Spanish in the experiment), and one was a native speaker of both French and Dutch (this participant used French for the tests). All the participants were fluent in English because they were registered students at the University of Manchester (including the Erasmus students), so they had no difficulty in completing the questionnaire that was used to guide the tasks and collect the usability data during the testing of the four redesigned home pages.

5.5.3 Experimental Set-up and Methodology

The reason why the language-specific sub-groups consisted of multiples of four was that it was necessary to randomise the order in which the members of the language-specific sub-groups interacted with each of the four redesigned prototypes, to prevent learning effects during the tasks designed for our study. This is common practice in testing and evaluation experiments in which users are asked to interact with a series of alternative interface designs for the same product, website or online service (in our case the prototypes with the redesigned home page of the London 2012 Olympic bid website), in order to counterbalance the bias that can arise from the order in which a number of different prototypes are tested (e.g. Benyon, 1995; Hackos & Redish, 1998: 390; Giller et al., 2003; Gajos et al., 2005; Morris et al., 2005).

As a matter of fact, users become gradually more familiar with the tasks included in experiments that follow a repeated pattern, and more aware of the design features as well as other variables displayed by the prototypes being tested. Unless the order of the alternative designs is changed within similar sub-groups (i.e. native speakers of the same language, in this case) to guarantee that all the users are similarly sensitised to the issues under consideration, the loss of the “novelty factor” can skew the results quite dramatically. These considerations were taken into account while designing the experimental sessions, and the questionnaires that the

participants received were prepared so that each of them was going to test the four prototypes in a specific order. In other words, the sequence of the tasks was carefully pre-determined and monitored, to ensure in particular that each of the four prototypes was tested first by the same number of members of each language-specific and nationality-based sub-group; the order of the remaining three prototypes with which the participants interacted was also randomised to avoid skewing the results of the testing and evaluation in any way. Given that four prototypes had to be tested and evaluated, there were 24 possible permutations. Three sets of these 24 permutations were repeated, and the different sequences in which the four prototypes were presented for the tasks were allocated randomly to each of the 72 participants.

Another consideration is in order here regarding the execution of the user testing and usability evaluation. The experiment was also partly geared towards the assessment of the groups of students who had produced the prototypes, and for marking purposes a number of reactions to the prototypes on the part of the users had to be investigated, which however are not discussed because they are beyond the scope of this chapter. It should nevertheless be mentioned that during the experimental sessions the prototypes were anonymised, i.e. any text in English (which was the common language to all the members of the experimental population) or any other recognisable visual information (e.g. logos, pictures, etc.) that the prototypes contained was removed. This is a standard procedure in usability testing, to make sure that the users focus on the design-related features of the interface, and do not rely on additional information or cues guiding their interaction that do not form part of the design and navigation scheme. The standard technique that is adopted to anonymise prototypes of user interfaces when a product or web-based application is tested is commonly referred to as “greeking” (see e.g. Fernandes, 1995: 49; Chak, 2002: 197).¹⁴

As part of this process, all the words in English shown on the prototypes were replaced by strings of equivalent length using the letter “x”. For consistency reasons, capital letters (e.g. initials of proper names, characters at the beginning of sentences, etc.) were replaced by an upper-case “X”, and punctuation marks were left unchanged. However, words in languages other than English (in particular the names

¹⁴ This technical term means “to make unintelligible”, by substituting words and text with random symbols or characters, so that they do not convey any meaning to the user. In this context the term “greeking” does not refer to the use of words belonging to the Greek language as such.

of the languages covered by the prototypes that were written in the respective languages, e.g. “italiano”, “Deutsch”, etc.) were left unchanged on the redesigned home pages that were used in the experiment, because they were needed by the international volunteers to interact meaningfully and perform the guided tasks using their respective native languages. Similarly, numbers (most notably, the figure for the year 2012, which appeared a number of times in the prototypes in relation to the Olympic Games to take place in London) were not modified in any way, given their essentially non-linguistic nature.

In addition, recognisable pictures and visual cues that were not directly relevant to the purpose of the redesign project were removed or concealed from the anonymised versions of the prototypes that were used in the experiment. This applied, for example, to the distinctive logo of London’s bid campaign and to pictures of well-known British athletes (that were featured prominently on prototype B). On the other hand, though, other visual elements were left unchanged in the anonymised prototypes, e.g. the symbol of the five Olympic rings (which was assumed to have a universal meaning) and the flags to indicate the available languages supported by the free online MT facility, because these were required to guide the interaction of the multilingual users with the prototypes during the experiment.

Following these anonymisation and “greekling” processes, the revised versions of the prototypes shown in Figures 5.11-17 were used in the experiment with the 72 international users.¹⁵ It should be noted that although the redesigned home pages had been anonymised and subjected to the process of “greekling”, this did not have any effect on the MT processing as such when the international users attempted to access other webpages. In other words, even though the volunteers involved in the testing and usability evaluation initially interacted with the modified versions of the four prototypes shown in Figures 5.11-17, after they clicked on the icon or on the link to select their native language they were presented with the machine-translated version of the London 2012 website in that language, including all the text, design features, pictures, icons, etc. that formed part of the actual webpages in question.

¹⁵ As Figures 5.14-15 show, a mistake in the welcome message in German had been rectified for the experiment. The experimental sessions for user testing and usability evaluation with the 72 international participants were conducted using computers that had fonts for Asian languages installed, which was essential for the native speakers of Chinese to use the redesigned home pages and access web content written in their own language. As a result, Figure 5.15 shows how prototype C appeared to the users during the experiment, after “greekling”.

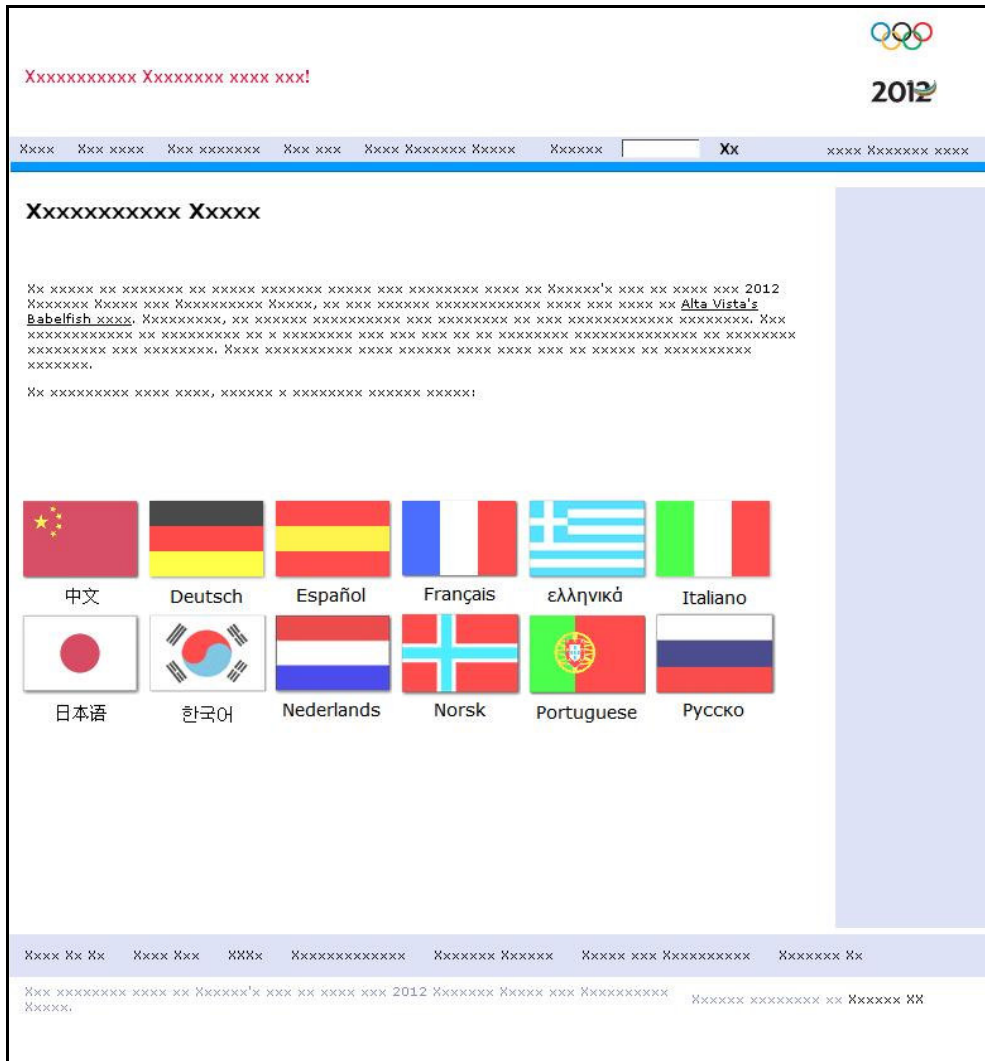


Figure 5.13: The anonymised extra webpage in prototype B



Figure 5.14: The anonymised prototype C (without font support for Asian languages)



Figure 5.15: The anonymised prototype C (with font support for Asian languages)



Figure 5.16: The anonymised prototype D



Figure 5.17: The anonymised extra webpage in prototype D (disclaimer in Italian)

5.5.4 Results and Discussion

After they had tested all the four anonymised prototypes and interacted with each of them for a similar amount of time, the 72 international participants were asked which approach they preferred for the design of the online MT facility offered by the redesigned home pages, based on a number of key factors, which were illustrated in practice by the prototypes. First of all, the respondents were asked which of the following three approaches was in their opinion more successful in indicating that they could navigate the site in their own language:

- I) name of the language written in the language itself (as in prototypes A and D);
- II) flag representing the language and no other indication (as in prototype B);
- III) combination of flag and a brief welcome message in the language concerned (as in prototype C).

Nearly half of the sample (48%) expressed a preference for option III, whilst the other two possibilities obtained a roughly equal number of votes, with about one

quarter of the preferences each. Figure 5.18 summarises the answers to this design-related question, showing small images of the anonymised prototypes associated with each design option for the sake of clarity.

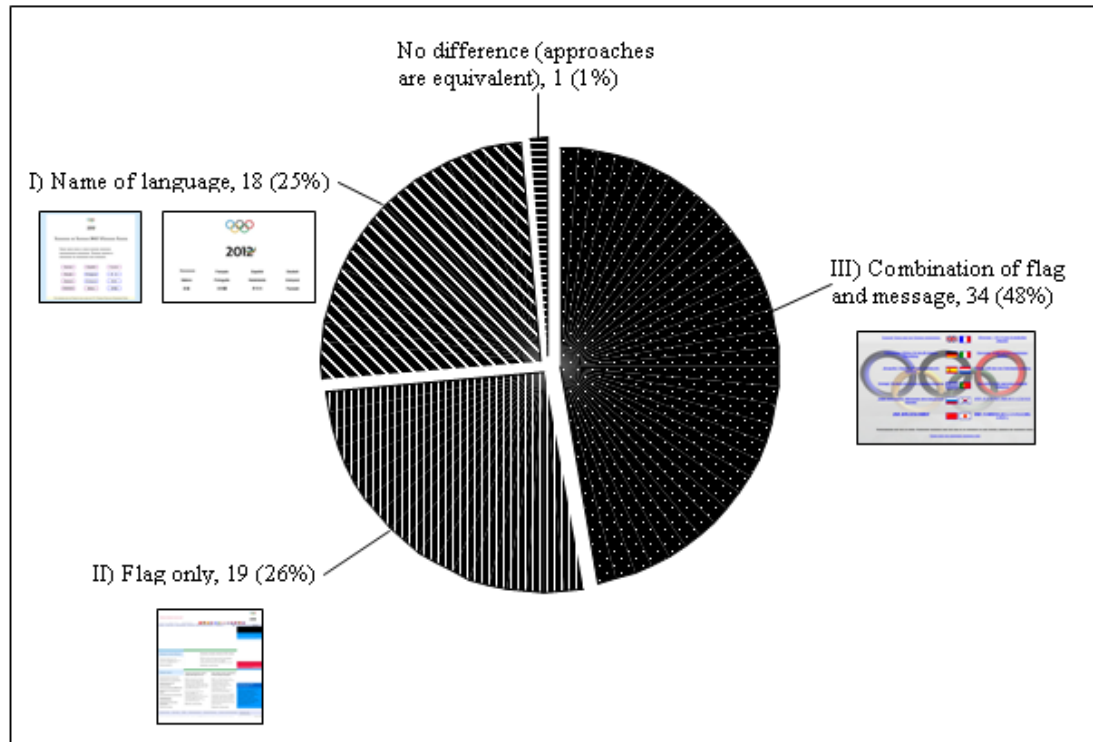


Figure 5.18: Answers to the question “Which of the following three approaches do you personally think is more successful in indicating that the information contained in the website is also available in your own language?”

To investigate another key aspect of the MT-related design and implementation, the next question asked the respondents which of these two approaches was more successful in indicating that they could navigate the site in their own language:

- I) language options presented in a separate page (as in prototypes A, C and D);
- II) language options presented prominently on the existing home page (as in prototype B).

The reaction to this question showed a preference (41 respondents, 57%) for option II, with the language options forming part of the home page alongside other content, rather than being shown on a separate welcome page focusing exclusively on getting the users to select their own language, which was the route taken by three out of the four groups of students for their prototypes.

5.5.5 Comparative Evaluation of the Redesigned Prototypes

In the final part of the questionnaire, the participants were asked to rank the four prototypes, putting them in order of their overall personal preference from best to worst. Following this comparative evaluation, the home page redesigned by group B (which was largely based on the design of the original home page of the official website) was rated top by more than half of the sample (42 respondents, 58.3%), and was the overall favourite among the respondents, as shown in Figure 5.19.¹⁶

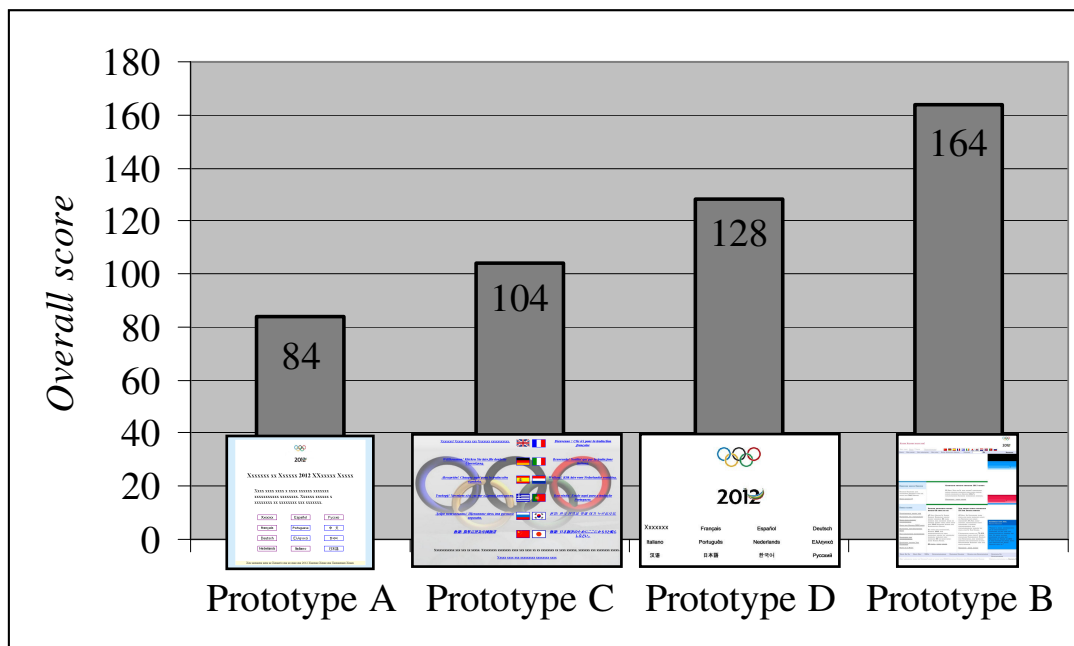


Figure 5.19: Overall scores following the ranking for the four prototypes given by the 72 international respondents based on their personal preference

5.5.6 Factors Affecting the Use of an Embedded Free Online MT Facility

The last question of the questionnaire focused on seven factors related to the design of monolingual websites that embed a free online MT facility to disseminate their contents in multiple languages, and which play a crucial role in shaping the overall

¹⁶ To work out the overall scores shown in Figure 5.19 and obtain a general comparative ranking of the four prototypes, the points were awarded as follows: 3 points for the prototype ranked best by a participant, 2 points for the prototype ranked second, 1 point for the prototype ranked third, and, finally, zero points for the prototype ranked fourth (i.e. worst). As a result, the better ranking a prototype received by a greater number of participants, the higher its final overall score. The users were allowed to give an equal ranking to more than one home page to show that they did not have a clear favourite, if they so wished, in which case the top-ranking prototype(s) received 3 points, the second-ranking prototype(s) received 2 points, and the third-ranking one(s) received 1 point. The highest possible overall score that could be achieved with this system was 216 points.

experience of using a built-in web-based MT engine to navigate a monolingual website in the visitor’s preferred language. The respondents were asked to rate the importance of these seven factors on a 7-point Likert scale (with 1 being “completely irrelevant” and 7 being “very important”). These ratings were given by the participants at the very end of their experimental session, after they had used the four prototypes to perform a number of tasks and to access the content of the London 2012 website machine-translated from English into their respective native languages. Figures 5.20-27 present a summary of the answers provided to the last question for each of these seven factors.

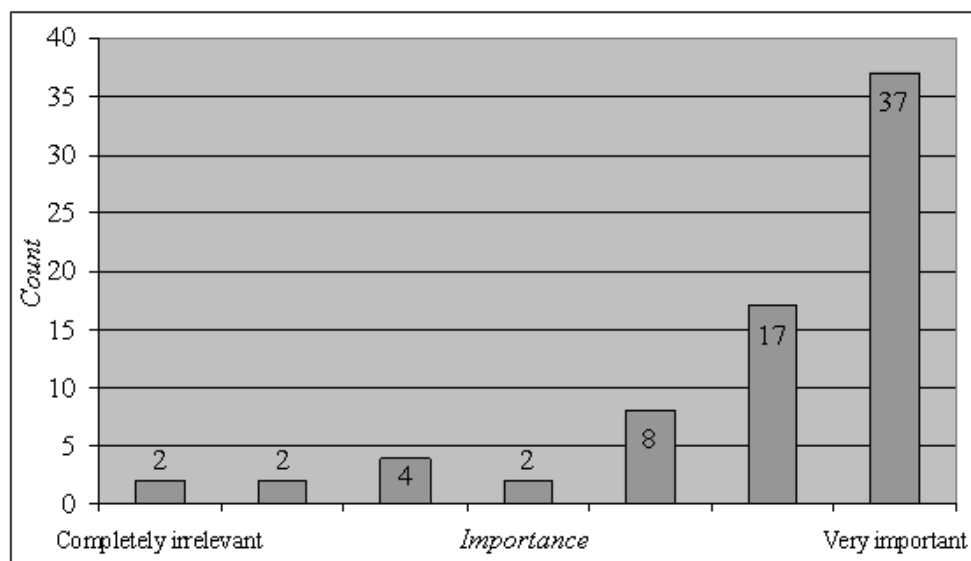


Figure 5.20: Results for the rating of the factor: “the fact that the translation service is available free of charge to both visitors and webmasters” (mean: 5.93)

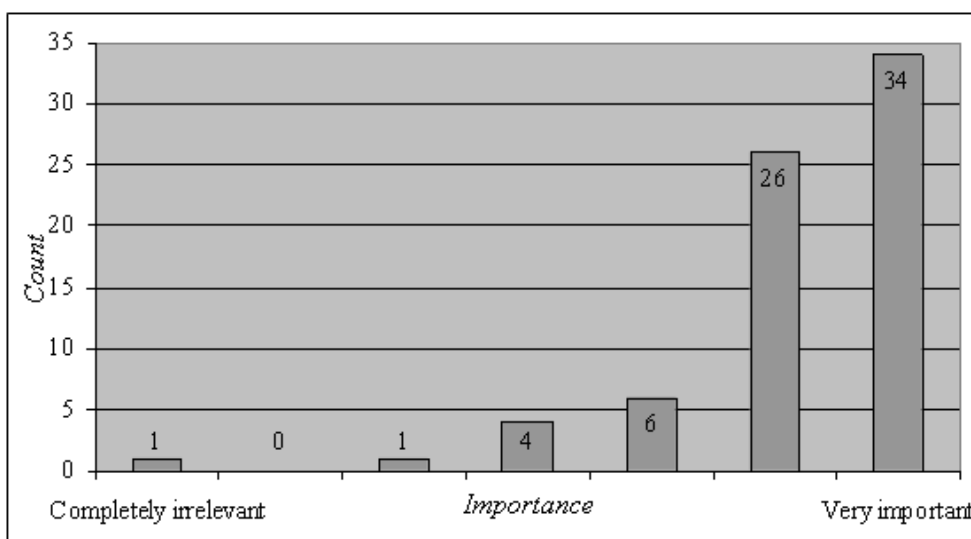


Figure 5.21: Results for the rating of the factor: “professional look of the page informing visitors that the translation into their language is available” (mean: 6.17)

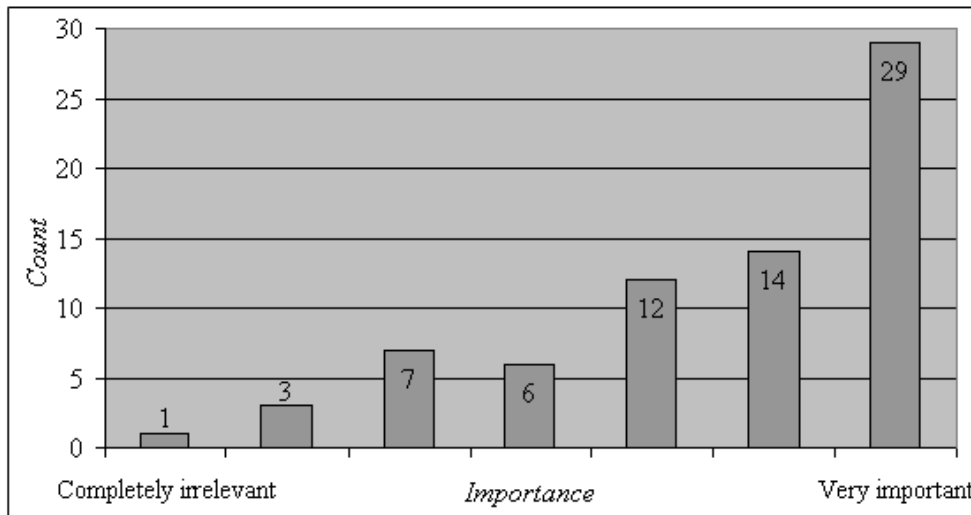


Figure 5.22: Results for the rating of the factor: “careful use of symbols indicating languages (e.g. flags), so that no visitor feels upset or excluded” (mean: 5.54)

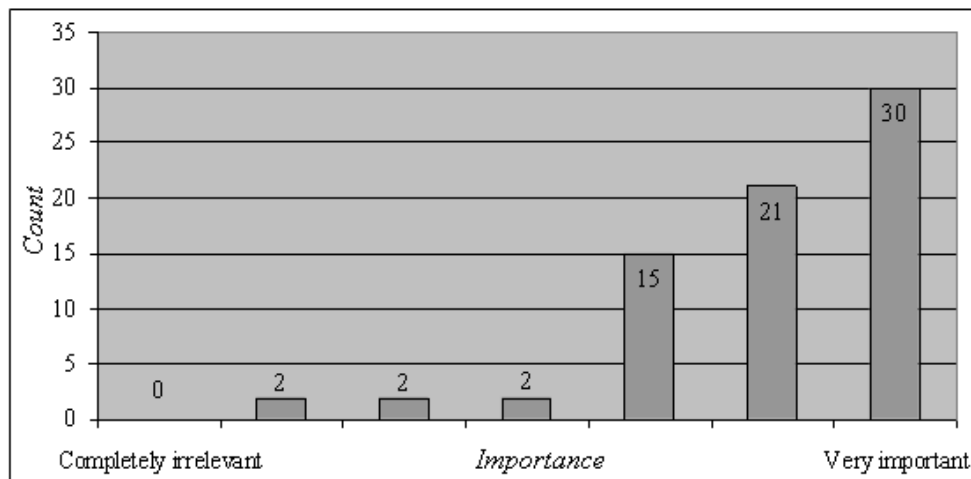


Figure 5.23: Results for the rating of the factor: “ease of use and interaction when users have to select the language in which to navigate the site” (mean: 5.96)

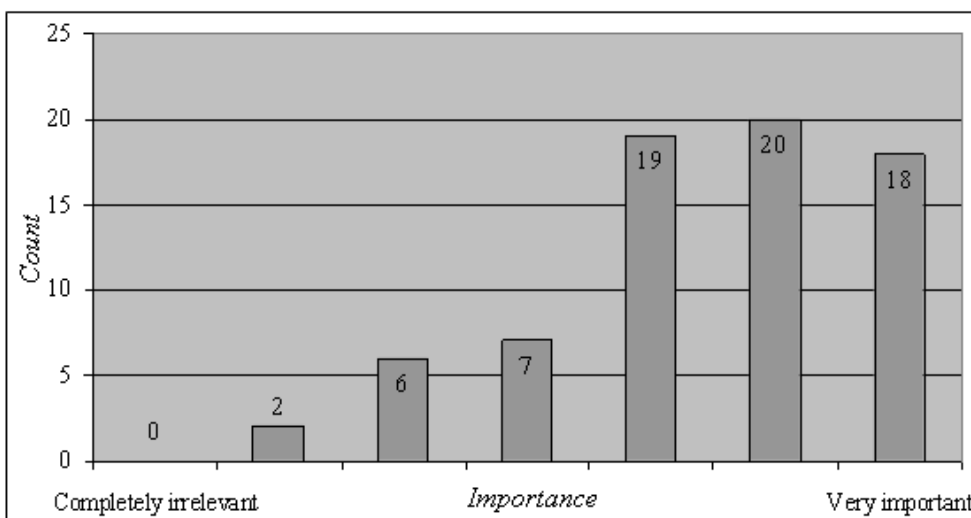


Figure 5.24: Results for the rating of the factor: “fast response time in providing the translation after the visitors select their preferred language” (mean: 5.43)

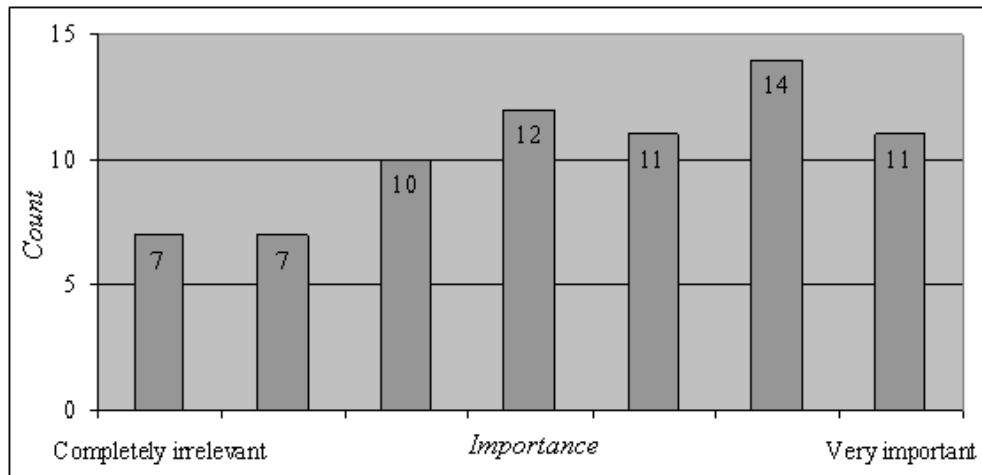


Figure 5.25: Results for the rating of the factor: “a note on the limitations of machine translation (e.g. warning/disclaimer)” (mean: 4.38)

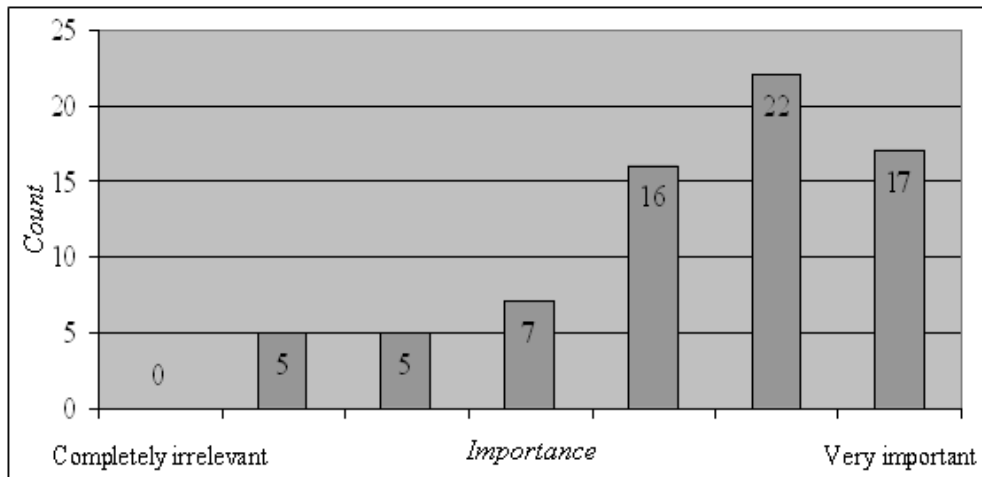


Figure 5.26: Results for the rating of the factor: “wide language coverage (translations offered in a large number of different languages)” (mean: 5.33)

All these seven factors were included in the questionnaire because they were deemed to be particularly important and relevant contributors to an overall positive experience for the users of an online MT facility offered by a monolingual website. As a result, it was expected that all the factors would receive ratings confirming their importance. However, the comparative ratings present some interesting and somewhat surprising differences that deserve some comment (cf. Healy & Herder, 2002: 338). Table 5.6 summarises the mean ratings given by the 72 respondents for the importance of the seven factors under consideration, in order from the most to the least important.

<i>Factor</i>	<i>Mean rating of importance (1-7 scale)</i>
Professional look of the page	6.17
Ease of use and interaction	5.96
Translation service available free of charge	5.93
Careful use of symbols to avoid upsetting visitors	5.54
Fast response time in providing the translation	5.43
Wide language coverage	5.33
Inform users of the limitations of MT (warning/disclaimer)	4.38

Table 5.6: Relative importance of the factors affecting the use of an embedded free online MT facility (mean ratings)

Interestingly, the factor that is considered the most important one by the respondents is the “professional look” of the page that presents the free online MT facility, which is an aesthetic rather than functional attribute. Overall, 34 out of the 72 respondents gave the top rating to this factor, which received the highest mean rating (6.17) across the seven factors. Surprisingly, the appeal of the webpage presenting the online MT facility is considered more important than the fact that the MT service is available for free, possibly because poorly designed unattractive webpages tend to be found in websites offering information and services of dubious quality. The fast response time in the provision of the translation and a wide coverage of the languages supported by the online MT facility do not appear to be priorities in terms of importance for the user population, because these two factors received low mean ratings in comparative terms (5.43 and 5.33, respectively). As far as the issue of language coverage is concerned, it seems that users are mostly concerned about the availability of their own language, as from their point of view this is a crucial factor, whereas the possibility to select a wide range of other languages is to a large extent irrelevant to individual visitors.

Finally, among the seven factors under consideration the lowest mean rating (4.38) was given to messages informing visitors that the translations may not be accurate or high-quality, because they are offered by an MT service, for example by showing a warning or a disclaimer. This is somewhat surprising, because it could be argued that providing a message along these lines would be a gesture of courtesy on

the part of the website, to clarify this point to their international visitors who might otherwise be confused and doubt the credibility of the website. However, perhaps this data provided by the respondents suggests that native speakers of a language do not need to be told that the poor-quality translations are not carried out by professional human translators, possibly making any disclaimer policy unnecessary.

5.6 Summary and Lessons Learned

The results of this user testing and usability evaluation represent the first attempt to shed some light on the design and implementation issues involved in presenting a monolingual website to an international multicultural audience, giving users the possibility to browse the online content in their preferred language by taking advantage of a free online MT facility. Whilst it is difficult to identify optimal design options given the significant role played by individual preferences at a number of levels (not least in terms of aesthetic appeal, which is very difficult to pin down and factor in during the evaluation), this experimental data shows that there is some consensus on how the majority of international users with different cultural backgrounds prefer to be presented with the option of choosing their own language to navigate a website.

5.6.1 Relevance of the Findings for Monolingual Websites Embedding Free Online MT

One surprising result was that flags are not regarded, in the main, as problematic symbols or discriminatory metaphors for language selection in the prototypes produced by groups B and C. Our study found that regardless of their nationality, the respondents accepted that flags of a state different from their own could be effective representations of their language, if this is officially spoken in more than one country. This was the case, for example, for the participants with Cypriot nationality who did not have a problem in general with clicking on the Greek flag as a “shortcut” for the availability of their native language; similar reactions were found for the other languages spoken in a number of different countries, e.g. German (the German flag had to be clicked by Swiss and Austrian citizens) or Spanish (the flag of Spain served as the icon to be clicked by Latin American people as well, although

they do not have any direct affiliation with Spain as such). This positive and pragmatic attitude was widely represented for all the languages and countries covered in the study where this was a potential issue, but it is impossible to say whether it would also be apparent for other languages officially spoken by different national communities worldwide (e.g. English and Arabic), or for other sets of Internet users who might be less flexible in their expectations than the students who were involved in the experiment.

There is in fact a large amount of literature that discusses the merits and drawbacks of using culture-bound metaphors and potentially controversial visual elements in web design, particularly flags, to indicate language-specific (as opposed to country-specific) content or sections of websites, given that the borders separating cultural, national and linguistic identities tend to become rather blurred on the Internet (Halavais, 2000). On the one hand, Bishop (1998: 31, 86), Dabbs (2002: 53) and Smith (2005: 130-131) are among those who encourage web designers to support the language selection process by means of flag icons if the content of a website is available in several languages, in order to maximise the effectiveness and attractiveness of the users' initial interaction with the site, before they actually reach the desired or relevant content.

On the other hand, however, Aykin & Milewski (2005: 23, emphasis original) warn that "languages and countries, while related, do not form a one-to-one relationship. [...] [D]esigners must consider both language *and* country as potential determinants of design". Nielsen (1996; 2000: 325-330), McAlpine (2001: 46), Brinck et al. (2002: 51-53) and Yunker (2003: 308-309) also discuss similar concerns for situations that are likely to alienate certain users, if their sensitivities are hurt in the process of guiding them towards web content that is supposed to be relevant to them, and therefore discourage the use of national flags as metaphors for languages. The World Wide Web Consortium (W3C) adds its authoritative voice to this debate along the same lines to explain why the use of flags to indicate the languages available on a multilingual website should be avoided in favour of text-based solutions, stating that "[f]lags represent countries, not languages. Numerous countries use the same language as another country, and numerous countries have more than one official language." (W3C, 2007: ev).

Finally, Baxley (2003: 160-162) approaches the same problem from a different perspective, exploring the issues involved in presenting language-specific

web content for a multilingual website on the basis of geographic classification schemes, e.g. by using clickable maps or regional sections of global gateways for a widely distributed, international audience of potential visitors. The discussion emphasises that this is a viable approach, but recognises that it entails controversial decisions in some respects, which however could not be looked at in our study because none of the prototypes presented a design metaphor based on the geographic location of the users to hint at the available languages. The studies that have been briefly reviewed here discuss a variety of interesting arguments to support different points of view. Regrettably, however, they do not provide any hard evidence or experimental user data to back up their advice and recommendations with regard to using or avoiding flags to refer to the multilingual sections of websites.

The results of our questionnaire, which focused specifically on the reactions of international users to flags being shown as metaphors for languages, indicate that this is regarded as an effective and widely accepted design solution. This seems to be at least partly the consequence of current practice in many multilingual (i.e. professionally localised) websites, which guide Internet users from different countries to select the language-specific versions of the website through national flags as symbols to represent languages. As a result of this *de facto* convention, people do not seem to be upset or offended by having to click on a flag that is not that of their own country, which stands for a widely spoken language, thereby showing a fairly pragmatic attitude, although it is recognised that this is not an ideal solution. With specific regard to the method used by the redesigned home pages to get users to select the language in which to browse the machine-translated website, it should also be noted that the sample of participants expressed a clear preference for the design that combined textual components (i.e. the names of the various languages and short welcome messages in the respective languages), with graphic or visual elements like flags, as illustrated by prototype C. Although this approach places heavy demands on the screen real estate of the entry page or home page of a website, it can be easily implemented when the range of languages supported by the free online MT facility is not very wide.

Another interesting finding of our experiment was that the majority of the people participating in the survey preferred to select the language from a list of options presented prominently on an already existing home page with some content (as was the case for prototype B), rather than on a separate page with the sole

purpose of guiding the language selection process. This seems to indicate that Internet users are quite accustomed to viewing complex and text-intensive webpages that present a number of different elements (e.g. banners, pictures, navigation bar, text, etc.) competing for their attention at the same time, whilst they would rather avoid being forced to go through a page only to choose the language in which to carry on browsing the rest of the website.

5.6.2 Wider Implications for Professionally Localised Multilingual Websites

Although this user testing and usability evaluation was strongly focused on multilingual websites powered by free Internet-based MT, the design-related findings apply with equal force to any multilingual website, regardless of whether the translations are provided by an online MT engine embedded within its architecture, or they are the result of a fully-fledged localisation process. Either way, the same broad considerations in terms of design, user interface and interaction apply when it comes to getting international visitors to select their preferred language to navigate the website, and similar cultural issues arise (e.g. choosing a particular national flag to refer to a language that is spoken in multiple countries). It seems therefore reasonable to suggest that the findings provided here can also help to promote best practice in the design of websites that are professionally localised and translated, in order to maximise their ability to meet the expectations and preferences of a multicultural and multilingual international population of visitors.

5.6.3 Future Research Directions

In conclusion, the study presented here emphasises that user-centred design and the careful consideration of issues in HCI and web usability have a crucial role to play in enabling web users to take full advantage of online MT, so that its power can be harnessed in the interest of more effective strategies of multilingual content management and dissemination on the Internet. A considerable amount of observational usability data was gathered during the user testing, by collecting the responses to a 74-item questionnaire provided by a sample of 72 participants with different national, cultural and linguistic backgrounds. Still, this was an initial

attempt to explore a new area of research into the use of online MT, with a strong input from relevant disciplines such as HCI and web usability.

It is hoped that similar experiments will be carried out in the future, covering a wide range of different websites (e.g. e-commerce sites, corporate and institutional websites, etc.), considering different language combinations, and exploring additional approaches (e.g. interaction metaphors based on the geographic location of the user to indicate the available languages), with a view to gaining further insight into the design-related issues affecting the effectiveness of multilingual websites, and the variation of expectations as well as the preferences of users with different linguistic, cultural and national backgrounds. One area that stands out as worthy of more in-depth research concerns the use of disclaimers and warnings provided to multilingual users by websites that disseminate their contents in multiple languages via online MT. Whilst the responses to the questionnaire suggest that this is not deemed to be particularly important (at least compared to the other crucial factors that were explicitly investigated), more data is needed to explore the issue further, and to identify what format and level of detail would be regarded as helpful for these disclaimers by the users. The deployment of online MT, particularly as a feature that enables people to browse originally monolingual websites in their preferred languages, raises a number of issues that deserve careful investigation. Further research is vital to develop a better understanding of how its potential can be brought to bear on the solution of real online communication problems by achieving effective and user-friendly MT-based strategies for multilingual information dissemination.

CHAPTER 6

TESTING AND VALIDATION OF THE HEURISTICS FOR THE DESIGN OF A WEBSITE POWERED BY FREE ONLINE MT

6.1 Focus on Good Practice and Real-life Applications

As a result of the redesign project followed by the user testing and usability evaluation described in chapter 5, a number of design-related issues were identified that deserve careful consideration when monolingual websites offer a free online MT facility to their international visitors. Subsequent work aimed at looking at these issues in more detail, and at transferring to real-life applications the lessons learned in terms of good MT-oriented interface design, with a view to helping web developers meet the expectations and preferences of multilingual Internet users. This chapter reports on a follow-up project that was carried out to expand on the results of the experimental work presented in chapter 5, on the basis of the feedback given by the four groups of students who carried out the redesign of the home page of the London 2012 website, as well as of the input received from the 72 international participants in the testing and usability evaluation of the four redesigned prototypes.

Combining this information enabled us to progressively formulate a set of ten user-centred and usability-oriented web design heuristics, which are presented in detail, to guide the process of integrating free online MT into the architecture of monolingual websites. In the work that is described in this chapter these heuristics were used to assist six teams of postgraduate students in the task of designing and implementing successful web interfaces that allowed the contents of a monolingual website to be disseminated in multiple languages via web-based MT. The six groups of web developers designed from scratch new functioning home pages for the website of an academic department which included an online MT facility on the basis of the heuristics. The chapter explains the requirements of this development project and reviews the six designs that were produced, laying special emphasis on how the students chose to present the Internet-based MT facility. Following a comparison of the implementation strategies, the discussion focuses on the next stages of the testing and validation of the design heuristics, commenting on their usefulness for the web

design community and on the role that they can play in diagnostic evaluations. Finally, the conclusion points out some topics that the heuristics do not currently cover, but that would enhance their overall effectiveness for the purpose of successfully integrating Internet-based MT into monolingual websites, ending with a discussion of the challenges and opportunities in this area that are of potential interest to both industry and researchers.

6.2 Heuristics for MT-oriented Web Design

Several web-related studies focus on the development, testing and validation of design heuristics and guidelines, discussing their practical applications to improve various aspects of web design (e.g. Ivory et al., 2001). Many sets of heuristics have been published since the mid-1990's with the aim of enhancing the usability and accessibility of websites (Comber, 1995 and Borges et al., 1996 are two early examples of work done in this area). Some of these heuristics have been progressively refined, extended or adapted over time, particularly in response to the introduction of new technologies, legislation, standards and widely-accepted design principles, to the extent that there are those who lament the increasing proliferation and fragmentation of sources that give advice on usability- and accessibility-oriented web design (e.g. Vanderdonckt, 1998; Limbourg & Vanderdonckt, 2000; Zajicek, 2004).

Some studies propose web design heuristics tailored to specific groups of Internet users, particularly those with special needs due to factors such as age, physical conditions or cognitive disabilities, which tend to focus very heavily on the features and requirements of the populations that they target. Kurniawan & Zaphiris (2005), for instance, present research-derived web design guidelines to cater for the needs of elderly Internet users. They describe the validation process through which a small and robust set of reliable guidelines is gradually achieved from a much larger tentative list of candidate guidelines extracted from a thorough survey of the relevant literature. The final guidelines are the result of a series of selection stages, including expert validation followed by usefulness ratings performed by representatives of the targeted user group, and take into account a range of ageing-related impairments that have an impact on how older users interact with websites.

Our work that is presented in this chapter adopted an iterative approach to the testing and validation of the MT-specific web design heuristics that was quite similar to the one used by Kurniawan & Zaphiris (2005). This methodology resulted in the formulation of a set of ten user-centred and usability-oriented web design heuristics related to the integration of free online MT into monolingual websites serving a double aim: first, they can guide the design, development and implementation process, and, second, they provide a framework for the diagnostic evaluation of the degree of success achieved by monolingual sites that offer Internet-based MT to support the multilingual browsing experience of their international visitors.

6.2.1 Input from the London 2012 Redesign Project and Expert Validation

At the end of the redesign project described in chapter 5, the postgraduate students belonging to the four groups who had prepared the prototypes were asked to answer two separate sets of essay-type questions, which formed a small part of the assessment for their HCI course. Each of the 14 students completed an individual reflective questionnaire on their own (included in appendix D), and the members of the four redesign teams answered together the questions of a group follow-up questionnaire (available in appendix E). Apart from the assessment purposes, these two sets of questions were designed to gather insights into what the students had learned during this coursework project, receive feedback on its usefulness, and give them an opportunity to explain in some detail the key design choices made in the preparation of their prototypes.

In particular, the individual reflective questionnaire had three questions which served the purpose of assessing the students' grasp of the issues explored during the project in the light of their background knowledge in HCI. One of these questions (number 3) was particularly relevant to the work presented in this chapter, because it asked the students to elaborate on the most difficult or challenging aspect encountered during the implementation of the redesign project. Although a few answers were a bit vague or focused on organisational matters that are of no interest here (e.g. allocating tasks to group members and co-ordinating everybody's work), most of them covered a wide range of key design-related areas, revealing some of the technical stumbling blocks and issues with which the designers had grappled. This

gave a unique insight into the real difficulties entailed by the process of embedding a free online MT facility into a monolingual website, and highlighted some points that a proposed set of heuristics should definitely cover for the benefit of designers working on similar implementation tasks.

In addition, the main purpose of the group follow-up questionnaire to be completed by the four teams of students was to give them an opportunity to articulate the main strengths of their prototypes and justify their design choices. As an extension of their redesign work and based on their experience in the project, questions number 4 and 5 asked the groups to come up with the following:

- I) a set (at least five, up to a maximum of ten) of *heuristics to evaluate* how successfully websites originally available only in one language (say, English) integrate free online MT services into their design in order to disseminate their textual contents in different languages for the benefit of multilingual Internet users;
- II) a set (at least five, up to a maximum of ten) of *redesign guidelines* aimed at helping web designers and developers who are not experts in HCI and usability to integrate successfully free online MT services into already existing monolingual websites (say, in English), so that multilingual Internet users can easily navigate these websites in their own preferred language.

The number of heuristics and guidelines required for the two sets was left deliberately flexible, so that the groups could include the level of detail that they preferred and cover the points that they thought were the most important, according to their experience. As expected, there was a considerable degree of overlap between the heuristics proposed by the four groups, and several points of contact between the evaluation heuristics and the redesign guidelines, which were covered separately in the questions to ensure that the students could focus equally on both of these related aspects.

Following a methodology similar to the one adopted in Kurniawan & Zaphiris (2005: 130-131), these heuristics and guidelines put forward by the four teams of designers were reduced to a set of ten, merging and unifying them into a comprehensive and coherent whole. This process was undertaken by the researcher with the help of a senior HCI expert and web usability consultant, and was also

heavily influenced by the results of the user testing and usability evaluation conducted by the 72 international users, which are reported in section 5.5. This approach was chosen to strike a balance between the designer-oriented emphasis of the proposals put forward by the groups of students on the one hand, and the users' preferences that were derived from the 72 people involved in the testing and evaluation experiments on the other. That is to say, the final set of ten heuristics was put together combining the most important design-related aspects as identified by the groups of designers themselves, prioritising and interpreting them in the light of the users' preferences that emerged from the usability data collection (e.g. the factors affecting the use of an embedded free online MT facility to access the content of a website that are discussed in sub-section 5.5.6).

6.2.2 Heuristics for the Design of an Online MT Facility Embedded in a Monolingual Website

With this procedure, the following set of ten user-centred and usability-oriented heuristics for the design of an online MT facility featured in monolingual websites was finally formulated:

1. Availability of the languages of prospective users
The translation options provided cater to the language preferences of the expected user population.
2. Prominence of the online MT facility
The online MT facility stands out in terms of presentation (e.g. colour, size, etc.).
3. Location of the online MT facility
The online MT facility is located in a visible position and "above the fold".
4. Use of appropriate representation
The translation facility into various languages is represented in linguistically, culturally and politically appropriate fashion.
5. Meaningful grouping of languages
The languages are grouped in meaningful order.
6. Scalability
The design allows an easy addition of further translation options for other languages.

7. Seamlessness

The translated versions of the website can be accessed with as few clicks as possible.

8. Disclaimer in users' languages

The website provides a disclaimer of the limitations of online MT, presented in the users' own languages.

9. Redundant representation

The online MT facility is also available in alternative formats, so that for example users without the relevant Unicode fonts installed or with images turned off in their web browsers can still identify the languages covered by the translation facility.

10. Error recovery

The website provides ways to view the content in the original language and to switch languages.

These heuristics cover the crucial areas that have been shown to have an impact on the positive navigation experience of Internet users who rely on an online MT facility to browse a website translated into their preferred languages. They are formulated in non-technical style with explanatory examples, so as to be clear and helpful for web designers with different levels of expertise, including those with limited experience. It should also be noted that the heuristics can be applied to the interface design of a monolingual website with original content in any language (i.e. not necessarily English, which however is the most likely scenario, as discussed in sub-section 5.3.2), as long as this source language is supported by available web-based MT software in combination with the desired target language(s).

6.3 Designing a Website Powered by Free Online MT: the Example of the School of Informatics Home Page

The next stage of the work consisted in using these heuristics to guide the design of a website including an online MT facility, in order to gather feedback on their actual helpfulness for web designers. Following the redesign work carried out for the home page of the London 2012 website, it seemed appropriate to change the type of website for this project, and the decision was made to put the heuristics to the test on the design of an academic website, namely that of the School of Informatics of the University of Manchester, where this research was based (the website is available at

www.informatics.manchester.ac.uk). One reason for this choice was that at the start of this project (in early 2006) the School was actually considering a revamp of its website, and similarly to the redesign project discussed in chapter 5, this situation presented a real-world task that could give the postgraduate students involved an opportunity to develop valuable skills in a realistic setting while completing their assessed coursework. Although the website in question has always had content only in English, the School and the University are increasingly committed to establishing effective communication channels with a wide range of Internet users around the world (potential overseas students and their families or sponsors, foreign research organisations, international industrial partners, etc.). As a result, web-based MT appeared as a resource that could provide a solution to meet the needs of multilingual dissemination of the online content of the redeveloped website.

In addition, during the preparation of the coursework documentation for this project in January 2006, we discovered that the official website of another department of the university, namely Manchester Business School (MBS, available at www.mbs.ac.uk), whose content was posted online only in English, had a link to an Internet-based MT system to disseminate its information in a variety of languages. Figure 6.1 shows the home page of the MBS website as it appeared in January 2006, with the link to the free online MT facility (called “Translate”) at the very bottom, in the right-hand corner.¹ This part of the home page was well “below the fold” for most screen resolutions, i.e. it did not appear in a prominent position of the browser window, and users needed to scroll down to be able to see it and click on it. When visitors clicked on the “Translate” link, they were directed to the webpage shown in Figure 6.2.

This implementation of the free online MT facility (supported by Google Language Tools and covering eight target languages) within the MBS website was not particularly well-designed, because it was purely text-based, and the information regarding the MT service was all in English, so not particularly helpful for international visitors who might not be very familiar with this language. On the other hand, though, some aspects of this implementation in the MBS website were properly handled, since for example after clicking on one of the language-specific links the user was presented immediately with the home page of the website

¹ At the time of writing the overall design of the MBS website has changed, but the home page still includes a similar link to online MT.

machine-translated into their chosen language, without the need to follow cumbersome procedures. However, in general this design was quite poor, displaying a low degree of usability and user-friendliness.



Figure 6.1: The official home page of the Manchester Business School website as it appeared in January 2006 (www.mbs.ac.uk)

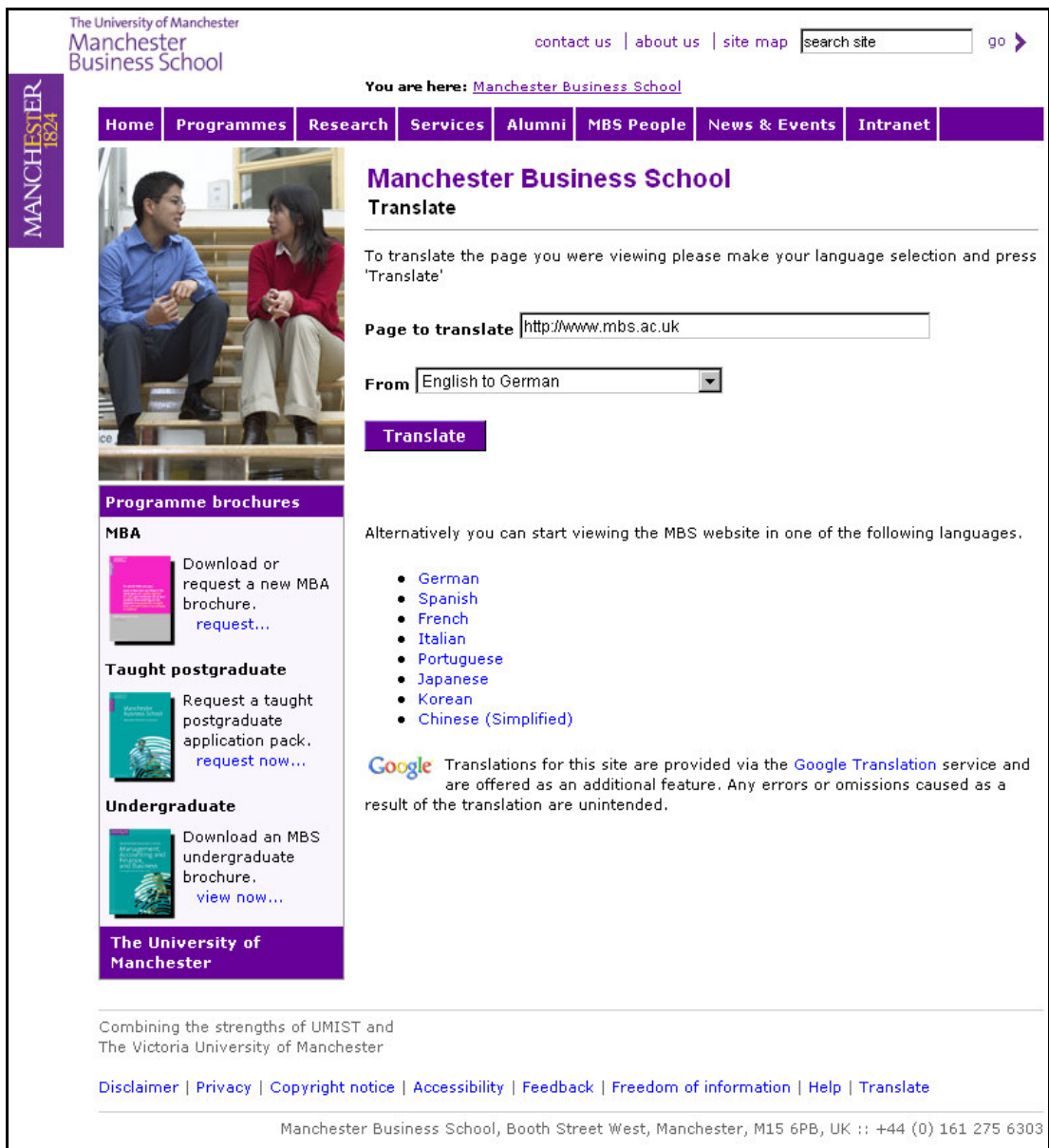


Figure 6.2: The “Translate” page of the Manchester Business School website as it appeared in January 2006 (www.mbs.ac.uk/translate)

This convinced us that the proposed revamp of the School of Informatics website provided an excellent opportunity to test the MT-specific web design heuristics presented in sub-section 6.2.2, giving us the possibility to develop an academic website with a potential audience of international visitors similar to that of the MBS site. As a result, for the project described in the rest of this chapter we decided to utilise the heuristics for the design, development and implementation of a brand new home page for the MT-powered School of Informatics website, as a fitting example

of a real-life application that could be easily extended and adapted to websites of other kinds as well. The chapter also covers the results of a diagnostic evaluation performed with the same set of heuristics on a series of alternative designs for the home page in question.

6.3.1 Groups of Web Developers and Task for the Project

This group project took place over a period of roughly three months, between February and May 2006, and was part of the assessed coursework for a course in “Human Computer Interaction and Web User Interfaces” offered by the School of Informatics to students taking two postgraduate programmes, the MSc in e-Business Technology and the MSc in Informatics. There were 30 students on the course, and in spite of a very diverse range of backgrounds and skills, they all had a good grounding in HCI. They were randomly divided into six different groups, which had between four and six members each. Their core task for the group project was to design from scratch a fully functioning home page of the School of Informatics website, which should include a free online MT facility, following the ten design heuristics described in sub-section 6.2.2.

Figure 6.3 shows an example of the home page for the School website that had been prepared by the web design team of the university in compliance with the official university-wide template for the corporate website. Although this design was never actually used for the website, it was given to the students at the start of the project as an example of the main elements to be included in their deliverable for the coursework (e.g. the official logo of the university, a search facility), and to suggest some possible keywords that might be used to identify the main sections of the website accessible from the home page. However, the students were free to adapt these elements in their own home pages, ensuring that they included an online MT facility designed according to the heuristics.

In addition, at the end of the project the groups had to provide feedback on the usefulness of the heuristics, utilise them to evaluate the designs produced by two of the other teams, write a formal report on their work and give a presentation on their home page. A few other tasks and related assignments were involved in the coursework for the project, but they are not discussed here because they are not directly relevant to the main focus of this chapter. As a result, the scope and purpose of this group project were fairly similar to the one described in chapter 5, although in

this case there were six teams, which consisted of different students from those who had worked on the home page of the London 2012 website, and they were given a set of heuristics to guide their design work. For this project the participants were expected to develop the home page of the academic website with the free online MT facility from scratch, and not as part of a redesign exercise in which they already had a basis to work on.

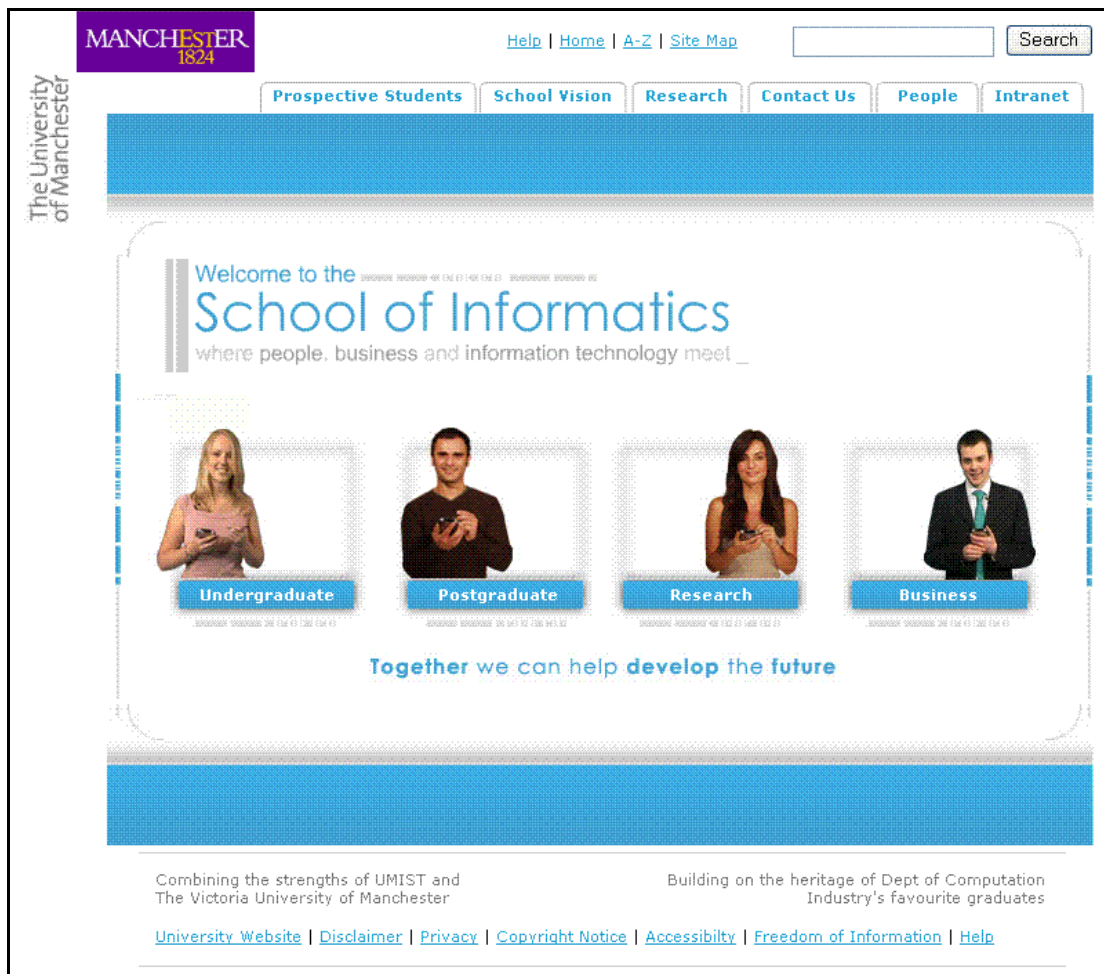


Figure 6.3: Example of the home page for the School of Informatics website prepared by the university's web design team

6.3.2 Review of the Six Alternative Designs and Their Online MT Facilities

As was the case for the redesign of the London 2012 home page, the six teams of students working in this project came up with very different implementations, which are briefly discussed here. Figures 6.4-9 present the home pages for the School of Informatics website, each with a free online MT facility, designed by the six groups.



Figure 6.4: The home page designed by group 1



Figure 6.5: The home page designed by group 2

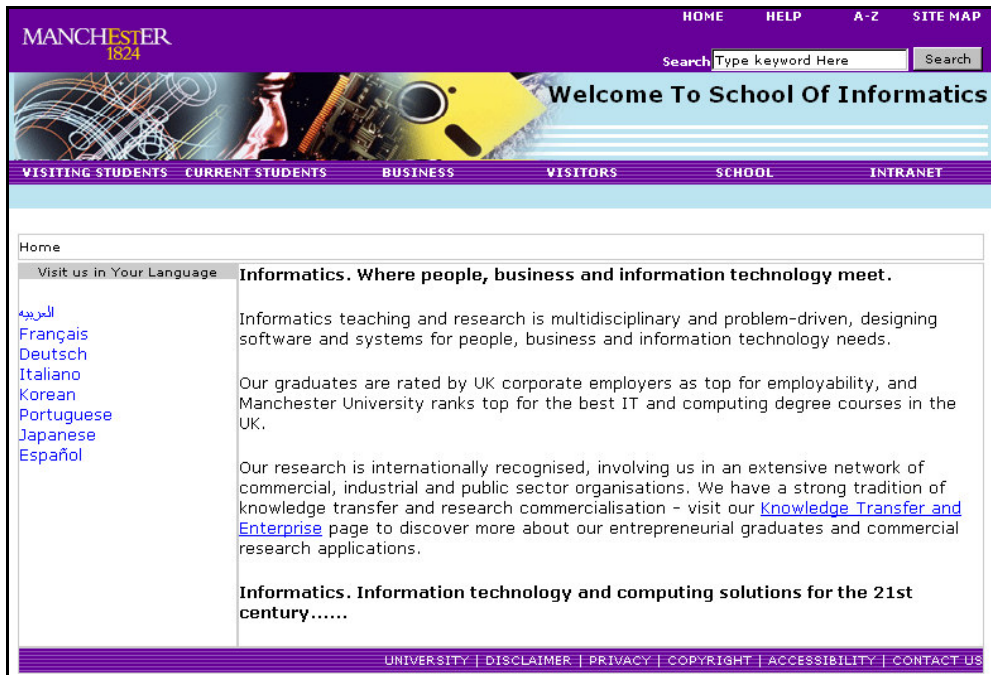


Figure 6.6: The home page designed by group 3

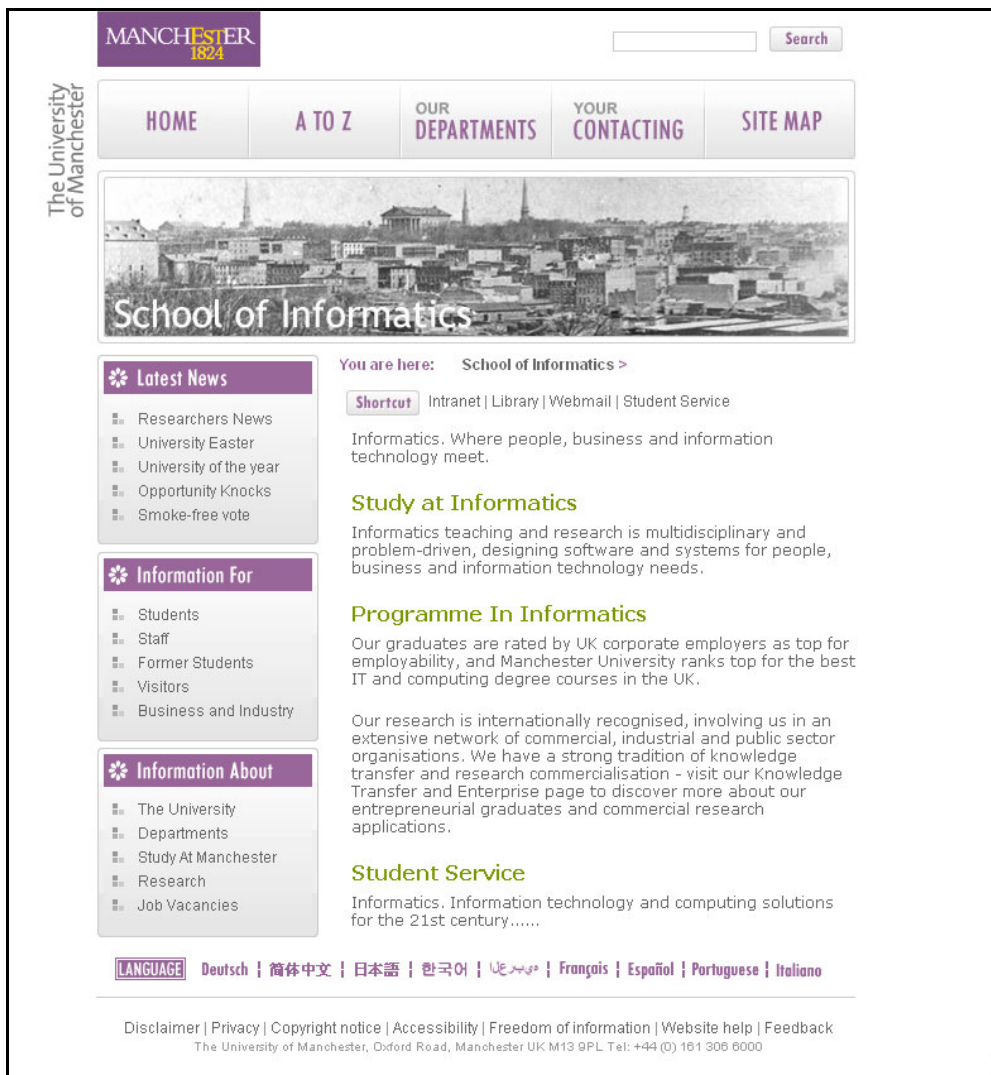


Figure 6.7: The home page designed by group 4

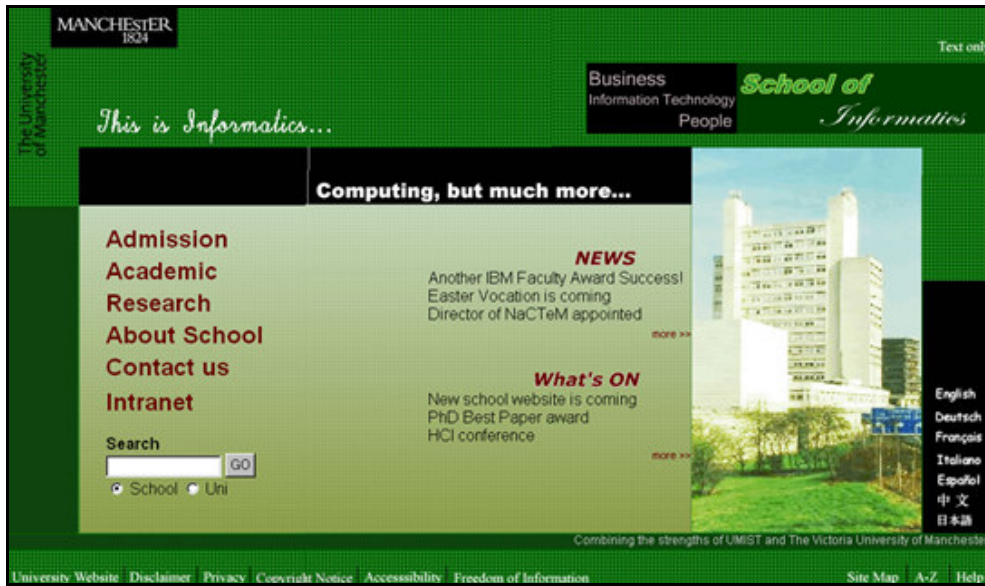


Figure 6.8: The home page designed by group 5

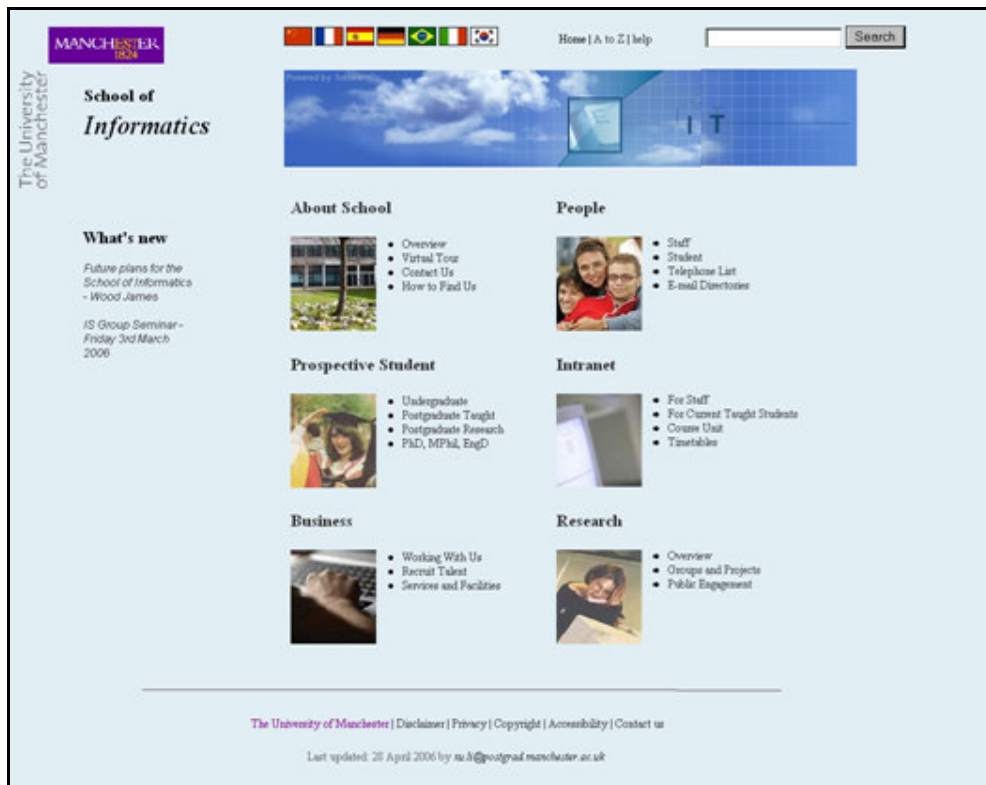


Figure 6.9: The home page designed by group 6

Table 6.1 summarises the main features of the free online MT facilities that the six groups of students included in their home pages, allowing for comparison across their implementation strategies.

<i>Group (Figure)</i>	<i>Target languages supported (number)</i>	<i>Online MT service used</i>	<i>Location of the online MT facility</i>	<i>Method and style of presentation</i>
1 (Figure 6.4)	German, Spanish, French, Italian, Japanese, Korean, Chinese (7 + English)	Google Language Tools	At the top, next to the university logo	Icons of flags arranged in two horizontal lines
2 (Figure 6.5)	Chinese, French, German, Dutch, Greek, Italian, Japanese, Portuguese, Russian, Korean, Spanish (11)	Babel Fish	Across the top	Names of the languages in the respective languages (except for Portuguese and Russian) arranged in a horizontal line
3 (Figure 6.6)	Arabic, French, German, Italian, Korean, Portuguese, Japanese, Spanish (8)	Google Language Tools	On the left halfway down	Names of the languages in the respective languages (except for Japanese, Korean and Portuguese) arranged in a vertical list
4 (Figure 6.7)	German, Chinese, Japanese, Korean, Arabic, French, Spanish, Portuguese, Italian (9)	Google Language Tools	Across the bottom	Names of the languages in the respective languages (except for Portuguese) arranged in a horizontal line
5 (Figure 6.8)	German, French, Italian, Spanish, Chinese, Japanese (6 + English)	Google Language Tools	Bottom right-hand corner	Names of the languages in English arranged in a vertical list
6 (Figure 6.9)	Chinese, French, Spanish, German, Portuguese, Italian, Korean (7)	Google Language Tools	At the top roughly in the middle	Icons of flags arranged in a horizontal line

Table 6.1: Main features of the online MT facilities on the home pages designed by the six groups of students

6.3.3 Comparison of the Implementation Strategies

The teams of students decided to support between six and eleven foreign languages, and they all relied on Google Language Tools for the translation service, except for group 2 (which used Babel Fish for all the target languages, instead). As the groups

explained in more detail in their reports accompanying the home pages and during the formal presentations of their work, they chose which target languages to support among those available from the free online MT services in combination with English based on some background research undertaken for the project. This preparatory work aimed at determining which are the most important areas and countries of the world where prospective students and potential partners of the School of Informatics (therefore likely visitors of its website) are based. Among the various translation options, a separate link to English (the language in which the content of the website was originally available) was included only by groups 1 and 5. However, in these two designs as well as in all the others it was possible to access the original sections of the website in English by clicking on the relevant links presented on the home page, which enabled English-speaking visitors to browse the original content.

Interestingly, in spite of the popularity of this implementation revealed by the user testing covered in chapter 5, none of the six groups decided to adopt a mixed visual and textual presentation for the online MT facility (i.e. combining an icon and a text-based message to indicate which languages were available), possibly because of the pressure that this approach puts on the prime screen real estate on the home page. Instead, groups 1 and 6 adopted an icon-based design, with a set of flags representing the languages, whereas all the other groups indicated the languages using their respective names (Français, Deutsch, etc.).² The choice of national flags to represent languages officially used in multiple countries might appear to be politically sensitive and possibly inappropriate, but as discussed in sub-section 5.6.1 international users seem to accept it as a convenient convention to represent languages, rather than countries, when they interact with multilingual websites. In this respect, it is interesting to note, for example, that the home page of group 1 used the Union Jack to represent English, and group 6 included the flag of Brazil for the Portuguese language. In a similar vein, both the home pages produced by groups 1 and 6 chose the Spanish, French and German flags to indicate three languages which are spoken in a number of countries, not only in Europe. In addition, these two home pages displayed the flags of South Korea and of the People's Republic of China for

² However, as noted in Table 6.1, there are a few exceptions due to inaccuracies. The home pages of groups 2, 3 and 4 list “Portuguese” as one of the languages, whereas the original or correct name is “Português”. Similarly, the home page of group 2 includes “Русско” among the possible target languages, whereas “Русский” (or “Русский язык”) would have been the correct way to indicate the availability of Russian. Finally, the home page of group 3 mentions “Korean” and “Japanese”, failing to use the official names or even the correct characters for these two Eastern Asian languages.

the Korean and Chinese languages, respectively, although they are officially spoken in other countries as well.

As far as the other home pages are concerned, i.e. those that showed the names of the languages into which international visitors could obtain a translation, group 3 presented the links as plain text, whereas groups 2, 4 and 5 captured the names of the languages as clickable images. As discussed in sub-section 5.4.4, the latter strategy enables visitors to view clearly the characters for all the languages that are available (including Eastern Asian ones like Chinese, Japanese and Korean), even if they do not have the required font set installed on the computer that they are using. On the other hand, however, the presence of images on the home page may result in the undesired side effect of slower download times for Internet users relying on connections with limited bandwidth.

Another issue regarding the implementation strategy of the online MT facility raised in sub-section 5.4.4 concerns the availability of “alt text” associated with the clickable images, the icons or the links that enable users to access the machine-translated content in the desired language. Heuristic number 9, which is presented in sub-section 6.2.2, emphasises the importance of providing redundant representations in various formats for the available languages, so that users without the required fonts installed or who have the option to display images turned off in their web browsers can still understand which languages are offered via the MT engine, and select the relevant one. Table 6.2 presents some information regarding how the six home pages produced by the groups of students handled these issues.

<i>Group</i>	<i>Method of presentation of languages</i>	<i>Names shown as images or plain text</i>	<i>Redundant representation with “alt text”</i>	<i>Language used in “alt text”</i>
1	Flags	N/A	Yes	Languages concerned
2	Names	Images	No	N/A
3	Names	Plain text	No	N/A
4	Names	Images	Yes	English
5	Names	Images	Yes	Languages concerned
6	Flags	N/A	No	N/A

Table 6.2: Presence of “alt text” as redundant representation of the languages

Table 6.2 shows that some of the home pages presented some problems with regard to the user-centred and usability-oriented design of redundant representations for the languages available in translation. Groups 2, 3 and 6 did not provide any “alt text” to accompany the links associated with the languages supported by their home pages, whilst group 4 provided “alt text” only in English to accompany each image containing the names of the languages, which is not at all ideal, if one considers that the international visitors might speak only their own native language. Finally, however, groups 1 (which used flags) and 5 (which presented the language names captured as images) did provide “alt text” associated with each option, using in each case the languages concerned, which is the most successful strategy in terms of usability and user-friendliness. As a matter of fact, this approach ensures that all visitors have a pleasant and smooth browsing experience and are able to interact meaningfully with the interface of the online MT facility, regardless of their language background and of the settings of the software with which they log on to the home page of the MT-powered website.

6.3.4 Designer-oriented Ratings of the Usefulness of the Ten Heuristics

After the six teams of students had completed their own designs of the fully functioning home page of the School of Informatics website, the next stage of the project reported here focused on testing and validating the ten MT-specific web design heuristics. As a result, the groups were asked to rate their usefulness for the design of the free online MT facility embedded in their home page using a 5-point scale, with 1 being “completely useless” and 5 corresponding to “extremely useful”. The groups were expected to include this information in their final written report, but unfortunately groups 2 and 3 did not get around to covering this part of the coursework. As a result, this sub-section reports only the ratings of the usefulness of the ten web design heuristics given by the remaining four groups. Table 6.3 shows the ten heuristics introduced in sub-section 6.2.2 with the average ratings of their usefulness given by groups 1, 4, 5 and 6, after they had used these guidelines to inform the design of the free online MT facility embedded in their home pages.

<i>Heuristic</i>	<i>Average rating of usefulness (1-5 scale)</i>
1. Availability of the languages of prospective users	4.75
2. Prominence of the online MT facility	4.00
3. Location of the online MT facility	4.25
4. Use of appropriate representation	4.00
5. Meaningful grouping of languages	2.75
6. Scalability	3.25
7. Seamlessness	4.50
8. Disclaimer in users' languages	3.00
9. Redundant representation	3.50
10. Error recovery	3.75

Table 6.3: Ratings of the usefulness of the ten heuristics given by four groups

Table 6.3 shows that none of the ten heuristics received a rating of 5 (i.e. “extremely useful”) from all four groups. However, heuristics number 1 and 7 were considered very useful, with an average rating of 4.50 or above on a 5-point scale. Not surprisingly, heuristics number 2, 3 and 4, which concern different crucial aspects of the appearance of the free online MT facility (its location and prominence on the page as well as its appropriate style of presentation) received fairly high usefulness ratings, between 4.00 and 4.25. On the other hand, it is interesting to focus on the heuristics that received an average rating lower than 4.00, which in other words were considered relatively less useful among the ten guidelines. This applied for example to heuristics 5 (“meaningful grouping of languages”) and 6 (“scalability”), which received average ratings of 2.75 and 3.25, respectively, with none of the four groups considering either of them “extremely useful”.

One possible reason for the lower ratings given to these two heuristics is that the notion of “meaningful grouping of the languages” (which received the lowest average rating of all ten heuristics, 2.75) is to a large extent an elusive and subjective one, compared for example to the fact that the online MT facility should be located in a visible position and should stand out in terms of presentation, so as to be easily recognisable. In addition, the scalability issue that is the focus of heuristic number 6 becomes relevant only for those websites whose home pages are subject to redesigns and need to expand the language coverage of their free online MT facility, adding

further translation options which need to be easily accommodated into the existing design. Since the project reported in this chapter involved only a one-off design without the need to worry about subsequent modifications, the groups may have felt that this heuristic was not particularly helpful for the task at hand.

Heuristic number 8 (provision of a disclaimer of the limitations of online MT, written in the users' languages) got an average rating of 3.00, making it the second lowest ranking heuristic in terms of usefulness for the teams of designers. Interestingly, this is consistent with the reactions of the 72 international users involved in the user testing and usability evaluation of the four prototypes of the redesigned home page of the London 2012 Olympic bid, who in the main did not regard the presence of a disclaimer as particularly important for the visitors of a monolingual website relying on free online MT, as discussed in sub-section 5.5.6. As a matter of fact, from the users' point of view, the presence of a disclaimer or warning of the limitations of MT was the least important factor among the list of seven that affected the use of an embedded free online MT facility to browse a monolingual site.

Heuristic number 9 ("redundant representation") received a rating of 3.50 in terms of usefulness from the groups of designers, and, as discussed in sub-section 6.3.3, only three teams provided alternative redundant representations of the language options available in their online MT facilities by means of "alt text". However, only two of them implemented this strategy successfully by using the visitors' native languages in the "alt text". As a result, in spite of representing a serious accessibility issue, the heuristic regarding the provision of redundant or alternative representations of the languages does not seem to have been given the right amount of attention from the majority of the teams of designers, who appear to have underestimated its implications and relevance for a potentially large population of Internet users.

Finally, heuristic number 10 focusing on the availability of an error recovery path received a usefulness rating of 3.75. The main point of this heuristic was to give visitors the possibility to view the content of the website in the original language (English, in the case of the School of Informatics project), if they so wished, and to switch between foreign languages, for instance following the initial wrong selection of the desired target language for the translation. As discussed in sub-section 6.3.3, a separate link to English among the various options of target languages was provided

by groups 1 and 5 in their home pages. On the other hand, though, none of the groups involved in the project had included an error recovery mechanism in their design. One likely cause for this choice is that the focus of this design project was exclusively on the home page of the School of Informatics website, and the students were explicitly instructed not to worry about the internal sections or deeper levels of the site for this group project.

Clearly, an error recovery mechanism would have been relevant to the website visitors only after they had made an initial selection of their preferred target language via the online MT facility, to take corrective action if required, for instance because of making a mistake in selecting their language. However, the implementation for the project did not require the students to take into account the navigation scheme and the interface design of the website beyond its home page. As a result, the teams' perception of the usefulness of the heuristic regarding the provision of an error recovery path might have been affected by the fact that this did not effectively represent an issue for the development work that they had been asked to carry out. In spite of this, the average rating of 3.75 given by the groups of students is still relatively high. One possible interpretation of this result is that error recovery mechanisms are a de facto standard component of good-quality and highly-usable web user interfaces, which might explain why the participants in the project, all of whom had a good grounding in HCI, recognised the usefulness and importance of this heuristic, although it had no direct applicability to the task that they had been given.

6.3.5 Heuristic-based Diagnostic Evaluation of the Home Pages

Once the design and development of the six home pages produced by the groups of students had been completed, they were uploaded to a password-protected area of a website, to which all the students involved in the project were given access. The next step consisted in getting each team of developers to interact with the home pages created by two other groups, evaluating their usability and user-friendliness on the basis of the ten MT-specific heuristics discussed in sub-section 6.2.2. Our aim was to further test and validate the heuristics as tools for diagnostic evaluation. In other words, students who had worked on the same development task were asked to use the heuristics to evaluate the design of the free online MT facilities implemented by their colleagues. The results of this evaluation were included in the written reports that

each group prepared at the very end of the project. Unfortunately, however, group 1 did not manage to complete this part of the report, which means that the designs of groups 2 and 3 were only evaluated by one other group, whereas all the remaining groups were evaluated by two teams (in these cases we have calculated the average evaluation score for each of the ten heuristics). As a result, whilst for the home pages of groups 1, 4, 5 and 6 we could collect two sets of evaluations, for those of groups 2 and 3 only one set of evaluation data was available.

In spite of these regrettable gaps in the evaluation data, analysing the results of this diagnostic assessment was essential to complete the testing and validation of the heuristics over the entire life cycle comprising the design, development, implementation and evaluation of the free online MT facilities for the home page of the School of Informatics website that had provided the case study for the project. The home pages with their web-based MT facilities were evaluated separately for each of the ten heuristics, using a 5-point scale with the following values: 1 = “disaster”, 2 = “problem”, 3 = “okay”, 4 = “good”, and 5 = “excellent”. In addition, in their reports the students provided detailed explanations for their heuristic-based ratings given to the free online MT facilities implemented by the other groups. Figure 6.10 presents a visual comparison of the evaluation scores given for each of the ten heuristics to the six home pages designed by the groups of students.

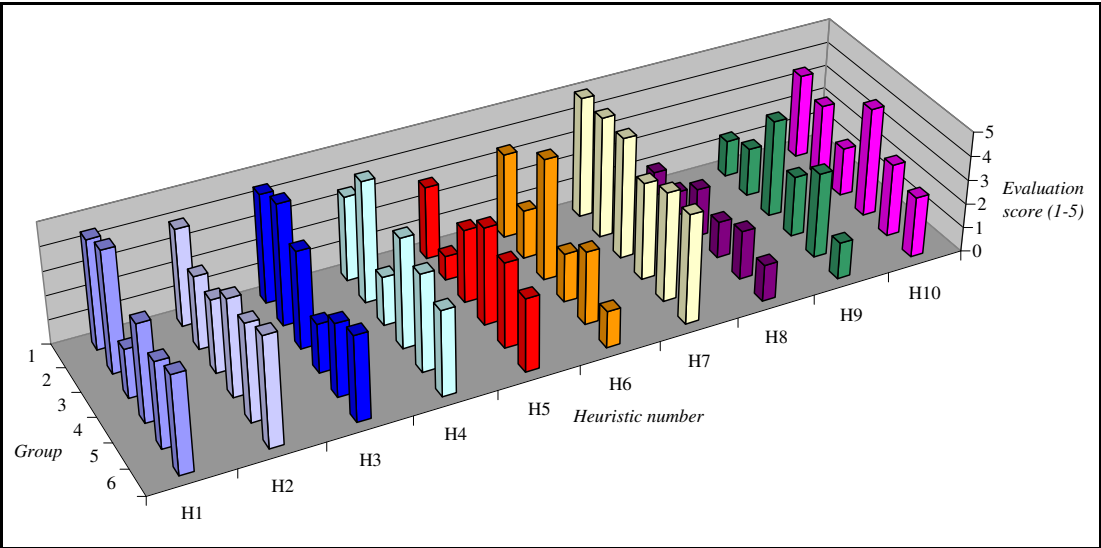


Figure 6.10: Evaluation scores of the six designs for each heuristic

During this stage of the project the ten heuristics were utilised for evaluation purposes, getting designers who had worked on the implementation of a user interface for the same feature to use them in order to carry out a diagnostic evaluation of alternative designs produced by other groups. It is recognised that one possible problem of this validation procedure of the heuristics is that the groups might be biased in favour of implementation approaches similar to their own (e.g. in terms of the location of the online MT facility on the home page, using flags as opposed to text-based indications of the languages available, etc.), and would tend to see these as more successful, being more generous in their evaluation as a result. For example, there are fairly striking differences between the two sets of evaluation data for the home pages produced by groups 4 and 6 (with differences of 1.0 and 1.4, respectively, between the overall scores for all ten heuristics given by the two sets of groups who evaluated these particular home pages).

We considered the option of conducting the heuristic-based evaluation of the alternative implementations with other individuals who had not been involved in this kind of design task before. However, we eventually decided against it because we thought that it would be more meaningful to carry out the evaluation with participants who were already highly sensitised to the issues under consideration, and aware of the complexities of this specific design task. To counterbalance any undesired bias effect during the evaluation, we allocated randomly the home pages to be evaluated to two other groups of students, although unfortunately in a couple of cases the evaluation data was provided only by one other team.

The diagnostic evaluation of the six home pages and their online MT facilities included some comments that the groups wrote in the reports to justify their evaluations of the alternative designs for each heuristic. These observations could be taken as a basis to modify the implementations and address some of their weaknesses, as identified by the evaluators, with a view to enhancing the level of usability of the online MT facilities concerned. This evaluation exercise whose results are presented in visual form in Figure 6.10 enables us to rank the six home pages in terms of the overall success of the implementation of their free online MT facilities, judged according to the average scores given by the fellow students for all the ten heuristics. Table 6.4 presents the list of the home pages, arranged in order of ranking on the basis of the overall results of the heuristic-based diagnostic evaluation.

<i>Home page designed by group</i>	<i>Rank</i>	<i>Overall result of the heuristic-based evaluation</i>
1	1	3.4
5		
4	3	3.3
2	4	3.2
3		
6	6	3.0

Table 6.4: Heuristic-based ranking of the MT facilities on the six home pages

Table 6.4 shows that all the six designs received an average evaluation of 3.0 or higher, which means that all of them were considered successful by the evaluators, assuming that the middle value on a 5-point scale is the dividing line between positive and negative results. In addition, even though they display several design differences in a number of respects, there is only a 0.4 difference (equivalent to 8%) between the overall evaluations of the highest and lowest ranking home pages. This is not surprising, and was indeed expected, because following the heuristics since the early stages of the design and implementation may result in alternative designs that achieve a roughly similar overall success during the subsequent evaluation.

Finally, the close results of the evaluation for the six home pages meant that two of them were ranked first with an equal overall rating of 3.4 (those produced by groups 1 and 5), and two others were ranked fourth, since they had both obtained a result of 3.2 (groups 2 and 3). It is worth pointing out that groups 1 and 5, which came out on top of the heuristic-based diagnostic evaluation, were the only ones who implemented a successful design for heuristic number 9 focusing on the redundant representation of the available language options, by providing “alt text” with content in the respective languages, as explained in sub-section 6.3.3 and Table 6.2.

6.4 Final Remarks

Thanks to its sharp focus on real-life applications, the work described in this chapter has enabled us to extend and maximise the benefits of the lessons learned from the redesign project, user testing and usability evaluation reported in chapter 5. Taking

into consideration good practice in the development of web design guidelines according to solid HCI principles and methods, we have put to the test and validated ten MT-specific web design heuristics over the entire life cycle involving the design, development, implementation and finally evaluation of the home page of a monolingual website, focusing in particular on the usability of the embedded online MT facility.

In so doing, we have been able to formulate what to our knowledge is the first ever set of user-centred and usability-oriented web design heuristics to help integrate a web-based MT facility into monolingual websites, that can also be used to evaluate the success achieved by monolingual websites that rely on such a strategy to disseminate their contents in multiple languages. These heuristics have been generated on the basis of extensive experimental work which involved 72 international and multilingual evaluators as well as more than 40 web designers with a good background in HCI, who worked in small teams during the course of two separate web development and implementation projects with a strong focus on the HCI dimension of web-based MT. In addition, the heuristics were subject to expert validation and practical testing at different stages. The final remarks made in this section comment on the importance of these heuristics, identifying some areas which they do not currently cover but that could enhance their effectiveness. The conclusion of the chapter also points out some challenges and opportunities for both the industry and research communities with regard to the possibility of developing and providing tools, resources and services to support the successful integration of online MT engines into monolingual websites.

6.4.1 Importance of the Heuristics

The results of the designer-oriented ratings of the usefulness of the ten heuristics discussed in sub-section 6.3.4 revealed that the groups of designers had found all of them useful during the execution of their design task. As a matter of fact, in spite of inevitable variation across the groups and of the differences in the relative usefulness of the individual heuristics, all of them had been considered at least moderately useful, with the lowest average score given to heuristic number 5 being 2.75 on a 5-point scale. Similarly to the conclusions made in sub-section 5.6.2, what is particularly interesting to note here is that with a couple of exceptions, the set of

heuristics can also be used to guide the design of professionally localised multilingual websites that rely on human translation.

One heuristic that is specific to websites powered by free online MT is number 8, i.e. providing a disclaimer or warning of the limitations of MT for the site visitors, which is clearly irrelevant for websites whose multilingual contents are professionally translated. Heuristic number 7 (about the seamless integration of online MT into the architecture of the monolingual website) does not apply to localised websites either, because there is no MT processing that needs to be hidden from the users. However, all the remaining eight heuristics focus on aspects of the interface design and implementation that are equally important for the user interface and interaction scheme of localised websites, insofar as most issues regarding the presentation of language-specific options to navigate a site (e.g. their location on the home page, scalability, redundant representation, etc.) are common to both MT-powered multilingual websites and properly translated ones.

The work described in this chapter was based on the application of the heuristics to develop, and later evaluate, alternative designs for the home page of a monolingual academic website in English, with a view to disseminating its information via Internet-based MT. In order to further refine the robustness and reliability of the heuristics, they should also be tested on websites of other kinds, and be modified or extended, if necessary. However, since we did not experience any shortcomings of the set of heuristics in the transition from the project focusing on the London 2012 website covered in chapter 5 to the design of the academic website discussed in this chapter, we would expect that to a very large extent the heuristics should be readily applicable to a wide range of Internet sites, both for providing useful guidance during the design process and as effective tools for diagnostic evaluation (sub-section 7.2.1 offers a more detailed discussion of the limitations of our research, with particular reference to the kinds of websites that we have considered for the projects and experiments presented in the thesis).

One key point on which the heuristics do not contain any information concerns which online MT service(s) to use for the translation facility embedded in the monolingual website. One reason for this seemingly major omission is that for the work reported in chapters 5 and 6 the teams of designers were informed by the researcher during the introductory sessions of the project about which web-based MT systems were available for free and could be used for the implementation. It is worth

noting that although the majority of the students were aware of the existence of online MT software, most of them had only used them sporadically. Since the MT-specific heuristics are primarily aimed at web designers who wish to develop low-maintenance multilingual websites with the help of MT (cf. the discussion in sub-section 5.3.3), one should not assume that they already know which services to use, or that they are familiar with MT. As a result, it would be helpful to add to the heuristics a list of the URLs of the leading or recommended online MT services.

One common feature in the implementations of the home pages presented in this chapter is that the groups chose to rely on one single online MT service to cover all the target languages supported by their translation facility: Google Language Tools was the engine chosen by all the teams except one, which selected Babel Fish. However, nothing prevents developers from choosing a variety of online MT services for different target languages, because the MT facility does not need to be powered by only one specific engine.³ Several MT systems (free or otherwise) are available on the World Wide Web, and whilst some of them produce nearly identical output for certain language pairs, because they share the same core technology, overall the quality of the results offered by these translation tools can be extremely variable. Since most web developers are not linguists and would find it difficult to judge the quality of MT output for multiple target languages (assuming that English is the source), it would be helpful to advise them on which online MT services are likely to give the best performance for the various language pairs that are supported or seem to cope better with texts belonging to specific domains.

Providing this extra information with the ten heuristics would raise the awareness of web designers with regard to some key issues, possibly helping them to select the best Internet-based MT system(s) to utilise for their own implementation, depending on the target languages in which they are interested and on the type of content that needs translating for their website. In addition, the extended heuristics could also point out the online MT services that offer the advantage of enabling the translation of webpages reached by clicking links found on already translated online documents. As a matter of fact, as discussed in some detail in section 4.6, the web-based MT systems that do not have this capability (like FreeTranslation) present a

³ Indeed, as mentioned in sub-section 5.4.2, during the project to redesign the home page of the London 2012 Olympic bid website, group B, whose MT facility supported twelve target languages, relied on Babel Fish for all the language pairs except English-Norwegian, which was available through the free web-based MT service FreeTranslation.

number of problems for users trying to navigate the content of a monolingual website and interact with it via an incorporated online MT facility (cf. Gaspari, 2004b: 77-81).

6.4.2 Extending the Heuristics to Include Guidelines on MT-friendly Authoring Style

The work undertaken for this thesis was deliberately restricted to exploring HCI problems and interface-related issues in connection with web-based MT, without considering in detail the linguistic performance of online MT services and the question of their output quality. However, even though we have confined ourselves to a language-neutral and output-independent approach for the methodology adopted in our investigations, issues related to MT output quality certainly come into play, as testified by the discussion in sub-section 6.4.1. In this respect, it should be noted that although the ten heuristics focus exclusively on design-related matters, they could be extended to also incorporate linguistically-oriented advice and guidelines, regarding for example how to draft the content of originally monolingual websites, so that they can be processed more successfully by MT (cf. the discussion in section 7.5). In concluding this chapter it should be emphasised that although the ten heuristics that have been tested and validated do not at present cover any linguistic recommendations, they can be extended to do so in the future.

O’Connell (2001), Gaspari (2004c) and Korpela (2006) are three examples, among many others, of sources that provide suggestions on how to write “MT-friendly” source texts and copy for websites, explaining a series of stylistic and linguistic guidelines that increase the likelihood of the input being successfully processed by online MT services. There is a rich literature on the advantages of using more or less prescriptive controlled languages and custom-built MT systems that are designed to process restricted input belonging to specific technical domains, which results in measurable improvements of the output quality. Recognising this fact, Gaspari (2004c) discusses the common ground between human-oriented and machine-oriented loosely defined controlled languages in the context of reader-friendly online content that needs to be translated into a variety of target languages by means of MT services. The paper argues that a usability-oriented writing style for online content not only enhances the readability of web-based texts for human

Internet users, but can also dramatically improve the performance of web-based MT systems.

The MT-specific web design heuristics presented in this chapter could be extended with linguistic advice, in order to alert web designers to the factors that could play a role in making the texts posted on their monolingual websites more MT-friendly, and possibly more reader-friendly as well. It seems reasonable to suggest that even basic guidelines would go a long way towards informing people who are not MT experts of the most dangerous pitfalls that should be avoided, as long as they are explained in a jargon-free style (e.g. keep sentences short, up to a maximum of X words; avoid using slang, abbreviations, ambiguous words with multiple meanings or technical terms; check the accuracy of the spelling and use punctuation marks where required, etc.).

These guidelines should help to maximise the positive impact of embedding an online MT facility into a monolingual website, and there is nothing preventing the set of MT-specific web design heuristics that we have covered in this chapter from being augmented with linguistic advice along these lines. However, one issue would be how to explain to people who are not trained linguists more complex linguistic phenomena that are difficult to process for MT software; for example, advice such as “avoid passive constructions”, “refrain from using metaphors” and “make all anaphoric references explicit” is likely to be unintelligible to most people without a background in linguistics or at least some experience in foreign language learning. As a result, although this is a distinct possibility, the key challenge in expanding the heuristics with linguistic advice aimed at making the input more MT-friendly would be how much detail to include, and how to make them clear and effective, without putting off people who are not familiar with linguistic concepts and technical jargon.

6.4.3 Challenges and Opportunities for Industry and Research

So far we have identified and discussed a number of areas that are not currently covered by the MT-specific web design heuristics that we have presented in this chapter, but that would seem worthy of further consideration. One particularly interesting and promising area to be investigated in connection with our work regards the development of templates and resources to support the successful integration of online MT engines into monolingual websites, and the creation of tools geared towards helping to draft MT-friendly web content (these prospects are discussed in

more detail in section 7.5). At the moment, there is a lack of such aids and devices, particularly because online MT providers do not seem to be interested in giving user-centred and usability-oriented support to web designers who may be willing to integrate an MT facility into their own website. MT vendors and manufacturers that maintain a web presence are very keen to get web developers to add links to the online translation engines, mainly to generate visitor traffic to their websites, so as to be able to showcase their products with a view to boosting the sales of their commercial software. However, they provide only a very limited amount of technical details and support to allow web designers to achieve user-friendly and highly-usable implementations of online MT facilities into monolingual websites. Figures 6.11-13 show some information taken from the websites of two major online MT providers explaining how to set up an embedded MT facility or link from other websites to the Internet-based MT systems.

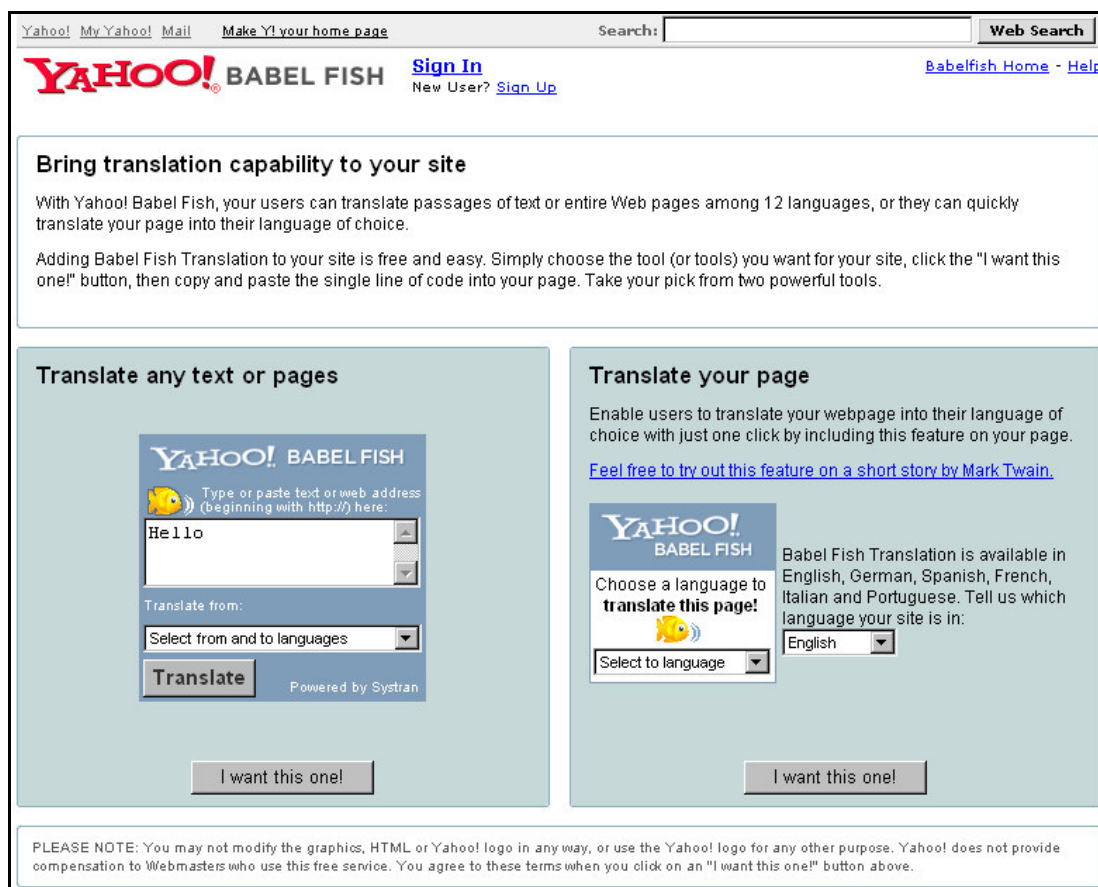


Figure 6.11: Yahoo! Babel Fish provides basic tools to help web designers add a standard MT facility with the company's brand and logo into their websites (http://babelfish.yahoo.com/free_trans_service)

Language: English | Español (América Latina)

Free2Professional Translation

SDL INTERNATIONAL
enabling global business

Home | About | More Services | Help & FAQ | Store | Blog | Your Account

Add the FreeTranslation.com service to your website

There are three ways to add the FreeTranslation.com service to your website:

- **Java Applet:** to add the free text and web page translator to your website
- **Text Link:** to add the free web page translator text link to your website
- **Image Link:** to add a link from your website to FreeTranslation

Figure 6.12: FreeTranslation gives three options to establish links with websites wanting to offer MT

(<http://www.freetranslation.com/tools/applets/Default.asp>)

Adding a web page translator text link to your website

To give visitors to your website the power to translate your web pages without leaving your site, follow the steps below to add a simple text link like in the box below:

[Translate this page into Spanish using FreeTranslation.com.](#)

- Copy the following HTML code to your clipboard by clicking this icon :


```

      <p><a href="http://fets3.freetranslation.com/?
      sequence=core&url=www.yourwebpage.com&language=English%
      2FSpanish" target="_top">Translate this page into
      Spanish</a> using <a
```
- Paste the HTML code into your web page.

Note: this code must be pasted into your web page's HTML using a text editor (or using your HTML editor in "code view"). If you're not sure how to do this, please refer to your software documentation.
- Make these changes to the HTML:
 - Change `www.yourwebpage.com` in the code above to the address of your web page.
 - The example above translates the web page from English into Spanish. If you want to use other combinations, you may change `English%2FSpanish` in the code above to one of the following:

<code>English%2FSpanish</code>	= English to Spanish
<code>English%2FFrench</code>	= English to French
<code>English%2FGerman</code>	= English to German
<code>English%2FItalian</code>	= English to Italian
<code>English%2FDutch</code>	= English to Dutch
<code>English%2FPortuguese</code>	= English to Portuguese
<code>English%2FNorwegian</code>	= English to Norwegian
<code>Spanish%2FEnglish</code>	= Spanish to English
<code>French%2FEnglish</code>	= French to English
<code>German%2FEnglish</code>	= German to English
<code>Italian%2FEnglish</code>	= Italian to English
<code>Dutch%2FEnglish</code>	= Dutch to English
<code>Portuguese%2FEnglish</code>	= Portuguese to English
 - If you want the translated web page to open in a new window, change `target="_top"` in the code above to `target="_blank"`.

Figure 6.13: FreeTranslation guides users through the steps required to create text-based links to its online MT service that are specific to the language combinations

(<http://www.freetranslation.com/tools/applets/Default.asp#hyperlink>)

These attempts on the part of the online MT providers to offer support to web designers represent only one-size-fits-all solutions that disregard any HCI consideration or usability issue connected with adopting MT as a tool for multilingual web content dissemination. Our research has identified a number of areas that are crucial to ensuring a smooth and positive experience for users who rely on web-based MT to browse the contents of a site in their preferred language. It would seem reasonable to suggest that the providers of online translation software should take a proactive approach to supporting successful user-centred integrations of online MT engines into monolingual websites, by adopting tools and resources that promote the usability of MT in the Internet environment. We believe that the web design heuristics presented in this chapter address the key issues that online MT facilities should take into account, and as a result we hope that our work helps to foster good practice in providing effective MT solutions embedded into monolingual websites.

In this respect, we argue that the results of academic research into user preference, visitor behaviour and browsing patterns when it comes to accessing websites via online MT can, and indeed should, be fed back into the development of tools and resources to facilitate the usable and successful integration of MT into monolingual sites, thus giving rise to a whole new range of commercial opportunities and support services to be offered in connection with Internet-based MT. The findings of our work presented in this thesis, and most notably the MT-specific web design heuristics that have been the focus of this chapter, provide a basis of research-derived results with a potential that could be exploited in commercial applications, some examples of which are discussed in more detail in sections 7.4 and 7.5. Not only would these applications represent new business and investment opportunities for industrial partners, but they would also ultimately contribute to raise the profile of online MT, making it more widely utilised and accepted among Internet users.

CHAPTER 7

CONCLUSIONS AND FUTURE WORK

7.1 General Conclusions

The thesis has covered the topic of online MT from different perspectives, giving attention to the role that it can play to help both with the dissemination and with the assimilation of multilingual information on the Internet. We have presented a series of surveys, web design and development projects, case studies and experiments shedding light on some of the key questions regarding the use of online MT in the Internet environment. This work has provided a large body of data enabling us to look systematically into the complex issues involved in the use of web-based MT, and to gain some insights into how to leverage the potential of online translation tools for the benefit of Internet users who need to overcome language barriers. This final chapter draws some conclusions from the research, highlighting the main contributions of the thesis, and points out a range of open questions and issues that have been identified for which further work is needed. We discuss some techniques to enhance the level of usability and user-friendliness of web-based MT systems by enriching them with some new functionalities. Finally, we put forward some suggestions for tools and resources representing potentially interesting commercial applications to be developed in connection with online MT services, so as to provide support to web designers wishing to create monolingual websites with MT-friendly content.

7.1.1 Main Contributions of the Thesis

To the best of our knowledge, this thesis constitutes the first in-depth study of web-based MT, and it has adopted a language-neutral and system-independent approach which lays strong emphasis on the needs and expectations in terms of usability of the people who interact with Internet-based translation tools for a variety of purposes. At the methodological level, we have taken a somewhat unusual stance for a piece of research in MT, insofar as we have deliberately neglected concerns regarding the linguistic quality of the output (except for a brief discussion in sub-section 3.4.9). On the contrary, we have chosen to concentrate on issues of usability and HCI that we

believe are much more likely to lead to noticeable improvements of benefit to the users of online MT, especially in the short term. We are convinced that these issues are central to the deployment of MT on the Internet platform, because they become foregrounded in the experience of web surfers and have a far-reaching impact on their perception of the usefulness and effectiveness of MT software. However, we do recognise that there is a need to pursue the linguistic enhancement of translation software on an ongoing basis, because this endeavour is complementary to the issues that we have addressed in this research, and not in opposition to it.

With a view to enhancing and promoting the use of MT on the Internet, this thesis has emphasised the need to adopt a user-centred design for the successful deployment of web-based MT services, and we have argued in particular that the level of usability and the quality of the interaction design are key factors in the evaluation of online MT facilities integrated within monolingual websites. In chapter 3 we have presented data regarding the previous use made by a population of 104 UK-based university students of a range of free web-based MT systems, pinpointing in particular unanticipated and questionable usage patterns already mentioned in the literature for Babel Fish, with a special emphasis on the use of free web-based MT services as online dictionaries. Our survey has shown that similar trends can be found for users of other free online MT services as well, and as a consequence in sub-sections 3.6.1 and 3.6.2 we have identified some areas where further research is needed, while also making recommendations concerning the implications of these unanticipated usage patterns for the design of the user interface of web-based MT services.

The case study covered in chapter 4 provided some surprising and interesting results. This part of our research focused on five monolingual websites in Italian which were translated into English with the help of online MT by a group made up of individuals who did not know any Italian and others who had some familiarity with this language at different levels. We had a double aim in this investigation: firstly, to find out whether online MT software is actually helpful to extract basic information from a website that is only available in a foreign language; and, secondly, to study the perception that the users have of the reliability of online translation tools, measured as a function of their confidence in the accuracy of the information that they find on a website after translating its content by means of web-based MT.

This case study has revealed some unexpected findings when we compared the results of the two experimental sub-groups with those of the control group, i.e. people who did not know any Italian and browsed the original websites in this language trying to perform the same information seeking tasks as the members of the experimental population, but without using online MT. We found that overall using MT did not increase the accuracy of the answers provided for the tasks, but that actually in some cases the use of online MT had an adverse effect on their correctness. On the other hand, however, on average the participants who used translation tools to perform the tasks consistently gave higher ratings to their level of confidence in the accuracy of the information that they had found compared to the control group, although actually they had not performed equally well. This case study focusing on the language pair Italian-English has shown that linguistically-challenged Internet users seem to have a positive perception of the reliability of free online MT tools, even though they may not realise that using them may sometime undermine the success of information seeking tasks. The interest and novelty of this experiment lie in the fact that it represents the first attempt to look into the subjective perception that Internet users have of the reliability of web-based MT software, in conjunction with its objective helpfulness in the completion of information assimilation tasks.

Chapter 5 reports a redesign project during which free Internet-based MT was embedded into the architecture of an existing monolingual website in English for the purpose of disseminating its content in at least ten other languages. Four teams of web developers worked on this assignment, and produced four alternative redesigns for the home page of the website in question which included an online MT facility. These prototypes were later subjected to extensive user testing and usability evaluation performed by a group of 72 users who were native speakers of seven different languages (Chinese, French, German, Greek, Italian, Russian and Spanish) and had a variety of nationalities and cultural backgrounds. This experiment enabled us to elicit from the participants their preferences in terms of design for the interface of the online MT facilities presented as part of the monolingual websites. One of the interesting results of this work is that in the main using national flags as metaphors for the availability of languages officially spoken in different countries is not regarded as discriminatory or upsetting by users from the countries that are effectively not represented by the flags. It should also be noted that, to a very large

extent, the findings of our research regarding how MT-powered websites can successfully present the language-specific versions of their contents in a culturally appropriate and politically sensitive fashion would seem to be applicable also to professionally localised websites that have been translated by humans.

Finally, chapter 6 expanded on our previous work to formulate a set of ten MT-specific web design heuristics. These can be used to guide the overall life cycle comprising the design, development and implementation of the interface of an online MT facility embedded in the architecture of a monolingual website for the purpose of disseminating its contents automatically in multiple languages, and also to conduct diagnostic evaluations of the level of success and effectiveness with which monolingual websites offer online MT to their visitors. We have developed these heuristics according to sound principles and methods in HCI, and we have validated them by checking their usefulness for web designers, and also as tools for diagnostic evaluations. We believe that these heuristics can be extremely useful to the web design community as a basis to promote good practice in the adoption of MT-based multilingual content dissemination strategies. In addition, we have pointed out some areas that are not currently covered by the heuristics, but that would in all likelihood improve their overall effectiveness and should be given some consideration in the future.

7.2 Open Research Questions and Issues

This research has covered a lot of ground, addressing a range of key questions linked to the use and potential of online MT which have been neglected so far by the research community. Not surprisingly, however, most of the answers provided by our work are not definitive, and their tentative nature is due in particular to the sample populations involved in our surveys and to the constraints under which the experiments that we have carried out were designed. This section explains in more detail the limitations of our research, suggesting how the body of data presented here and the validity of the conclusions that we have reached can be further consolidated and extended in future research endeavours.

7.2.1 Limitations of the Research

One crucial limitation of our data lies in the fact that it has all been provided by university students (e.g. for the survey on the use of free online MT presented in chapter 3), who in general are competent and relatively experienced Internet users, but do not necessarily reflect with precise accuracy the needs and expectations of other categories of web surfers, for example in terms of age and experience in the online environment. In addition, our questionnaire-based surveys and experiments have been limited to certain types of websites: five different sites in Italian for the case study in chapter 4 (sports centre, school, political party, collectors' items, radio station); the home page of the London 2012 Olympic bid website for the redesign project presented in chapter 5; and, finally, the home page of the School of Informatics website for the other group project covered in chapter 6. Despite the fact that the work based on these websites has yielded interesting results, we have covered only very few categories, and although it seems reasonable to think that most of our findings would also apply to other kinds of websites, the limited coverage of our experimental data does not allow us to generalise our conclusions (cf. the discussions in section 6.3 and sub-section 6.4.1).

Similarly, we have concentrated only on a few language pairs during the experiments. In particular, for the case study in chapter 4 we focused on the combination Italian-English, and for the other projects with an emphasis on information dissemination, presented in chapters 5 and 6, English was the source language to which we restricted ourselves – for example, the user testing and usability evaluation reported in section 5.5 involved 72 people translating from English into their seven native languages. It should be noted here that MT systems (and online MT services in particular) have historically supported only a small quantity of languages, mostly those of commercial interest to the manufacturers and vendors. As a result, the limited spectrum of language pairs that we have been able to cover and represent in our research is to some extent a consequence of the relatively small number of languages that are actually available from online MT software.

Given these limitations of our research, the data and results that we have presented here should be tested and verified in other scenarios as well: for example, when Internet-based MT is applied to different kinds of websites (most notably, for instance, e-commerce websites that enable visitors to make purchases or conduct online transactions, which we have not considered here), with other language pairs

and involving different categories of users, including less experienced ones who may not be familiar with a range of services and resources available on the Internet. Finally, another very interesting mode of use that we have not touched upon in the thesis can be envisaged in the scenario in which online MT is deployed by users for dissemination and assimilation purposes in more interactive situations, e.g. when they rely on translation tools to provide details requested by electronic forms, maintain multilingual blogs or discussion forums, post information on personal websites with pages in several languages, exchange emails or messages via the Internet with correspondents without sharing a common language, etc.

7.3 Areas for Future Work

The observations in sub-section 7.2.1 identify some areas in which future work would be essential to test the repeatability of our results in a variety of domains, with different target populations and for other language combinations, in order to verify whether our findings would apply in more general contexts. The rest of this section describes in more detail some other areas that stand out as worthy of further enquiry on the basis of outstanding questions that have been raised by the surveys and experiments that we have conducted for this thesis.

7.3.1 Need for Further Empirical and Experimental Research

With the exception of the comments on the ratings of the performance of free online MT services presented in sub-section 3.4.9, this thesis has adopted a language-neutral and system-independent approach (cf. sections 1.3 and 1.4 and sub-section 7.1.1), and we have decided not to focus on the evaluation of the output provided by online MT services. In the literature review presented in chapter 2 we have covered some contributions that refer, albeit indirectly, to the quality of the output produced by web-based MT systems. Whilst some of these evaluation studies seem to be based on flawed premises and questionable methodologies (e.g. Watters & Patel, 1999), others like Balleste (2001) and Yates (2006) are of some interest. However, most of the contributions focus on comparative evaluations between different online MT services, as discussed in section 2.8 (e.g. Blekhman et al., 2001; Guyon, 2003; Craciunescu et al., 2004; Wießner, 2004; Uneson, 2005; Izwaini, 2006), or utilise the

output provided by Internet-based MT software as a benchmark to evaluate the performance of MT systems under development, which is the case for the publications reviewed in section 2.9 (e.g. Menezes & Richardson, 2001; Richardson et al., 2001; Carbonell et al., 2006).

It is remarkable that all these studies tend to focus on one language combination (or, occasionally, a few of them), take into consideration only very limited well-defined domains, and most of the time use extremely small and arbitrarily chosen sets of data for the output evaluation. In addition, although some of these evaluations adopt more formal and reliable methodologies than others, most of them rely on impressionistic and subjective judgements which have no scientific validity (one clear example of this is Zervaki, 2002), and are not conducted using evaluation criteria or approaches that are the norm in MT evaluation studies today (e.g. with automatic metrics like BLEU). Among the works covered in the literature review in chapter 2, only Lavoie et al. (2002) and White (2005) report evaluation experiments with the output of online MT services involving automatic metrics, focusing on translation from Korean into English and from English into French, respectively. It is quite striking that to the best of our knowledge so far no large-scale reliable and robust evaluation of the output produced by online MT services has been carried out according to standard methodologies. The lack of thorough and rigorous evaluations of the output offered by web-based systems can only be explained with the little interest that the research community has shown towards online MT so far. As a result, this stands out as an area in which empirical studies would seem to be long overdue to fill an obvious gap.

Other promising themes for further experimental research have been identified in the thesis, and in what follows we provide a brief overview with some comments. In sub-section 3.6.1 we argue that there is a need to gain a better understanding of the reasons why people tend to use web-based MT services to look up the meaning and the translation of individual words taken out of context, and to investigate in more detail the conditions under which this happens. We have also suggested a set of experiments that could be conducted to analyse the consequences of this behaviour, by comparing the performance in foreign language reading comprehension and translation tasks of language learners and translation students at different levels: one could compare the performance of the experimental group who would be allowed to take advantage only of online MT services to translate single words, with that of the

control group who would instead be given access to more traditional (printed or online) sources of linguistic information, like bilingual dictionaries and glossaries, to complete the same assignment.

The case study presented in chapter 4 has yielded interesting and partially unexpected results. An obvious way to extend this line of research would be to conduct experiments focusing on information seeking and information assimilation tasks supported by online MT, looking at different language combinations for a larger variety of websites, and involving a wider range of web-based MT systems (including the ones that are available at a charge). There are endless possibilities regarding the nature of the information that users can be asked to look for, and we recognise that the kind of details on which the tasks of our experiments focused were relatively simple, as testified by the good level of performance achieved by the members of the control group, in spite of not knowing Italian and not using online MT (cf. sub-section 4.8.1). In sub-section 4.8.2 we point out that our research has not analysed the role played by the users' level of knowledge of the source and/or target language(s) of the translation in the accuracy and success of the multilingual information seeking tasks supported by online MT, and indeed in the confidence expressed in their answers. Further investigations in this area would be of great interest, and might have an impact on language teaching and learning (for studies along similar lines, see for example McCarthy, 2004; Somers et al., 2006; Niño Alonso, 2006).

As far as the work presented in chapters 5 and 6 is concerned, we suspect that to a very large extent our findings regarding the most effective and appealing ways to present multilingual information and language-specific options to browse web content should be applicable both to websites powered by online MT and to professionally localised ones alike. In spite of certain clear differences (for example disclaimers warning users about the weaknesses of MT would be irrelevant in websites translated by human professionals), we would argue that a large number of issues in usability-oriented and user-centred web design are common to all websites presenting multilingual content, regardless of how this is generated, i.e. whether as a result of manual or machine translation. The reason for this is that all these websites need to cater for the needs of an international and multicultural audience, and endeavour to meet their expectations and preferences (cf. the discussion on HCI, web usability and intercultural web design in sub-section 5.3.1). Given its strong focus on

the role played by online MT in enabling multilingual communication on the Internet, our research has not addressed directly the HCI and usability issues in connection with professional localisation, although some parallels have been drawn in the thesis (see sub-sections 5.6.2 and 6.4.1). The exploration of the common ground between MT-powered and localised multilingual websites in terms of HCI and usability seems to warrant further consideration, to look in more detail at the areas of overlap that may exist.

With the redesign project followed by the user testing and usability evaluation presented in chapter 5 we have been able to collect interesting data and reach some conclusions, but we feel that there is a need to test our results on different websites (e.g. e-commerce sites, corporate and institutional websites, etc.), apart from considering different language combinations. In particular, the four prototypes that were produced by the groups of students for this redesign task have not given us the chance to test the effectiveness of certain approaches to the presentation and implementation of the interface for the online MT facility embedded in the monolingual website. One example of this is the interaction metaphor based on the geographic location of the user to indicate the available languages, whereby international visitors would have to click on a map to select their preference in terms of language-specific content or to signal that they are interested in information regarding one country or area of the globe. Testing the effectiveness and appeal of this additional implementation strategy may shed further light on the variation of expectations as well as on the common preferences of users with different linguistic, cultural and national backgrounds.

Finally, as we have emphasised in sub-section 6.4.2, the ten MT-specific web design heuristics that we have developed should be further tested and refined or extended, as appropriate, particularly in response to the specific requirements of certain types of websites or online applications which incorporate an online MT facility for the benefit of multilingual users. In addition, while our work described in chapter 6 shows that the heuristics provide a good basis to help in the design and evaluation of websites powered by Internet-based MT, there is certainly room to augment the heuristics with linguistic advice and add further guidelines on how to draft MT-friendly text (with regard to this point, see the discussion in section 7.5), so that the impact of the core web design heuristics can be maximised.

7.4 Improvements and Additions to the Functionalities of Online MT Services

As a reaction to the questionable use of online MT services as dictionaries or look-up facilities for individual words which emerged from our survey presented in chapter 3, in sub-section 3.6.2 we discuss the implications of these frequent usage patterns for the design of web-based MT services, suggesting some improvements that we believe online MT providers should take into consideration. Although we cannot dwell at length on the technical details involved for reasons of space, in this section we address similar issues concerning the graphic user interface of the online MT services, and put forward some suggestions for improvements that may be put into place relatively easily. We focus in particular on the techniques of automatic source language identification, user profiling and user modelling as examples of extra functionalities that could be added to benefit the interaction with online MT software.

7.4.1 Automatic Source Language Identification

Automatic source language identification is a neat feature that online MT services could adopt in order to increase the level of their user friendliness and to enhance their usability for users who need the translation of a passage of plain text or of a whole webpage for which they know the URL. In this scenario the services could in fact help the user by automatically identifying the language in which the input is written, and accordingly restrict the choice to the relevant language pairs, by showing only the combinations that are available with the source language concerned. A survey of the interfaces and interaction schemes of all the current leading free online MT services (for example those mentioned in sub-section 3.4.1 and section 4.6) reveals that when users intend to submit a translation request, they are always shown all the possible options with all the language combinations that are supported by the system. It is then up to the users themselves to select the correct source and target language. This process is time-consuming and not particularly user-friendly, since it forces users to view all the possible options and sift through them to identify which ones (if any) actually apply to the translation task that they need.

If, on the other hand, the language of the input could be automatically detected and identified by the MT service, the steps to start the rest of the translation

procedure would become much simpler and quicker, since the service could dynamically adapt the online translation submission form accordingly. In this scenario, the users would only be expected to provide the free online MT engine with the input text or the URL of the webpage for which they want the translation, and the target language that suits them would be chosen from among those actually available, which would save some effort to the users, guiding their steps towards relevant directions.

7.4.2 User Profiling and User Modelling

Two other interaction-oriented techniques that could be usefully explored to enhance online MT services from the point of view of HCI and usability are those of user profiling and user modelling. We argue that alongside the automatic identification of the source language described in sub-section 7.4.1, simple techniques of this kind can be easily and successfully applied to the design of web-based MT services in order to improve their usability. Simply put, user profiling and modelling aim at presenting information (and services) on the Internet in a way that suits the needs and expectations of a user at a specific point in time, on the basis of the tasks that they intend to perform. In e-commerce websites this approach typically involves prioritising information, options and visual elements (e.g. icons, buttons, links, banners) in which a particular user is most likely to be interested, so the browsing experience is tailored to the needs of the individual, and content that is not relevant or important is kept in the background or is given less prominence.

At present, what happens to people who access the leading online MT services is that all of them are presented with the same standardised default webpage and graphic user interface over and over again. User profiling and user modelling rely on information about the online behaviour and preferences of users that is gathered by means of cookies or agents that follow and track the choices made by users while interacting with a website or online service. In the specific case of online MT services, for example, these techniques could help to identify returning users in terms of language preferences, prioritising the options that they are likely to choose. It seems in fact reasonable to assume that the majority of stable or returning users of web-based MT software will most of the time choose similar combinations of source and target languages when submitting a translation request.

Sub-section 3.4.6 of our survey on the use of free online MT showed that 96.1% of the respondents had used translation tools for assimilation purposes, while 38.5% of the people we interviewed had used them for a combination of multilingual assimilation and dissemination tasks. Assuming that our sample population provides a good indication of the assimilation vs. dissemination ratio of the translation requests submitted to online MT services, this usage pattern suggests that most of the time users need translations into their native language, because translations for assimilation purposes are likely to be done into a (very) familiar language. This in turn means that it is relatively easy to predict into which language(s) returning or stable users of online MT will be translating most often, and the options corresponding to these target languages can be prioritised or promoted by the interface of the system.

One simple way of identifying and profiling returning users could be through registration, whereby stable users of online MT services could be asked to create their own user account specifying the language that they are most likely to translate into when they use MT for assimilation purposes, if they wish to do so. By relying on this user-specific information, every time registered users log on to the service they would be offered only the options that are relevant and useful to them, e.g. in terms of available language pairs, providing of course the possibility to reconfigure user preferences, for example in the case of one-off translations into other languages.

There is no space here to discuss in more depth the possibilities and technical details of how user profiling and modelling could be added to free web-based MT services. Rather, the intention is to briefly illustrate some simple features that would in all likelihood enhance the degree of their usability, in favour of a user-centred interaction design. What should be emphasised in this respect is that at the moment none of the leading online MT services provide any sort of customisation of their graphic user interface to accommodate for the individual preferences and requirements of users. However, we argue that this kind of improvement is relatively easy to implement and would greatly benefit the users. In a bid to pursue the enhancement of Internet-based MT software and its success, we advocate the need to apply some of the key principles in terms of web usability and user-friendly web design that are widely followed in e-commerce and online shopping websites (like user profiling and modelling) to the presentation and interaction design of online MT services.

7.5 Tools and Templates to Design and Develop MT-friendly Monolingual Websites

A related area for future action which may represent a potential spin-off from this research in the longer term includes the development of web authoring tools, design templates and platforms to create monolingual online documents, webpages and sites that are amenable to Internet-based MT services. This last point seems likely to attract considerable interest, and to the best of our knowledge so far no action along these lines has been taken. We have argued that the MT-specific web design heuristics presented in sub-section 6.2.2, which can be extended and augmented with linguistic advice, have a huge potential interest, particularly because they can help to promote good practice, whilst very often today the implementation strategies pursued by monolingual websites trying to offer online MT to their multilingual visitors leave a lot to be desired (cf. section 5.3). The brief discussion that follows raises some points concerning the extent to which the webpages of monolingual websites are (or can be made) suitable for processing by online MT, so that their information can be automatically translated with success into multiple languages. The suggestions put forward here are based on our contention that new support services and tools will be needed to extend the current applications of online MT.

One example in this area regards the development of tools and resources to prepare online MT-friendly webpages and websites, for instance by creating pre-defined templates that web designers could adopt to present the language-specific options available for visitors to browse the machine-translated contents of the websites. These templates could have authoring guidelines and MT-friendliness checking functions at the linguistic level, similar to those that are commonly found nowadays in spellcheckers, thesauri and grammar checking facilities of word-processors. As a result, the creation of such tools would not require substantial investments from scratch, but would seem to have huge business potential in connection with the development and deployment of online MT services.

At a very simple level, this linguistic checklist would show to the web designer that their website contains texts with long sentences, thus recommending that their length be reduced, which is likely to lead to improved MT processing. At a more advanced level, these functions would help for instance to detect words that web designers would like to use in hyperlinks, in case they have different meanings

in the source language, and as a result they may have different translations into another language, with the risk of being confusing for the visitors of the website if they are mistranslated. By relying on the help of this MT-aware authoring tool for monolingual Internet content, web designers would be advised to avoid the use of potentially ambiguous words or complex sentence structures, and prompted to replace the words and sentences concerned with other unambiguous alternatives, or even language-neutral icons, if appropriate. In doing so, the reference to the same concept, function or operation would be expressed by means of a visual non-verbal (and therefore language-neutral) message, which would be kept in the machine-translated versions of the document as well, bypassing altogether the potential risk of mistranslations entailed by the reliance on web-based MT.

We believe that these examples provide a reasonable picture of tools that may be necessary in the future in connection with online MT services offered on the Internet. This final part of the discussion has aimed at providing some speculations on possible future developments, and it is hoped that continuous research is carried out to monitor the trends and opportunities that arise in the field of online MT.

7.6 Concluding Remarks

Online MT services have been available on the Internet for about a decade now, but even though MT software is easily accessible online, in general web-based MT systems are not as easy to use and interact with as they could be. This thesis has addressed the need to enhance the performance of these services, with a view to improving the perception that the population of Internet users has of MT. HCI and usability issues are currently receiving growing attention in the Internet community, mainly in connection with the development of e-commerce websites and web-based applications that specialise in online business transactions. A similar direction seems the best way to go to raise the profile of online MT in the near future, so that it may gain more credibility.

Serious work is needed in this area, so that lessons learned in other online domains can be applied to web-based MT. Looking at the leading online MT services, it seems that some basic improvements to enhance their usability and user-friendliness could be effectively implemented with limited effort in the short term, so

as to become standard requirements for high-quality Internet-based MT providers. We have also identified some developments that are either desirable or foreseeable for the future. In particular, we have mentioned the potential usefulness and commercial interest of a range of tools and resources to promote the authoring of MT-friendly web content that can lead to the design and development of monolingual websites whose information can be successfully disseminated in multiple languages by means of online translation tools. In concluding this research, we hope that some of the findings and suggestions in the thesis will pave the way for exciting new developments in the field of online MT, giving a contribution to the role that translation technology can play in supporting and facilitating multilingual communication on the Internet.

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APPENDIX A

Questionnaire for the Selection of the Five Italian Websites

This questionnaire was administered via email to 17 volunteers who helped the researcher during the pilot study to select five monolingual websites in Italian that were eventually used in the case study covered in chapter 4 (see in particular section 4.3) from an initial list of 15 candidates.

I have identified 15 websites that are only available in Italian and do not have a section or translation in another language. I need to check that the websites I have chosen meet the following requirements, and I need your help to make sure that this is actually the case:

- the websites should NOT be overly popular or famous (or linked with well-known brands, companies, institutions, etc.), therefore immediately identifiable;
- Internet users should NOT be able to guess what the websites are about by looking only at their URLs (i.e. Internet addresses of the respective home pages).

Below you find a list of URLs for the home pages of 15 Italian websites, and for each of them I would like you to do the following three tasks, indicating your answers based on them (please note that task A should be carried out by looking only at the URL or Internet address and WITHOUT logging on to the actual website, whilst for B and C you are supposed to log on to the website via the Internet address provided and explore it as much as you wish):

- A) without logging on to the website, but by looking only at its Internet address, say whether you can tell what the website is about; if you think you can tell what the website is about by looking only at its Internet address, then please state your guess;
- B) log on to the website via the Internet address of the home page provided, and feel free to explore the home page and any other parts and sections of the website as much as you like. Say whether you've ever visited or used this website before or you're familiar with it;
- C) feel free to explore the website as much as you want; even though I do appreciate that this may be difficult and frustrating to do if you do not know any Italian, this is the key point for me, so please bear with me. What I would like you to do after you've looked at the website for a bit is provide a short definition IN ENGLISH (using up to three keywords) that in your opinion describes the type and content of that particular Italian website.

While you do this, please do not use any help like dictionaries, online machine translation systems, etc.

www.gdmland.it	www.laviadellestreghe.com	www.osapp.it
www.bccfc.it	www.aima.it	www.pumilano.it
www.siesi.it	www.marconionline.it	www.siriogatto.it
www.aredragon.com	www.querinistampalia.it	www.rmfi.it
www.castelthun.com	www.zenson.it	www.lestrie.it

APPENDIX B

Questionnaire for the Control Group

This six-page questionnaire was administered on paper to the members of the control group (CG) for the case study on the use of free online MT for information assimilation purposes focusing on the language pair Italian-English, covered in chapter 4.

Subj. ID	Quest. no.	Course	Control group
CS-	CQ-	AA	A

QUESTIONNAIRE ON FREE ONLINE MACHINE TRANSLATION SERVICES
PART A (GENERAL INFORMATION)

Information about you, your course at the University and the languages you know	
A1	Year you were born: _ _ _ _ (write year in 4-digit format, e.g. "1984")
A2	Your gender: <input type="radio"/> male <input type="radio"/> female
A3	You are: <input type="radio"/> undergraduate <input type="radio"/> postgraduate student at the University
A4	What is the name of the programme or course that you are currently studying, and in what year are you? (e.g. "BA Modern Languages, 1st year") _____
A5	What is your mother tongue? (e.g. "English") _____
A6	How would you rate your knowledge of Italian? (tick one of the following options) <input type="radio"/> none <input type="radio"/> beginner <input type="radio"/> lower-intermed. <input type="radio"/> intermed. <input type="radio"/> upper-intermed. <input type="radio"/> advanced <input type="radio"/> excellent
A7	Tick all the following options that apply to your study and knowledge of Italian: <input type="checkbox"/> it is one of the core subjects of my course/programme at the University <input type="checkbox"/> I am studying it at the University as an optional course <input type="checkbox"/> I have studied it at school – indicate for how many years in total: _____ <input type="checkbox"/> I have studied it through private courses – indicate level and duration: _____
A8	How would you rate your knowledge of Spanish? (tick one of the following options) <input type="radio"/> none <input type="radio"/> beginner <input type="radio"/> lower-intermed. <input type="radio"/> intermed. <input type="radio"/> upper-intermed. <input type="radio"/> advanced <input type="radio"/> excellent
A9	How would you rate your knowledge of French? (tick one of the following options) <input type="radio"/> none <input type="radio"/> beginner <input type="radio"/> lower-intermed. <input type="radio"/> intermed. <input type="radio"/> upper-intermed. <input type="radio"/> advanced <input type="radio"/> excellent
A10	How would you rate your knowledge of Portuguese? (tick one of the following options) <input type="radio"/> none <input type="radio"/> beginner <input type="radio"/> lower-intermed. <input type="radio"/> intermed. <input type="radio"/> upper-intermed. <input type="radio"/> advanced <input type="radio"/> excellent
A11	Other than English, Italian, Spanish, French and Portuguese, give the names of up to 3 other languages you know, and indicate your level for each of them: _____ <input type="radio"/> poor <input type="radio"/> basic <input type="radio"/> reasonable <input type="radio"/> good <input type="radio"/> very good _____ <input type="radio"/> poor <input type="radio"/> basic <input type="radio"/> reasonable <input type="radio"/> good <input type="radio"/> very good _____ <input type="radio"/> poor <input type="radio"/> basic <input type="radio"/> reasonable <input type="radio"/> good <input type="radio"/> very good
A12	Today's date: _ _ / _ _ / 2005 (write date in DD/MM format, e.g. "04 / 05" for 4 May)

<i>Information about your previous experience of using the Internet</i>	
A13	In a typical week, how many days do you use the Internet? <i>(tick one of the following options)</i> <input type="radio"/> less than 1 day <input type="radio"/> 1-2 days <input type="radio"/> 3-4 days <input type="radio"/> 5-6 days <input type="radio"/> every day
A14	On a typical day, how many hours do you spend using the Internet? <i>(tick one of the following options)</i> <input type="radio"/> less than 1 hour <input type="radio"/> 1-2 hours <input type="radio"/> 2-3 hours <input type="radio"/> 3-4 hours <input type="radio"/> more than 4 hours
A15	Where do you usually use the Internet? <i>(tick all the options that apply)</i> <input type="checkbox"/> computer lab on the University campus <input type="checkbox"/> University accommodation <input type="checkbox"/> private home <input type="checkbox"/> work / office <input type="checkbox"/> public library <input type="checkbox"/> Internet café <input type="checkbox"/> other – please specify: _____
A16	For what purposes do you usually use the Internet? <i>(tick one of the following options)</i> <input type="radio"/> university-related research or work only <input type="radio"/> entertainment only <input type="radio"/> a combination of both
A17	Do you regularly use a web-based service for emailing (e.g. Hotmail, Yahoo mail, Google Gmail)? <input type="radio"/> yes <input type="radio"/> no
A18	Which search engine(s) do you use most often on the Internet (e.g. Google, Altavista, Yahoo)? <i>(write their names if you remember them, otherwise tick “don’t know”)</i> _____ <input type="radio"/> don’t know
A19	Do these search engines offer free online machine translation as part of their services? <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> don’t know
A20	In the last three months, which of the following 18 activities have you done at least once on the Internet? <i>(tick all the options that apply)</i> 1 <input type="checkbox"/> access course materials via virtual learning platform (e.g. WebCT, Blackboard) 2 <input type="checkbox"/> use email 3 <input type="checkbox"/> check bank account or use financial services 4 <input type="checkbox"/> use a chatroom 5 <input type="checkbox"/> consult online maps or journey planners 6 <input type="checkbox"/> listen to the radio 7 <input type="checkbox"/> sell or bid on an auction site (e.g. eBay) 8 <input type="checkbox"/> read online newspapers 9 <input type="checkbox"/> compare prices of products or services 10 <input type="checkbox"/> use instant messaging (e.g. MSN) 11 <input type="checkbox"/> check online library catalogues 12 <input type="checkbox"/> buy or rent goods (e.g. books, CDs, DVDs) 13 <input type="checkbox"/> use online dictionaries 14 <input type="checkbox"/> download software (e.g. trial demos, plug-ins) 15 <input type="checkbox"/> use a search engine 16 <input type="checkbox"/> download audio or video files (e.g. MP3, MPEG) 17 <input type="checkbox"/> play online games 18 <input type="checkbox"/> buy tickets (e.g. coach/bus, train, plane, cinema/theatre)
A21	In the past, have you ever wanted to access a website or webpage whose contents were only written in a language that you were not familiar with? <i>(tick one of the following options)</i> <input type="radio"/> never <input type="radio"/> occasionally <input type="radio"/> sometimes <input type="radio"/> frequently <input type="radio"/> very frequently <input type="radio"/> don’t know
A22	Have you ever used free online machine translation services on the Internet? <input type="radio"/> yes <input type="radio"/> no <i>If you have answered “yes”, go on to the next question A23 on the next page</i> <i>If you have answered “no”, go directly to question B1 at the top of page 4</i>

Information about your experience of using free online machine translation services	
<i>Questions A23-A28 on this page should be answered only if you have answered "yes" to the previous question A22. Otherwise go directly to question B1 at the top of the next page</i>	
A23	<p>What free online machine translation service(s) have you used in the past? (<i>give their names if you remember them, otherwise tick "don't know"</i>)</p> <p>_____ O don't know</p>
A24	<p>With which language(s) have you used free online machine translation? (<i>tick all the options that apply and specify languages as required</i>)</p> <p><input type="checkbox"/> from English into other language(s) – <i>please specify:</i> _____</p> <p><input type="checkbox"/> into English from other language(s) – <i>please specify:</i> _____</p> <p><input type="checkbox"/> other language combinations not including English – <i>please specify source and target languages:</i> _____</p>
A25	<p>For what purpose have you used free online machine translation? (<i>tick all the options that apply</i>)</p> <p><input type="checkbox"/> I wanted to understand something written by others</p> <p><input type="checkbox"/> I wanted others to understand something written by me</p> <p><input type="checkbox"/> other – <i>please specify:</i> _____</p>
A26	<p>In what way(s) have you used free online machine translation? (<i>tick all the options that apply</i>)</p> <p><input type="checkbox"/> manually typed in text to have it translated into another language</p> <p><input type="checkbox"/> copied and pasted text to have it translated into another language</p> <p><input type="checkbox"/> entered a URL (Internet address) to have a whole webpage translated into another language</p> <p><input type="checkbox"/> clicked on links provided by search engines to translate relevant hits into another language</p> <p><input type="checkbox"/> other – <i>please specify:</i> _____</p>
A27	<p>Please give brief details about the kind of information, texts or webpages that you have translated with free online machine translation services (<i>e.g. commercial/technical documents, informal letters, business correspondence, email messages, sentences or single words to find out their meaning, etc.</i>):</p> <p>_____</p> <p>_____</p>
A28	<p>Overall, how would you rate the performance of the free online machine translation services that you have used in the past? (<i>tick one of the following options</i>)</p> <p>O very poor O poor O neither poor nor good O good O very good O don't know</p>

*QUESTIONNAIRE ON FREE ONLINE MACHINE TRANSLATION SERVICES
PART B (WEBSITES NOT IN ENGLISH)*

To complete this section you need a computer with Internet access

	<i>Finding information in websites not in English</i>
B1	Where are you completing this part of the questionnaire? (<i>tick one of the following options</i>) <input type="checkbox"/> computer lab on the University campus <input type="checkbox"/> University accommodation <input type="checkbox"/> private home <input type="checkbox"/> work / office <input type="checkbox"/> public library <input type="checkbox"/> Internet café <input type="checkbox"/> other – please specify: _____
B2	What kind of computer are you using to complete this part of the questionnaire? (<i>tick one of the following options</i>) <input type="checkbox"/> desktop PC <input type="checkbox"/> laptop computer <input type="checkbox"/> don't know <input type="checkbox"/> other – please specify: _____
B3	Please log on to the website at the following Internet address: www.areadragon.com Feel free to explore this website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>) <input type="checkbox"/> tourist information <input type="checkbox"/> a political party <input type="checkbox"/> a city council <input type="checkbox"/> a sports centre <input type="checkbox"/> ethnic food <input type="checkbox"/> oriental art <input type="checkbox"/> astronomy and astrophysics <input type="checkbox"/> pets and animals <input type="checkbox"/> collectors' items <input type="checkbox"/> an online newspaper <input type="checkbox"/> a radio station <input type="checkbox"/> a photo club <input type="checkbox"/> company/corporate <input type="checkbox"/> scientist's profile <input type="checkbox"/> a school
B4	Explore this website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: <input type="checkbox"/> don't know
B5	If you have provided a number in answer to the previous question, how confident are you that it is correct answer? (<i>tick one of the following options</i>) not at all confident <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> very confident
B6	Please log on to the website at the following Internet address: www.marconionline.it Feel free to explore this website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>) <input type="checkbox"/> tourist information <input type="checkbox"/> a political party <input type="checkbox"/> a city council <input type="checkbox"/> a sports centre <input type="checkbox"/> ethnic food <input type="checkbox"/> oriental art <input type="checkbox"/> astronomy and astrophysics <input type="checkbox"/> pets and animals <input type="checkbox"/> collectors' items <input type="checkbox"/> an online newspaper <input type="checkbox"/> a radio station <input type="checkbox"/> a photo club <input type="checkbox"/> company/corporate <input type="checkbox"/> scientist's profile <input type="checkbox"/> a school
B7	Explore this website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: <input type="checkbox"/> don't know
B8	If you have provided a number in answer to the previous question, how confident are you that it is correct answer? (<i>tick one of the following options</i>) not at all confident <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> very confident

B9	<p>Please log on to the website at the following Internet address: www.pumilano.it</p> <p>Feel free to explore this website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>)</p> <table border="0"> <tr> <td><input type="radio"/> tourist information</td> <td><input type="radio"/> a political party</td> <td><input type="radio"/> a city council</td> </tr> <tr> <td><input type="radio"/> a sports centre</td> <td><input type="radio"/> ethnic food</td> <td><input type="radio"/> oriental art</td> </tr> <tr> <td><input type="radio"/> astronomy and astrophysics</td> <td><input type="radio"/> pets and animals</td> <td><input type="radio"/> collectors' items</td> </tr> <tr> <td><input type="radio"/> an online newspaper</td> <td><input type="radio"/> a radio station</td> <td><input type="radio"/> a photo club</td> </tr> <tr> <td><input type="radio"/> company/corporate</td> <td><input type="radio"/> scientist's profile</td> <td><input type="radio"/> a school</td> </tr> </table>	<input type="radio"/> tourist information	<input type="radio"/> a political party	<input type="radio"/> a city council	<input type="radio"/> a sports centre	<input type="radio"/> ethnic food	<input type="radio"/> oriental art	<input type="radio"/> astronomy and astrophysics	<input type="radio"/> pets and animals	<input type="radio"/> collectors' items	<input type="radio"/> an online newspaper	<input type="radio"/> a radio station	<input type="radio"/> a photo club	<input type="radio"/> company/corporate	<input type="radio"/> scientist's profile	<input type="radio"/> a school
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<input type="radio"/> company/corporate	<input type="radio"/> scientist's profile	<input type="radio"/> a school														
B10	<p>Explore this website to find a contact telephone number and write it in the space below:</p> <p>_____ - if you cannot find one, tick here: <input type="radio"/> don't know</p>															
B11	<p>If you have provided a number in answer to the previous question, how confident are you that it is correct answer? (<i>tick one of the following options</i>)</p> <p style="text-align: center;">not at all confident <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very confident</p>															
B12	<p>Please log on to the website at the following Internet address: www.rmfi.it</p> <p>Feel free to explore this website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>)</p> <table border="0"> <tr> <td><input type="radio"/> tourist information</td> <td><input type="radio"/> a political party</td> <td><input type="radio"/> a city council</td> </tr> <tr> <td><input type="radio"/> a sports centre</td> <td><input type="radio"/> ethnic food</td> <td><input type="radio"/> oriental art</td> </tr> <tr> <td><input type="radio"/> astronomy and astrophysics</td> <td><input type="radio"/> pets and animals</td> <td><input type="radio"/> collectors' items</td> </tr> <tr> <td><input type="radio"/> an online newspaper</td> <td><input type="radio"/> a radio station</td> <td><input type="radio"/> a photo club</td> </tr> <tr> <td><input type="radio"/> company/corporate</td> <td><input type="radio"/> scientist's profile</td> <td><input type="radio"/> a school</td> </tr> </table>	<input type="radio"/> tourist information	<input type="radio"/> a political party	<input type="radio"/> a city council	<input type="radio"/> a sports centre	<input type="radio"/> ethnic food	<input type="radio"/> oriental art	<input type="radio"/> astronomy and astrophysics	<input type="radio"/> pets and animals	<input type="radio"/> collectors' items	<input type="radio"/> an online newspaper	<input type="radio"/> a radio station	<input type="radio"/> a photo club	<input type="radio"/> company/corporate	<input type="radio"/> scientist's profile	<input type="radio"/> a school
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<input type="radio"/> an online newspaper	<input type="radio"/> a radio station	<input type="radio"/> a photo club														
<input type="radio"/> company/corporate	<input type="radio"/> scientist's profile	<input type="radio"/> a school														
B13	<p>Explore this website to find a contact telephone number and write it in the space below:</p> <p>_____ - if you cannot find one, tick here: <input type="radio"/> don't know</p>															
B14	<p>If you have provided a number in answer to the previous question, how confident are you that it is correct answer? (<i>tick one of the following options</i>)</p> <p style="text-align: center;">not at all confident <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very confident</p>															
B15	<p>Please log on to the website at the following Internet address: www.siriogatto.it</p> <p>Feel free to explore this website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>)</p> <table border="0"> <tr> <td><input type="radio"/> tourist information</td> <td><input type="radio"/> a political party</td> <td><input type="radio"/> a city council</td> </tr> <tr> <td><input type="radio"/> a sports centre</td> <td><input type="radio"/> ethnic food</td> <td><input type="radio"/> oriental art</td> </tr> <tr> <td><input type="radio"/> astronomy and astrophysics</td> <td><input type="radio"/> pets and animals</td> <td><input type="radio"/> collectors' items</td> </tr> <tr> <td><input type="radio"/> an online newspaper</td> <td><input type="radio"/> a radio station</td> <td><input type="radio"/> a photo club</td> </tr> <tr> <td><input type="radio"/> company/corporate</td> <td><input type="radio"/> scientist's profile</td> <td><input type="radio"/> a school</td> </tr> </table>	<input type="radio"/> tourist information	<input type="radio"/> a political party	<input type="radio"/> a city council	<input type="radio"/> a sports centre	<input type="radio"/> ethnic food	<input type="radio"/> oriental art	<input type="radio"/> astronomy and astrophysics	<input type="radio"/> pets and animals	<input type="radio"/> collectors' items	<input type="radio"/> an online newspaper	<input type="radio"/> a radio station	<input type="radio"/> a photo club	<input type="radio"/> company/corporate	<input type="radio"/> scientist's profile	<input type="radio"/> a school
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<input type="radio"/> company/corporate	<input type="radio"/> scientist's profile	<input type="radio"/> a school														
B16	<p>Explore this website to find a contact telephone number and write it in the space below:</p> <p>_____ - if you cannot find one, tick here: <input type="radio"/> don't know</p>															
B17	<p>If you have provided a number in answer to the previous question, how confident are you that it is correct answer? (<i>tick one of the following options</i>)</p> <p style="text-align: center;">not at all confident <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very confident</p>															
5/6																

<i>Final comments</i>	
B18	Using free online machine translation would have helped me to find the correct answers to the questions about the five websites I explored in the tasks (<i>tick one of the following options</i>): <div style="text-align: center;">strongly disagree O O O O O O O O strongly agree O don't know</div>
B19	Use this space to comment on any problems you encountered while carrying out the tasks above: <hr/> <hr/> <hr/>
B20	Use this space to add any more general comments: <hr/> <hr/> <hr/>

• Returning the completed questionnaire

Please return your questionnaire by **Friday 20th May 2005**. Completed questionnaires should be left in **the pigeon hole of your lecturer Anita Auer**.

• Anonymity, confidentiality and use of the data

The questionnaire is completely anonymous and all the information you provide will be treated in the strictest confidence. Your answers will be entered into a database and the resulting data will be analysed statistically for research purposes. The final results of the study will be published in the form of a PhD thesis and academic papers, and the contribution of the anonymous volunteers responding to the questionnaire will be duly acknowledged. By completing and returning the questionnaire you give your consent to your answers being used in this way.

• Background information on the research

This questionnaire is part of PhD research into free online machine translation services that is being conducted by Federico Gaspari in the School of Informatics at the University of Manchester under the supervision of Dr Sri Kurniawan and Professor Harold Somers. The overall aim of the research is to investigate the role played by free web-based machine translation systems, and to identify ways in which their quality and performance might be enhanced. So far, the study has yielded encouraging preliminary results, but this questionnaire is an essential part of the experiments that are being carried out and will provide valuable data on the experience and evaluation of real users.

• Further information

If you would like to receive further information on this experimental research or on web-based machine translation services (e.g. a list of the Internet addresses of free systems which translate from and into English in combination with a huge number of other languages), please contact Federico Gaspari via email (F.Gaspari@postgrad.manchester.ac.uk) or phone (0161 3063106).

Thank you very much for taking the time to complete this questionnaire; your help is greatly appreciated!

APPENDIX C

Questionnaire for the Two Experimental Sub-groups

This seven-page questionnaire was administered on paper to the members of the two experimental sub-groups (EGIT and EGNO) for the case study on the use of free online MT for information assimilation purposes focusing on the language pair Italian-English, covered in chapter 4.

This specific example was used by the students who were asked to carry out the tasks using the free online MT service Babel Fish (available at <http://www.babelfish.altavista.com>). Similar questionnaires were distributed in equal quantities asking the students to carry out the same tasks using three other free web-based MT systems, namely FreeTranslation (<http://www.freetranslation.com>), Google Language Tools (http://www.google.com/language_tools) and Voila (<http://tr.voila.fr>).

		<i>Subj. ID</i>	<i>Ques. no.</i>	<i>FOLMT service</i>	<i>Contact</i>	<i>Main sample</i>
		MS-	MQ-	Babelfish		SLLC LW
QUESTIONNAIRE ON FREE ONLINE MACHINE TRANSLATION SERVICES						
PART A (GENERAL INFORMATION)						
Information about you, your course at the University and the languages you know						
A1	Year you were born: _ _ _ _ (write year in 4-digit format, e.g. "1984")					
A2	Your gender: O male O female					
A3	You are: O undergraduate O postgraduate student at the University					
A4	What is the name of the programme or course that you are currently studying, and in what year are you? (e.g. "BA Modern Languages, 1st year") _____					
A5	What is your mother tongue? (e.g. "English") _____					
A6	How would you rate your knowledge of Italian? (tick one of the following options) O none O beginner O lower-intermed. O intermed. O upper-intermed. O advanced O excellent					
A7	Tick all the following options that apply to your study and knowledge of Italian: <input type="checkbox"/> it is one of the core subjects of my course/programme at the University <input type="checkbox"/> I am studying it at the University as an optional course <input type="checkbox"/> I have studied it at school – indicate for how many years in total: _____ <input type="checkbox"/> I have studied it through private courses – indicate level and duration: _____					
A8	How would you rate your knowledge of Spanish? (tick one of the following options) O none O beginner O lower-intermed. O intermed. O upper-intermed. O advanced O excellent					
A9	How would you rate your knowledge of French? (tick one of the following options) O none O beginner O lower-intermed. O intermed. O upper-intermed. O advanced O excellent					
A10	How would you rate your knowledge of Portuguese? (tick one of the following options) O none O beginner O lower-intermed. O intermed. O upper-intermed. O advanced O excellent					
A11	Other than English, Italian, Spanish, French and Portuguese, give the names of up to 3 other languages you know, and indicate your level for each of them: _____ O poor O basic O reasonable O good O very good _____ O poor O basic O reasonable O good O very good _____ O poor O basic O reasonable O good O very good					
A12	Today's date: _ _ / _ _ / 2005 (write date in DD/MM format, e.g. "04 / 05" for 4 May)					

<i>Information about your previous experience of using the Internet</i>	
A13	In a typical week, how many days do you use the Internet? (<i>tick one of the following options</i>) <input type="radio"/> less than 1 day <input type="radio"/> 1-2 days <input type="radio"/> 3-4 days <input type="radio"/> 5-6 days <input type="radio"/> every day
A14	On a typical day, how many hours do you spend using the Internet? (<i>tick one of the following options</i>) <input type="radio"/> less than 1 hour <input type="radio"/> 1-2 hours <input type="radio"/> 2-3 hours <input type="radio"/> 3-4 hours <input type="radio"/> more than 4 hours
A15	Where do you usually use the Internet? (<i>tick all the options that apply</i>) <input type="checkbox"/> computer lab on the University campus <input type="checkbox"/> University accommodation <input type="checkbox"/> private home <input type="checkbox"/> work / office <input type="checkbox"/> public library <input type="checkbox"/> Internet café <input type="checkbox"/> other – <i>please specify:</i> _____
A16	For what purposes do you usually use the Internet? (<i>tick one of the following options</i>) <input type="radio"/> university-related research or work only <input type="radio"/> entertainment only <input type="radio"/> a combination of both
A17	Do you regularly use a web-based service for emailing (e.g. Hotmail, Yahoo mail, Google Gmail)? <input type="radio"/> yes <input type="radio"/> no
A18	Which search engine(s) do you use most often on the Internet (e.g. Google, Altavista, Yahoo)? (<i>write their names if you remember them, otherwise tick “don’t know”</i>) _____ <input type="radio"/> don’t know
A19	Do these search engines offer free online machine translation as part of their services? <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> don’t know
A20	In the last three months, which of the following 18 activities have you done at least once on the Internet? (<i>tick all the options that apply</i>) 1 <input type="checkbox"/> access course materials via virtual learning platform (e.g. WebCT, Blackboard) 2 <input type="checkbox"/> use email 3 <input type="checkbox"/> check bank account or use financial services 4 <input type="checkbox"/> use a chatroom 5 <input type="checkbox"/> consult online maps or journey planners 6 <input type="checkbox"/> listen to the radio 7 <input type="checkbox"/> sell or bid on an auction site (e.g. eBay) 8 <input type="checkbox"/> read online newspapers 9 <input type="checkbox"/> compare prices of products or services 10 <input type="checkbox"/> use instant messaging (e.g. MSN) 11 <input type="checkbox"/> check online library catalogues 12 <input type="checkbox"/> buy or rent goods (e.g. books, CDs, DVDs) 13 <input type="checkbox"/> use online dictionaries 14 <input type="checkbox"/> download software (e.g. trial demos, plug-ins) 15 <input type="checkbox"/> use a search engine 16 <input type="checkbox"/> download audio or video files (e.g. MP3, MPEG) 17 <input type="checkbox"/> play online games 18 <input type="checkbox"/> buy tickets (e.g. coach/bus, train, plane, cinema/theatre)
A21	In the past, have you ever wanted to access a website or webpage whose contents were only written in a language that you were not familiar with? (<i>tick one of the following options</i>) <input type="radio"/> never <input type="radio"/> occasionally <input type="radio"/> sometimes <input type="radio"/> frequently <input type="radio"/> very frequently <input type="radio"/> don’t know
A22	Have you ever used free online machine translation services on the Internet? <input type="radio"/> yes <input type="radio"/> no <i>If you have answered “yes”, go on to the next question A23 on the next page</i> <i>If you have answered “no”, go directly to question B29 at the top of page 4</i>

Information about your experience of using free online machine translation services	
<i>Questions A23-A28 on this page should be answered only if you have answered "yes" to the previous question A22. Otherwise go directly to question B29 at the top of the next page</i>	
A23	What free online machine translation service(s) have you used in the past? (<i>give their names if you remember them, otherwise tick "don't know"</i>) _____ O don't know
A24	With which language(s) have you used free online machine translation? (<i>tick all the options that apply and specify languages as required</i>) <input type="checkbox"/> from English into other language(s) – <i>please specify:</i> _____ <input type="checkbox"/> into English from other language(s) – <i>please specify:</i> _____ <input type="checkbox"/> other language combinations not including English – <i>please specify source and target languages:</i> _____
A25	For what purpose have you used free online machine translation? (<i>tick all the options that apply</i>) <input type="checkbox"/> I wanted to understand something written by others <input type="checkbox"/> I wanted others to understand something written by me <input type="checkbox"/> other – <i>please specify:</i> _____
A26	In what way(s) have you used free online machine translation? (<i>tick all the options that apply</i>) <input type="checkbox"/> manually typed in text to have it translated into another language <input type="checkbox"/> copied and pasted text to have it translated into another language <input type="checkbox"/> entered a URL (Internet address) to have a whole webpage translated into another language <input type="checkbox"/> clicked on links provided by search engines to translate relevant hits into another language <input type="checkbox"/> other – <i>please specify:</i> _____
A27	Please give brief details about the kind of information, texts or webpages that you have translated with free online machine translation services (<i>e.g. commercial/technical documents, informal letters, business correspondence, email messages, sentences or single words to find out their meaning, etc.</i>): _____ _____
A28	Overall, how would you rate the performance of the free online machine translation services that you have used in the past? (<i>tick one of the following options</i>) <input type="radio"/> very poor <input type="radio"/> poor <input type="radio"/> neither poor nor good <input type="radio"/> good <input type="radio"/> very good <input type="radio"/> don't know

QUESTIONNAIRE ON FREE ONLINE MACHINE TRANSLATION SERVICES
PART B (TASKS ON THE INTERNET)

To complete this section you need a computer with Internet access

Using free online machine translation to find information in websites not in English																
B29	Where are you completing this part of the questionnaire? (<i>tick one of the following options</i>) <input type="checkbox"/> computer lab on the University campus <input type="checkbox"/> University accommodation <input type="checkbox"/> private home <input type="checkbox"/> work / office <input type="checkbox"/> public library <input type="checkbox"/> Internet café <input type="checkbox"/> other – <i>please specify:</i> _____															
B30	What kind of computer are you using to complete this part of the questionnaire? (<i>tick one of the following options</i>) <input type="checkbox"/> desktop PC <input type="checkbox"/> laptop computer <input type="checkbox"/> don't know <input type="checkbox"/> other – <i>please specify:</i> _____															
B31	Please log on to the free online machine translation service Babelfish at this Internet address: <p style="text-align: center;">www.babelfish.altavista.com</p> Use Babelfish to translate the following home page from Italian into English: www.areadragon.com Feel free to explore the translated website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> tourist information</td> <td><input type="checkbox"/> a political party</td> <td><input type="checkbox"/> a city council</td> </tr> <tr> <td><input type="checkbox"/> a sports centre</td> <td><input type="checkbox"/> ethnic food</td> <td><input type="checkbox"/> oriental art</td> </tr> <tr> <td><input type="checkbox"/> astronomy and astrophysics</td> <td><input type="checkbox"/> pets and animals</td> <td><input type="checkbox"/> collectors' items</td> </tr> <tr> <td><input type="checkbox"/> an online newspaper</td> <td><input type="checkbox"/> a radio station</td> <td><input type="checkbox"/> a photo club</td> </tr> <tr> <td><input type="checkbox"/> company/corporate</td> <td><input type="checkbox"/> scientist's profile</td> <td><input type="checkbox"/> a school</td> </tr> </table>	<input type="checkbox"/> tourist information	<input type="checkbox"/> a political party	<input type="checkbox"/> a city council	<input type="checkbox"/> a sports centre	<input type="checkbox"/> ethnic food	<input type="checkbox"/> oriental art	<input type="checkbox"/> astronomy and astrophysics	<input type="checkbox"/> pets and animals	<input type="checkbox"/> collectors' items	<input type="checkbox"/> an online newspaper	<input type="checkbox"/> a radio station	<input type="checkbox"/> a photo club	<input type="checkbox"/> company/corporate	<input type="checkbox"/> scientist's profile	<input type="checkbox"/> a school
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<input type="checkbox"/> an online newspaper	<input type="checkbox"/> a radio station	<input type="checkbox"/> a photo club														
<input type="checkbox"/> company/corporate	<input type="checkbox"/> scientist's profile	<input type="checkbox"/> a school														
B32	Explore the translated website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: <input type="checkbox"/> don't know															
B33	If you have provided a number in answer to the previous question, how confident are you that it is the correct answer? (<i>tick one of the following options</i>) not at all confident <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> very confident															
B34	Now go back to the Babelfish default page at this Internet address: <p style="text-align: center;">www.babelfish.altavista.com</p> Use Babelfish to translate the following home page from Italian into English: www.marconionline.it Feel free to explore the translated website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> tourist information</td> <td><input type="checkbox"/> a political party</td> <td><input type="checkbox"/> a city council</td> </tr> <tr> <td><input type="checkbox"/> a sports centre</td> <td><input type="checkbox"/> ethnic food</td> <td><input type="checkbox"/> oriental art</td> </tr> <tr> <td><input type="checkbox"/> astronomy and astrophysics</td> <td><input type="checkbox"/> pets and animals</td> <td><input type="checkbox"/> collectors' items</td> </tr> <tr> <td><input type="checkbox"/> an online newspaper</td> <td><input type="checkbox"/> a radio station</td> <td><input type="checkbox"/> a photo club</td> </tr> <tr> <td><input type="checkbox"/> company/corporate</td> <td><input type="checkbox"/> scientist's profile</td> <td><input type="checkbox"/> a school</td> </tr> </table>	<input type="checkbox"/> tourist information	<input type="checkbox"/> a political party	<input type="checkbox"/> a city council	<input type="checkbox"/> a sports centre	<input type="checkbox"/> ethnic food	<input type="checkbox"/> oriental art	<input type="checkbox"/> astronomy and astrophysics	<input type="checkbox"/> pets and animals	<input type="checkbox"/> collectors' items	<input type="checkbox"/> an online newspaper	<input type="checkbox"/> a radio station	<input type="checkbox"/> a photo club	<input type="checkbox"/> company/corporate	<input type="checkbox"/> scientist's profile	<input type="checkbox"/> a school
<input type="checkbox"/> tourist information	<input type="checkbox"/> a political party	<input type="checkbox"/> a city council														
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<input type="checkbox"/> an online newspaper	<input type="checkbox"/> a radio station	<input type="checkbox"/> a photo club														
<input type="checkbox"/> company/corporate	<input type="checkbox"/> scientist's profile	<input type="checkbox"/> a school														
B35	Explore the translated website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: <input type="checkbox"/> don't know															
B36	If you have provided a number in answer to the previous question, how confident are you that it is the correct answer? (<i>tick one of the following options</i>) not at all confident <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> very confident															

B37	<p>Now go back to the Babelfish default page at this Internet address: www.babelfish.altavista.com</p> <p>Use Babelfish to translate the following home page from Italian into English: www.pumilano.it</p> <p>Feel free to explore the translated website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>)</p> <p>O tourist information O a political party O a city council O a sports centre O ethnic food O oriental art O astronomy and astrophysics O pets and animals O collectors' items O an online newspaper O a radio station O a photo club O company/corporate O scientist's profile O a school</p>
B38	<p>Explore the translated website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: O don't know</p>
B39	<p>If you have provided a number in answer to the previous question, how confident are you that it is the correct answer? (<i>tick one of the following options</i>) not at all confident O O O O O O O very confident</p>
B40	<p>Now go back to the Babelfish default page at this Internet address: www.babelfish.altavista.com</p> <p>Use Babelfish to translate the following home page from Italian into English: www.rmfi.it</p> <p>Feel free to explore the translated website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>)</p> <p>O tourist information O a political party O a city council O a sports centre O ethnic food O oriental art O astronomy and astrophysics O pets and animals O collectors' items O an online newspaper O a radio station O a photo club O company/corporate O scientist's profile O a school</p>
B41	<p>Explore the translated website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: O don't know</p>
B42	<p>If you have provided a number in answer to the previous question, how confident are you that it is the correct answer? (<i>tick one of the following options</i>) not at all confident O O O O O O O very confident</p>
B43	<p>Now go back to the Babelfish default page at this Internet address: www.babelfish.altavista.com</p> <p>Use Babelfish to translate the following home page from Italian into English: www.siriogatto.it</p> <p>Feel free to explore the translated website as much as you wish. What do you think this website is about? (<i>tick one of the following options</i>)</p> <p>O tourist information O a political party O a city council O a sports centre O ethnic food O oriental art O astronomy and astrophysics O pets and animals O collectors' items O an online newspaper O a radio station O a photo club O company/corporate O scientist's profile O a school</p>
B44	<p>Explore the translated website to find a contact telephone number and write it in the space below: _____ - if you cannot find one, tick here: O don't know</p>
B45	<p>If you have provided a number in answer to the previous question, how confident are you that it is the correct answer? (<i>tick one of the following options</i>) not at all confident O O O O O O O very confident</p>

<i>Final comments</i>	
B46	Using free online machine translation (Babelfish) has helped me to find the correct answers to the questions about the five websites that I explored in the tasks (<i>tick one of the following options</i>): strongly disagree <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> strongly agree <input type="radio"/> don't know
B47	How would you rate Babelfish's response time in providing the translation? (<i>tick one of the following options</i>): <input type="radio"/> Very slow <input type="radio"/> slow <input type="radio"/> a little slow <input type="radio"/> neither slow nor fast <input type="radio"/> fairly fast <input type="radio"/> fast <input type="radio"/> Very fast
B48	While using Babelfish in the tasks, have you noticed any commercial machine translation software being advertised? <input type="radio"/> yes <input type="radio"/> no <i>If you have answered "yes", give the name of the commercial software:</i> _____
B49	While using Babelfish in the tasks, did you also look at the original version of the website in Italian to help you find or check the information you were looking for? (<i>tick one of the following options</i>) <input type="radio"/> never <input type="radio"/> occasionally <input type="radio"/> sometimes <input type="radio"/> frequently <input type="radio"/> Very frequently
B50	Briefly describe how you tried to find the contact telephone numbers in the translated websites: _____
B51	How would you rate your interaction with Babelfish overall? (<i>tick one of the following options</i>) <input type="radio"/> very unsatisfactory <input type="radio"/> unsatisfactory <input type="radio"/> neither sat. nor unsat. <input type="radio"/> satisfactory <input type="radio"/> very satisfactory
B52	How would you rate Babelfish's helpfulness during the tasks? (<i>tick one of the following options</i>) <input type="radio"/> very unsatisfactory <input type="radio"/> unsatisfactory <input type="radio"/> neither sat. nor unsat. <input type="radio"/> satisfactory <input type="radio"/> very satisfactory
B53	Please rate each of the following 10 features from the point of view of a user of online machine translation (<i>tick the relevant option for each feature</i>): 1) <i>The fact that it is available free of charge</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 2) <i>Appeal and attractiveness of the interface</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 3) <i>Having the interface in one's own language</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 4) <i>Ease of use and interaction</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 5) <i>Fast response time in providing the translation</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 6) <i>A note on the limitations of machine translation</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 7) <i>Language coverage (number of language combinations)</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 8) <i>Availability of subject-specific glossaries within the service that can be activated by users when translating texts on a particular subject (e.g. medicine, computing, engineering, etc.)</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 9) <i>Automatic translation into the user's chosen language of the next page when they click on a link</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 10) <i>Providing the possibility to browse "in parallel" the translated page and its original counterpart</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important

B54	<p>Based on your experience of using Babelfish in the tasks above, what, in your opinion, are the 3 most important aspects or significant advantages of using free online machine translation?</p> <hr/> <hr/> <hr/>
B55	<p>Based on your experience of using Babelfish in the tasks above, what, in your opinion, are the 3 most significant problems or disadvantages associated with using free online machine translation?</p> <hr/> <hr/> <hr/>

• **Returning the completed questionnaire**

Please return your completed questionnaire by **Friday 20th May 2005**. You can either **leave it in the box located inside Mr Andrés Lozoya's office** (Languagewise Programme secretary, room S3.4, 3rd floor, Humanities Building – Live Grove), or **return it in class to the lecturer** from whom you received it.

• **Anonymity, confidentiality and use of the data**

The questionnaire is completely anonymous and all the information you provide will be treated in the strictest confidence. Your answers will be entered into a database and the resulting data will be analysed statistically for research purposes. The final results of the study will be published in the form of a PhD thesis and academic papers, and the contribution of the anonymous volunteers responding to the questionnaire will be duly acknowledged. By completing and returning the questionnaire you give your consent to your answers being used in this way.

• **Background information on the research**

This questionnaire is part of PhD research into free online machine translation services that is being conducted by Federico Gaspari in the School of Informatics at the University of Manchester under the supervision of Dr Sri Kurniawan and Professor Harold Somers. The overall aim of the research is to investigate the role played by free web-based machine translation systems, and to identify ways in which their quality and performance might be enhanced. So far, the study has yielded encouraging preliminary results, but this questionnaire is an essential part of the experiments that are being carried out and will provide valuable data on the experience and evaluation of real users.

• **Further information**

If you would like to receive further information on this experimental research or on web-based machine translation services (e.g. a list of the Internet addresses of free systems which translate from and into English in combination with a huge number of other languages), please contact Federico Gaspari via email (F.Gaspari@postgrad.manchester.ac.uk) or phone (0161 3063106).

Thank you very much for taking the time to complete this questionnaire; your help is greatly appreciated!

APPENDIX D

Individual Reflective Questionnaire

This individual reflective questionnaire with three essay-type questions was administered via email to each of the 14 postgraduate students at the University of Manchester who were involved in the redesign project of the home page for the London 2012 Olympic bid website, covered in chapter 5. This questionnaire formed part of the coursework-based assessment, and some of the information provided by the students in response to it was used in preparation for the work presented in chapter 6 (see in particular sub-section 6.2.1).

CT404: Human Computer Interaction

Group Project II – Individual reflective questionnaire

This individual reflective questionnaire consists of 3 questions. Please avoid discussing the questions and possible answers with other group members, as this questionnaire focuses on your own individual experience during the project, and should reflect your own personal opinions. The length of each of the 3 answers should be between approximately 150 and 250 words.

*The deadline to submit the answers to this individual reflective questionnaire is 4:00 PM on Friday 13th May 2005. The answers should be sent electronically via email (either in the body of the email message or as an attached MS-Word file saved in *.doc format) to both Dr. Sri Kurniawan (email: S.Kurniawan@manchester.ac.uk) and Federico Gaspari (email: F.Gaspari@postgrad.manchester.ac.uk).*

Answer all the following 3 questions:

- 1) Based on your experience in the project, briefly discuss the potential and limitations of free online machine translation technology as a tool available to Internet users to overcome linguistic barriers on the Internet.
- 2) Explain what are in your opinion the key issues involved in making Internet users with different linguistic backgrounds aware of the fact that they can take advantage of integrated free online machine translation technology to access in their own preferred language the contents of an originally monolingual website.
- 3) What has been in your opinion the most difficult or challenging aspect during the implementation of the redesign project?

APPENDIX E

Group Follow-up Questionnaire

This group follow-up questionnaire with five essay-type questions was administered via email to the four groups of postgraduate students at the University of Manchester who were involved in the redesign project of the home page for the London 2012 Olympic bid website, covered in chapter 5. This questionnaire formed part of the coursework-based assessment, and some of the information provided by the groups in response to it was used in preparation for the work presented in chapter 6 (see in particular sub-section 6.2.1).

CT404: Human Computer Interaction

Group Project II – Group follow-up questionnaire

This group follow-up questionnaire consists of 5 questions. The answers should be based on the work done by the whole group during the project in the preparation of the deliverable, and reflect the opinions of all group members. In your answers to questions 1-3, please respect the word limit that is indicated.

*The deadline to submit the answers to this group follow-up questionnaire is 4:00 PM on Friday 13th May 2005. The answers should be sent electronically via email (either in the body of the email message or as an attached MS-Word file saved in *.doc format) to both Dr. Sri Kurniawan (email: S.Kurniawan@manchester.ac.uk) and Federico Gaspari (email: F.Gaspari@postgrad.manchester.ac.uk).*

Answer all the following 5 questions:

- 1) Briefly discuss the most important HCI-related and usability issues that your group considered as priorities in the preparation of the deliverable. *(the length of the answer to this question should be between approximately 150 and 250 words)*
- 2) Briefly present the main strengths of your redesigned home page in relation to the aim of the project, explaining according to what criteria you decided how to organise and present the various language options available to multilingual visitors on the redesigned home page. *(the length of the answer to this question should be between approximately 150 and 250 words)*
- 3) On what basis did you choose the free online machine translation service(s) that you integrated into the redesigned home page of the London 2012 website? *(the length of the answer to this question should be between approximately 150 and 250 words)*
- 4) Based on your experience in the project, provide a set (at least 5, up to a maximum of 10) of **heuristics to evaluate** how successfully websites originally available only in one language (say, English) integrate free online machine translation services into their design in order to disseminate their textual contents in different languages for the benefit of multilingual Internet users. *(there is no word limit for the length of the answer to this question)*
- 5) Provide a set (at least 5, up to a maximum of 10) of **redesign guidelines** aimed at helping web designers and developers who are not experts in HCI and usability to integrate successfully free online machine translation services into already existing monolingual websites (say, in English), so that multilingual Internet users can easily navigate these websites in their own preferred language. This set of redesign guidelines should provide practical advice informed by good practice in usability-oriented and user-centred web design as well as by the key lessons you have learned while working on this group project. *(there is no word limit for the length of the answer to this question)*

APPENDIX F

Questionnaire for User Testing and Usability Evaluation

This ten-page paper-based questionnaire was completed by the 72 international participants during lab sessions for the user testing and usability evaluation of the four prototypes for the home page for the London 2012 Olympic bid website, covered in chapter 5.

This specific example was used by the students who completed the evaluation of the four alternative redesigns of the home page in question in the following order: BLUE page (corresponding to the prototype of group A), GREEN page (group B), RED page (group C) and finally YELLOW page (group D). Similar questionnaires completed by other students presented the four prototypes in different orders, to randomise the sequence in which the members of the language-specific sub-groups interacted with each of the four redesigned prototypes to be tested and evaluated, thus preventing learning effects during the execution of the tasks designed for the study (see sub-section 5.5.3 for more details).

Name: _____ Surname: _____	
<i>Information about you, your language background and your studies</i>	
A1	Your gender: <input type="radio"/> male <input type="radio"/> female
A2	Year you were born: _ _ _ _ (write year in 4-digit format, e.g. "1984")
A3	What is your mother tongue? (e.g. "Chinese" – give both if bilingual) _____
A4	What is your nationality? (e.g. "Chinese") _____
A5	In what country were you born? (e.g. "China") _____
A6	In what countries have you lived for long periods of time (i.e. more than a year) and for how many years approximately? These may for example be the countries where you have been raised as a child and you have completed your education (e.g. "China for 18 years and UK 3 years") _____
A7	For how many years in total have you lived in an English-speaking country (UK or other)? _____
A8	How would you rate your own knowledge of English? (tick one of the following options) <input type="radio"/> very poor <input type="radio"/> limited <input type="radio"/> basic <input type="radio"/> reasonable <input type="radio"/> good <input type="radio"/> advanced <input type="radio"/> excellent
A9	At the moment you are: <input type="radio"/> undergraduate <input type="radio"/> postgraduate student at the University of Manchester
A10	What is the name of your School or Department at the University of Manchester? (e.g. "School of Social Sciences") _____
A11	What is the name of the programme or course that you are currently studying, and in what year are you? (e.g. "BA Economic and Social Studies, 2nd year") _____
A12	Today's date: _ _ / _ _ / 2005 (write date in DD / MM format, e.g. "09 / 06" for 9 th June)
DIS	Do you have any medical condition, disability, cognitive impairment or learning difficulty (e.g. poor vision, dyslexia, etc.) that may affect your Web interaction? <input type="radio"/> yes <input type="radio"/> no If you have answered "yes", it would be very helpful if you could provide a few more details on the nature and severity of this condition or disability (all information will be kept strictly confidential): _____ _____
1/10	

<i>Information about your previous experience of using the Internet</i>	
A13	In a typical week, on how many days do you use the Internet? <i>(tick one of the following options)</i> <input type="radio"/> less than 1 day <input type="radio"/> 1-2 days <input type="radio"/> 3-4 days <input type="radio"/> 5-6 days <input type="radio"/> every day
A14	On a typical day, how many hours do you spend using the Internet? <i>(tick one of the following options)</i> <input type="radio"/> less than 1 hour <input type="radio"/> 1-2 hours <input type="radio"/> 2-3 hours <input type="radio"/> 3-4 hours <input type="radio"/> more than 4 hours
A15	Where do you usually use the Internet? <i>(tick all the options that apply)</i> <input type="checkbox"/> computer lab on the University campus <input type="checkbox"/> University accommodation <input type="checkbox"/> private home <input type="checkbox"/> work / office <input type="checkbox"/> public library <input type="checkbox"/> Internet café <input type="checkbox"/> other – please specify: _____
A16	For what purposes do you usually use the Internet? <i>(tick one of the following options)</i> <input type="radio"/> university-related research or work only <input type="radio"/> entertainment only <input type="radio"/> a combination of both
A17	Do you regularly use a web-based service for email (e.g. University Webmail, Hotmail, Yahoo mail)? <input type="radio"/> yes <input type="radio"/> no
A18	Which search engine(s) do you use most often on the Internet (e.g. Google, Altavista, Yahoo)? <i>(write their names if you remember them, otherwise tick "don't know")</i> _____ <input type="radio"/> don't know
A19	Do these search engines offer free online machine translation as part of their services? <input type="radio"/> yes <input type="radio"/> no <input type="radio"/> don't know
A20	In the last three months, which of the following 18 activities have you done at least once on the Internet? <i>(tick all the options that apply)</i> 1 <input type="checkbox"/> access course materials via virtual learning platform (e.g. WebCT, Blackboard) 2 <input type="checkbox"/> use email 3 <input type="checkbox"/> check bank account or use financial services 4 <input type="checkbox"/> use a chatroom 5 <input type="checkbox"/> consult online maps or journey planners 6 <input type="checkbox"/> listen to the radio 7 <input type="checkbox"/> sell or bid on an auction site (e.g. eBay) 8 <input type="checkbox"/> read online newspapers 9 <input type="checkbox"/> compare prices of products or services 10 <input type="checkbox"/> use instant messaging (e.g. MSN) 11 <input type="checkbox"/> check online library catalogues 12 <input type="checkbox"/> buy or rent goods (e.g. books, CDs, DVDs) 13 <input type="checkbox"/> use online dictionaries 14 <input type="checkbox"/> download software (e.g. trial demos, plug-ins) 15 <input type="checkbox"/> use a search engine 16 <input type="checkbox"/> download audio or video files (e.g. MP3, MPEG) 17 <input type="checkbox"/> play online games 18 <input type="checkbox"/> buy tickets (e.g. coach/bus, train, plane, cinema/theatre)
A21	In the past, have you ever wanted to access a website or webpage whose contents were only written in a language that you were not familiar with? <i>(tick one of the following options)</i> <input type="radio"/> never <input type="radio"/> occasionally <input type="radio"/> sometimes <input type="radio"/> frequently <input type="radio"/> very frequently <input type="radio"/> don't know
A22	Have you ever used free online machine translation services on the Internet? <input type="radio"/> yes <input type="radio"/> no <i>If you have answered "yes", go on to the next question A23 on the next page</i> <i>If you have answered "no", go directly to question B29 at the top of page 4</i>

<i>Information about your experience of using free online machine translation services</i>	
<i>Questions A23-A28 on this page should be answered only if you have answered "yes" to the previous question A22. Otherwise please go directly to question B29 at the top of the next page</i>	
A23	<p>What free online machine translation service(s) have you used in the past? (<i>give their names if you remember them, otherwise tick "don't know"</i>)</p> <p>_____ O don't know</p>
A24	<p>With which language(s) have you used free online machine translation? (<i>tick all the options that apply and specify languages as required</i>)</p> <p><input type="checkbox"/> from English into other language(s) – <i>please specify:</i> _____</p> <p><input type="checkbox"/> into English from other language(s) – <i>please specify:</i> _____</p> <p><input type="checkbox"/> other language combinations not including English – <i>please specify source and target languages:</i> _____</p>
A25	<p>For what purpose have you used free online machine translation? (<i>tick all the options that apply</i>)</p> <p><input type="checkbox"/> I wanted to understand something written by others</p> <p><input type="checkbox"/> I wanted others to understand something written by me</p> <p><input type="checkbox"/> other – <i>please specify:</i> _____</p>
A26	<p>In what way(s) have you used free online machine translation? (<i>tick all the options that apply</i>)</p> <p><input type="checkbox"/> manually typed in text to have it translated into another language</p> <p><input type="checkbox"/> copied and pasted text to have it translated into another language</p> <p><input type="checkbox"/> entered a URL (Internet address) to have a whole webpage translated into another language</p> <p><input type="checkbox"/> clicked on links provided by search engines to translate relevant hits into another language</p> <p><input type="checkbox"/> other – <i>please specify:</i> _____</p>
A27	<p>Give details about the kind of information, texts or webpages that you have translated using free online machine translation services (<i>e.g. commercial/technical documents, informal letters, business correspondence, email messages, sentences or single words to find out their meaning, etc.</i>):</p> <p>_____</p> <p>_____</p>
A28	<p>Overall, how would you rate the performance of the free online machine translation services that you have used in the past? (<i>tick one of the following options</i>)</p> <p>O very poor O poor O fairly poor O neither poor nor good O fairly good O good O very good</p>

<i>Testing and evaluating the first BLUE page</i>	
B29	<p>Open the BLUE page by double-clicking on the icon called "BLUE page" in the middle of the desktop. Feel free to look at this page as much as you wish but <u>do not click</u> on any links yet. You can use the scroll bars on the browser window and move the mouse pointer around this page to hover it over any images or links, but refrain from clicking on them for now.</p> <p>By only looking at the BLUE page and without clicking on any links, state in the space below what you think this website is about, and explain why you think so:</p> <p>_____</p> <p>_____</p>
B30	<p>How would you rate the appearance of the BLUE page? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Very unprofessional <input type="radio"/> fairly unprofess. <input type="radio"/> neither unprof. nor prof. <input type="radio"/> fairly profess. <input type="radio"/> very professional</p>
B31	<p>How would you rate the way in which the BLUE page makes use of the space available on the screen to let you know you that the information contained in this website is also available in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Very bad <input type="radio"/> fairly bad <input type="radio"/> bad <input type="radio"/> neither bad nor good <input type="radio"/> fairly good <input type="radio"/> good <input type="radio"/> very good</p>
B32	<p>Using the BLUE page as a starting point to access the actual contents of the website, try to find some information translated into your own language (i.e. <u>not</u> in English). To do this, you may now click anywhere you want on the BLUE page.</p> <p>Once you have found information translated into your language, rate the BLUE page in terms of how clear and helpful it was in enabling you to find this information (<i>tick one of the following options</i>):</p> <p><input type="radio"/> Very poor <input type="radio"/> poor <input type="radio"/> fairly poor <input type="radio"/> neither poor nor good <input type="radio"/> fairly good <input type="radio"/> good <input type="radio"/> Very good</p>
B33	<p>How would you rate the style of the BLUE page (e.g. fonts used, background colours, etc.), compared to the style of the first page of the website that you have found with information translated into your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Very inconsistent <input type="radio"/> fairly inconsistent <input type="radio"/> neither incons. nor cons. <input type="radio"/> fairly consistent <input type="radio"/> very consistent</p>
B34	<p>After you clicked on the correct link for your language on the BLUE page, how would you rate the response time in providing the translation in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Very slow <input type="radio"/> slow <input type="radio"/> a little slow <input type="radio"/> neither slow nor fast <input type="radio"/> fairly fast <input type="radio"/> fast <input type="radio"/> Very fast</p>
B35	<p>Explore the version of the website translated into your language to find a contact telephone number, and write it here. Feel free to click on as many links as you like: _____</p> <p>If you cannot find a contact telephone number, tick here: <input type="radio"/> don't know</p>
B36	<p>Whether or not you have been able to find a contact telephone number, describe in the space below how you tried to find it in the translated website:</p> <p>_____</p> <p>_____</p>
B37	<p>Feel free to explore the version of the website which is translated into your language, e.g. by clicking on any links and reading some of the information that you find interesting. How would you rate the general quality of the translation into your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> very poor <input type="radio"/> poor <input type="radio"/> fairly poor <input type="radio"/> neither poor nor good <input type="radio"/> fairly good <input type="radio"/> good <input type="radio"/> Very good</p>

B38	<p>List up to three things that you personally like about the way in which the BLUE page indicates that the information in this website is also available in your own language:</p> <hr/> <hr/> <hr/>
B39	<p>List up to three things that you personally do not like about the way in which the BLUE page indicates that the information in this website is also available in your own language:</p> <hr/> <hr/> <hr/>

Now please close all the browser windows that are still open (e.g. the one with the BLUE page)

<i>Testing and evaluating the second GREEN page</i>	
G40	<p>Open the GREEN page by double-clicking on the icon called "GREEN page" in the middle of the desktop. Feel free to look at this page as much as you wish but <u>do not click</u> on any links yet. You can use the scroll bars on the browser window and move the mouse pointer around this page to hover it over any images or links, but refrain from clicking on them for now.</p> <p>How would you rate the appearance of the GREEN page? (<i>tick one of the following options</i>)</p> <p>O very unprofessional O fairly unprofess. O neither unprof. nor prof. O fairly profess. O very professional</p>
G41	<p>How would you rate the way in which the GREEN page makes use of the space available on the screen to let you know that the information contained in this website is also available in your own language? (<i>tick one of the following options</i>)</p> <p>O very bad O fairly bad O bad O neither bad nor good O fairly good O good O very good</p>
G42	<p>Using the GREEN page as a starting point to access the actual contents of the website, try to find some information translated into your own language (i.e. <u>not</u> in English). To do this, you may now click anywhere you want on the GREEN page.</p> <p>Once you have found information translated into your language, rate the GREEN page in terms of how clear and helpful it was in enabling you to find this information (<i>tick one of the following options</i>):</p> <p>O very poor O poor O fairly poor O neither poor nor good O fairly good O good O very good</p>
G43	<p>How would you rate the style of the GREEN page (e.g. fonts used, background colours, etc.), compared to the style of the first page of the website that you have found with information translated into your language? (<i>tick one of the following options</i>)</p> <p>O very inconsistent O fairly inconsistent O neither incons. nor cons. O fairly consistent O very consistent</p>
G44	<p>After you clicked on the correct link for your language on the GREEN page, how would you rate the response time in providing the translation in your own language? (<i>tick one of the following options</i>)</p> <p>O very slow O slow O a little slow O neither slow nor fast O fairly fast O fast O very fast</p>
G45	<p>Feel free to explore the version of the website which is translated into your language, e.g. by clicking on any links and reading some of the information that you find interesting. How would you rate the general quality of the translation into your language? (<i>tick one of the following options</i>)</p> <p>O very poor O poor O fairly poor O neither poor nor good O fairly good O good O very good</p>
G46	<p>List up to three things that you personally like about the way in which the GREEN page indicates that the information in this website is also available in your own language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
G47	<p>List up to three things that you personally do not like about the way in which the GREEN page indicates that the information in this website is also available in your own language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>Now please close <u>all</u> the browser windows that are still open (e.g. the one with the GREEN page)</p>	

<i>Testing and evaluating the third RED page</i>	
R48	<p>Open the RED page by double-clicking on the icon called "RED page" in the middle of the desktop. Feel free to look at this page as much as you wish but <u>do not click</u> on any links yet. You can use the scroll bars on the browser window and move the mouse pointer around this page to hover it over any images or links, but refrain from clicking on them for now.</p> <p>How would you rate the appearance of the RED page? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Overly unprofessional <input type="radio"/> O fairly unprofess. <input type="radio"/> O neither unprof. nor prof. <input type="radio"/> O fairly profess. <input type="radio"/> O very professional</p>
R49	<p>How would you rate the way in which the RED page makes use of the space available on the screen to let you know that the information contained in this website is also available in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Overly bad <input type="radio"/> O fairly bad <input type="radio"/> O bad <input type="radio"/> O neither bad nor good <input type="radio"/> O fairly good <input type="radio"/> O good <input type="radio"/> O very good</p>
R50	<p>Using the RED page as a starting point to access the actual contents of the website, try to find some information translated into your own language (i.e. <u>not</u> in English). To do this, you may now click anywhere you want on the RED page.</p> <p>Once you have found information translated into your language, rate the RED page in terms of how clear and helpful it was in enabling you to find this information (<i>tick one of the following options</i>):</p> <p><input type="radio"/> O very poor <input type="radio"/> O poor <input type="radio"/> O fairly poor <input type="radio"/> O neither poor nor good <input type="radio"/> O fairly good <input type="radio"/> O good <input type="radio"/> O very good</p>
R51	<p>How would you rate the style of the RED page (e.g. fonts used, background colours, etc.), compared to the style of the first page of the website that you have found with information translated into your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> O very inconsistent <input type="radio"/> O fairly inconsistent <input type="radio"/> O neither incons. nor cons. <input type="radio"/> O fairly consistent <input type="radio"/> O very consistent</p>
R52	<p>After you clicked on the correct link for your language on the RED page, how would you rate the response time in providing the translation in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> O very slow <input type="radio"/> O slow <input type="radio"/> O a little slow <input type="radio"/> O neither slow nor fast <input type="radio"/> O fairly fast <input type="radio"/> O fast <input type="radio"/> O very fast</p>
R53	<p>Feel free to explore the version of the website which is translated into your language, e.g. by clicking on any links and reading some of the information that you find interesting. How would you rate the general quality of the translation into your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> O very poor <input type="radio"/> O poor <input type="radio"/> O fairly poor <input type="radio"/> O neither poor nor good <input type="radio"/> O fairly good <input type="radio"/> O good <input type="radio"/> O very good</p>
R54	<p>List up to three things that you personally like about the way in which the RED page indicates that the information in this website is also available in your own language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
R55	<p>List up to three things that you personally do not like about the way in which the RED page indicates that the information in this website is also available in your own language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><i>Now please close <u>all</u> the browser windows that are still open (e.g. the one with the RED page)</i></p>	

<i>Testing and evaluating the fourth YELLOW page</i>	
Y56	<p>Open the YELLOW page by double-clicking on the icon called “YELLOW page” in the middle of the desktop. Feel free to look at this page as much as you wish but <u>do not click</u> on any links yet. You can use the scroll bars on the browser window and move the mouse pointer around this page to hover it over any images or links, but refrain from clicking on them for now.</p> <p>How would you rate the appearance of the YELLOW page? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Very unprofessional <input type="radio"/> fairly unprofess. <input type="radio"/> neither unprof. nor prof. <input type="radio"/> fairly profess. <input type="radio"/> very professional</p>
Y57	<p>How would you rate the way in which the YELLOW page makes use of the space available on the screen to let you know that the information contained in this website is also available in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Overly bad <input type="radio"/> O fairly bad <input type="radio"/> O bad <input type="radio"/> O neither bad nor good <input type="radio"/> O fairly good <input type="radio"/> O good <input type="radio"/> O very good</p>
Y58	<p>Using the YELLOW page as a starting point to access the actual contents of the website, try to find some information translated into your own language (i.e. <u>not</u> in English). To do this, you may now click anywhere you want on the YELLOW page.</p> <p>Once you have found information translated into your language, rate the YELLOW page in terms of how clear and helpful it was in enabling you to find this information (<i>tick one of the following options</i>):</p> <p><input type="radio"/> Overly poor <input type="radio"/> O poor <input type="radio"/> O fairly poor <input type="radio"/> O neither poor nor good <input type="radio"/> O fairly good <input type="radio"/> O good <input type="radio"/> O very good</p>
Y59	<p>How would you rate the style of the YELLOW page (e.g. fonts used, background colours, etc.), compared to the style of the first page of the website that you have found with information translated into your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Overly inconsistent <input type="radio"/> O fairly inconsistent <input type="radio"/> O neither incons. nor cons. <input type="radio"/> O fairly consistent <input type="radio"/> O very consistent</p>
Y60	<p>After you clicked on the correct link for your language on the YELLOW page, how would you rate the response time in providing the translation in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> Overly slow <input type="radio"/> O slow <input type="radio"/> O a little slow <input type="radio"/> O neither slow nor fast <input type="radio"/> O fairly fast <input type="radio"/> O fast <input type="radio"/> O very fast</p>
Y61	<p>Feel free to explore the version of the website which is translated into your language, e.g. by clicking on any links and reading some of the information that you find interesting. How would you rate the general quality of the translation into your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> O very poor <input type="radio"/> O poor <input type="radio"/> O fairly poor <input type="radio"/> O neither poor nor good <input type="radio"/> O fairly good <input type="radio"/> O good <input type="radio"/> O very good</p>
Y62	<p>List up to three things that you personally like about the way in which the YELLOW page indicates that the information in this website is also available in your own language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
Y63	<p>List up to three things that you personally do not like about the way in which the YELLOW page indicates that the information in this website is also available in your own language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p><i>Now please close <u>all</u> the browser windows that are still open (e.g. the one with the YELLOW page)</i></p>	

<i>Comparative evaluation</i>	
<p><i>This section compares some design choices and strategies used by the four pages you have looked at. Whenever a question refers to particular pages or to some of their features, feel free to look at them again as much as you wish, by clicking on the relevant icons in the middle of the desktop. If you wish, you may look at different pages simultaneously or in sequence, in order to compare them.</i></p>	
E64	<p>Which of the following three approaches do you personally think is more successful in indicating that the information contained in the website is also available in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> the name of the language written in the language itself - e.g. “<i>Español</i>” for Spanish, “<i>Deutsch</i>” for German, etc. - and no other visual clue (as in the case of the BLUE and YELLOW pages)</p> <p><input type="radio"/> a flag representing the language and no other indication (as in the case of the GREEN page)</p> <p><input type="radio"/> a combination of the flag representing the language and a brief welcome message written in that language (as in the case of the RED page)</p>
E65	<p>Which of the following two approaches do you personally think is more successful in indicating that the information contained in the website is also available in your own language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> the various language options are presented in a separate page, whose sole purpose is for the user to choose their preferred language (as in the BLUE, RED and YELLOW pages)</p> <p><input type="radio"/> the various language options are presented in a prominent area of an already existing home page which also has different content, e.g. text, banners, pictures, etc. (as in the GREEN page)</p>
E66	<p>Look at the GREEN and RED pages. What is your reaction to the way in which these two pages represent the availability of your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> very inappropriate <input type="radio"/> fairly inappropriate <input type="radio"/> neither inapp. nor approp. <input type="radio"/> fairly appropriate <input type="radio"/> very appropriate</p>
E67	<p>Comment on your reaction to the way in which the GREEN and RED pages represent the availability of your language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
E68	<p>Look at the BLUE and YELLOW pages. What is your reaction to the way in which these two pages represent the availability of your language? (<i>tick one of the following options</i>)</p> <p><input type="radio"/> very inappropriate <input type="radio"/> fairly inappropriate <input type="radio"/> neither inapp. nor approp. <input type="radio"/> fairly appropriate <input type="radio"/> very appropriate</p>
E69	<p>Comment on your reaction to the way in which the BLUE and YELLOW pages represent the availability of your language:</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>Now please close <u>all</u> the browser windows that are still open</p>	
<p>9/10</p>	

<i>Final comments</i>	
<p><i>This section elicits some final comments and reflections on the four pages you have looked at. Whenever a question refers to particular pages or to some of their features, feel free to look at them again as much as you wish, by clicking on the relevant icons in the middle of the desktop. If you wish, you may look at different pages simultaneously or in sequence, in order to compare them.</i></p>	
F70	<p>Before you started this experiment, did you know that London is one of the candidate cities to host the 2012 Olympic Games?</p> <p style="text-align: center;">O yes O no</p>
F71	<p>Before you started this experiment, had you ever visited the official website that has been set up to support London's bid to host the 2012 Olympic Games, available at the following Internet addresses: http://www.london2012.org or http://www.london2012.com ? (Before answering this question, feel free to log on to these websites and have a look at them – they are identical although the Internet addresses are different; click on the "Start" button to launch Internet Explorer)</p> <p style="text-align: center;">O yes O no O not sure</p>
F72	<p>Take a few moments to look again at each of the four pages (click on the icons in the middle of the desktop to open the pages). Based on your personal preference, give an overall ranking of the four pages, with "1" being the best and "4" being the worst. If you wish, you may give an equal ranking to more than one page (write your rankings in the boxes above the names of each page)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"><input type="text"/> <i>BLUE page</i></div> <div style="text-align: center;"><input type="text"/> <i>GREEN page</i></div> <div style="text-align: center;"><input type="text"/> <i>RED page</i></div> <div style="text-align: center;"><input type="text"/> <i>YELLOW page</i></div> </div>
F73	<p>Explain the reasons behind your ranking of the four pages:</p> <hr/> <hr/>
F74	<p>The following features relate to websites that rely on free online machine translation services (as opposed to human translation). Give your opinion on each of the 7 features (tick the relevant option for each feature):</p> <ol style="list-style-type: none"> 1) <i>The fact that the translation service is available free of charge to both visitors and webmasters</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 2) <i>Professional look of the page informing visitors that the translation into their language is available</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 3) <i>Careful use of symbols indicating languages (e.g. flags), so that no visitor feels upset or excluded</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 4) <i>Ease of use and interaction when visitors have to select the language in which to navigate the site</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 5) <i>Fast response time in providing the translation after visitors select their preferred language</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 6) <i>A note on the limitations of machine translation (e.g. warning/disclaimer, as provided by YELLOW page)</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important 7) <i>Wide language coverage (translations offered in a large number of different languages)</i> completely irrelevant <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> very important