LEIT phase I final report

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1. Summary of LEIT Phase 1

The LISA Education Initiative Taskforce (LEIT), http://www.ttt.org/leit, was formed in March 1998 at the behest of the Executive Committee (ExCom) of the Localisation Industry Standards Association (LISA), http://www.lisa.unige.ch, under the direction of Alison Rowles, LISA Business Manager, with Alan K. Melby as chairman, with the express purposes of:

1. Evaluating the state of education in three areas: localization, internationalization and globalization, as reflected in programs directed at five specific job functions:
    a. Localization project managers
    b. Translators working in localization environments
    c. Software engineers developing and internationalizing software
    d. Technical writers creating documentation that will later be localized
    e. Upper managers making organization-wide decisions that affect the internationalization/localization process
2. Making informed recommendations to the ExCom on whether LISA should support the development of new courseware in one or more of those three areas

To carry out Phase I of its mission, LEIT was charged with:

1. Identifying existing courseware in the three areas mentioned above
2. Performing a market-needs survey of companies involved in the language industries to determine what training the localization industry would like to see that new recruits generally do not have.
3. Based on an analysis of the first two items, mapping existing programs to needs and determining whether lacunae exist that require action to fulfill perceived market needs
4. Presenting a list of recommendations to the LISA ExCom on what actions, if any, should be taken in the arena of courseware development.

Phase II, which depends on the results of Phase I, would involve the implementation of any approved recommendations that grow out of the initial study.

LEIT has been active since its inception and has carried out its mandates, as detailed in this document.

1.2. Terminology

During its work, the LEIT group encountered the specific problem that terminology in the localization industry is not used consistently across the industry. Consequently, LEIT agreed to use the following definitions internally:

Localization (**L10N**) Localization involves taking a product and making it linguistically and culturally appropriate to the target locale (country/region and language) where it will be used and sold.

Internationalization (**I18N**) Internationalization is the process of generalizing a product so that it can handle multiple languages and cultural conventions without the need for re-design. Internationalization takes place at the level of program design and document development.

Globalization (**G11N**) Globalization addresses the business issues associated with taking a product global. In the globalization of high-tech products this involves integrating localization throughout a company, after proper internationalization and product design, as well as marketing, sales, and support in the world market.

1.3. Summary of LEIT Phase Ia observations and recommendations

Research indicated that although educational resources for localization are quite good at the university level in a few locations in the world, they are quite sparse overall. Most of the existing courses are not easily portable. The current focus in most locations is on terminology management and translation tools, with only some introductory treatment of localization per se (primarily in Ireland, but increasingly in the US and elsewhere in Europe). Education in internationalization is somewhat less common and all of the academic courses that LEIT identified

are aimed at professionals already active in software engineering. There is very little aimed at computer science students. Adding full courses to existing computer science curricula would be impractical at this point. LEIT found no business courseware (in university business programs) of any sort dealing with the language aspects of high-tech-globalization.

The immediate recommendation was that LEIT complete Phase I in order to prepare actual long-term recommendations with regard to the implementation of Phase II, which may involve, if justified by the results of this analysis:

1. Preparation of courseware to fill existing lacunae both in academia and industry
2. Exploration of the possibility for establishing a LISA-authorized certification program

2. discussion of existing programs uncovered in Phase I of LEIT

Most of the activity for the survey of existing courseware carried out in Phase I was conducted by Arle Lommel (BYU) and Ela Kotkowska (KSU). Most of the work was done via web searches, networking with informed persons in various locations around the world, extensive searching of online course catalogs of various universities, and numerous e-mail queries, both on a person-to-person level, and on listservers that relate to language industries.

LEIT found that, while there are various locations where language industry training is readily accessible and adequate, such as in Ireland, in most locations there is little or no courseware available.

In the following sections, reference is made to the matrix of courseware on the LEIT website, which is available at the LEIT website, http://www.ttt.org/leit/. **For specific information on any of these courses/programs, please visit the LEIT website.** The following universities all had relevant programs:

- University of California—UC Santa Barbara and Santa Cruz extensions. (No website, but questions can be directed to Bill Hall, billhall@mlmassoc.com)
- National University of Singapore, http://www.iss.nus.edu.sg/courses/postgraduate_cover.htm#Master of Technology
- Dublin City University (2 courses), http://www.dcu.ie/general/deg_str.html
- University of Saarbrücken (3 courses), http://www.uni-saarland.de/philfak/fb8/fr86 (German) or http://www.uni-saarland.de/philfak/fb8/fr86/englisch/welcome.htm (English)
- Mercer University, contact David Leonard, leonard_dc@mercer.edu
- Monterey Institute of International Studies (2 courses), http://www.miis.edu/gsti/ticourses.html
- University of Limerick (2 programs), http://www.csis.ul.ie/software_localisation/, http://www.ul.ie/~lcs/techcom/tcpage1.html
- Kent State University (2 programs), http://appling.kent.edu/60011syllabus.htm
- Fachhochschule Köln (Cologne University of Applied Science)
- Felician College (3 courses), http://www.felician.edu/ce/no_frames/nf_translation.htm
- UMIST (2 programs), http://www.ccl.umist.ac.uk/

In addition to the above listed programs, LEIT is aware of many other universities that teach terminology applications and other translation skills, but the primary objective of LEIT was to find localization courses, so, in general, schools with terminology programs are not included in the above list, unless they responded to the LEIT survey directly with information about their programs. Also, although not cited above, the University of Vienna School of Business provides one day seminars on globalization issues aimed at people in business environments who need to learn about language-related issues.

There are also a number of programs providing industry training on an *ad hoc* basis at various locations. Those LEIT has specific information on include:

- TGP Consulting, http://www.TGPConsulting.com
- Star+Globe Technologies (No website, but questions can be directed to Ms. Pauline Ng, pauline@starglobe.com)
- Bjorn Austraat, http://www.austraat.com
- Berlitz, http://www.berlitz.com for general programs, http://www.austraat.com for writing for translation
- The Localization Institute/Henes Inc., http://www.localization-institute.org
- Simultrans and the Society for Technical Communications, http://www.simultrans.com/events.htm
- ETP, http://www.etpint.com/html/lisa_workshop.html
- SLIG (Software Localization Interest Group) sponsors various localization-related activities

The above list does not include individual consultants who conduct in-house training, nor is it likely to contain all seminars currently available since many seminars are contracted for specific businesses or are administered at a local level and never advertised where they would by found by LEIT.

2.1. Localization

Of all of the course types LEIT examined, localization courseware, of one type or another, is the most common. (Academic) localization courses currently are being taught in the following locations:

- Dublin City University
- University of Limerick
- Monterey Institute of international Studies
- University of Saarbrücken
- Felician College (New Jersey)

There are currently seminars, workshops, or in-house training being taught by the following:

- Bjorn Austraat
- TGP Consulting
- The Localization Institute/Henes Inc.
- Simultrans

Terminology courses are taught at the following locations (these institutions responded with specific information about terminology courses, but the list is not exhaustive, as LEIT knows of other terminology programs from which information was not obtained):

- Cologne University of Applied Science (Fachhochschule Köln)
- University of Saarbrücken
- Kent State University
- University terminology program—University of Vienna, Austria

Many of the courses taught incorporate project management skills into their curricula, and ETP, a Dublin-based company, holds project management workshops especially for the LISA audience.

Computer-assisted translation courses (not specifically localization, but applicable to the LEIT study) are taught in the following locations:

- Monterey Institute of International Studies
- Kent State University
- UMIST

In addition, specific machine translation (MT) programs are taught at the following locations

- UMIST
- Dublin City University

Although translator/interpreter training is common, most such programs have not yet begun to incorporate localization and/or translation tools training into their curricula in any systematic way. Thus certain locations have excellent training, but this training is far from universally available, and translator training programs in general are inadequate to prepare someone to go directly into localization without additional on-the-job training. Of the schools contacted in Phase I by LEIT, the overwhelming majority indicated that they had no localization training, did not know of any other academic institutions that do, and had no definite plans to add localization components to their programs. Some individuals affiliated with various programs did, however, indicate that they would be interested in implementing such materials were they available.

The LEIT group has received inquiries from its web-based activities for information on programs in various locations other than those listed. Unfortunately there has been little available for people who do not live near one of the universities above or who can not afford to travel to a seminar in another location.

2.1. Internationalization

Internationalization courses are less frequent than localization courses, possibly because the model curricula for computer science programs of the Association for Computing Machinery (ACM), http://www.acm.org, includes no provision for internationalization training. Most computer science curricula are already very rigorous and their graduates are virtually assured of jobs upon graduation, so there is little incentive to add anything more to their curricula, at least in the United States. The lack of internationalization training for technical writing may stem from the perception that writing for translation is not a particularly marketable skill. LEIT did receive some comments from various schools that they might focus on internationalization issues if they were convinced that these would help their students find jobs.

Academic software internationalization courses are currently offered at:

- National University of Singapore
- University of California Santa Cruz and Santa Barbara
- In addition, a course to begin in February 1999 on software internationalization with Java to be taught at the University of California Santa Barbara Extension has been announced.

Seminars, workshops, or inhouse training are currently offered at:

- Star+Globe technologies. (This seminar focuses on Unicode.)
- TGP Consulting
- The Localization Institute/Henes Inc.

Academic courses in technical writing which emphasize writing for translation can be found at:

- University of Limerick
- Mercer University

Seminars, workshops, and in-house training on document internationalization are provided by:

- Berlitz
- Karin Spalink
- The Localization Institute/Henes Inc.

LEIT does not have specific figures on how many new technical writers are needed in the United States (let alone the world) each year for writing for localization, but informal conversation with people in the industry indicates that industry in general expects to train technical writers who need to write for localization since this skill is uncommon, and that a writer with training in this area would have a marketable skill.

2.3. Globalization

Globalization is the area where LEIT found the least courseware. To search for globalization courseware, the primary instrument was an e-mail query sent to various chapters of CIBER (Center for International Business Education and Research) and AIB (Association for International Business), an international association of business educators. This e-mail was sent by the president of the CIBER chapters, Lee Radebaugh of the BYU Business School. From this survey LEIT was not able to locate any business courses dealing with language-related aspects of high-tech product globalization.

One course aimed at technical writers (Mercer University, see section 2.B) does provide significant information on globalization and marketing of technical communication in an international context, but the course is not aimed at business students. In addition, the University of Vienna School of Business conducts one-day seminars treating globalization issues.

Independent web searches and queries have confirmed that, as far as LEIT can determine, language-related globalization topics are not taught to business students anywhere on a formal level, with the exception of the University of Vienna's globalization seminars (which deal primarily with language and cultural issues).

2.4. Other

Other courseware materials exist that relate to LEIT, but which are not included here, either due to their limited nature (single lectures in university programs), or because they are not yet offered. A list of these materials can be found at http://www.ttt.org/leit.

3. A discussion of the LEIT market needs survey and its results

The LEIT market needs survey is ongoing. The survey involves LISA members and other localization-industry professionals to determine how important training in various areas was felt to be for five job descriptions:

1. Upper managers
2. Project managers
3. Software engineers
4. Translators
5. Technical writers

These job descriptions were deliberately left somewhat vague so that the survey could be used to query individuals working in various work environments. The survey did not specify any job more specifically than listed above. This caused a number of respondents to question the job descriptions and suggest alternatives, but any of the alternatives would have been narrower in scope.

The survey was responded to by fifty-three individuals, either with paper-based forms or via an online form. This accounts for approximately 1/6 of LISA members. The survey was also continued at the KSU conference, and, at the suggestion of individuals at the conference, will be extended, in a modified form, to individuals who have graduated from LEIT-listed courses.

3.1. Survey methods

The LEIT market needs survey was carried out using two methods, a paper-based survey distributed at the LISA General Assembly meeting in Madrid in August 1998, and an online survey form at http://www.ttt.org/leit. Both of these surveys were identical and asked respondents to indicate how important previous education in certain job skills is on a scale of 1 (highest priority)–5(lowest priority), as listed here (**please note that the number 1 indicates a first priority and the number 5 a much lower priority**):

1. a job critical skill—employee must be highly skilled at this task
2. a job requirement—previous training or experience in this task mandatory
3. a necessary skill—employee should have some training in this task area
4. a needed skill—minimal training or experience required
5. a skill which could be learned on the job—no previous training required

Participants were invited to comment on any aspect of the survey and to list any skills that they felt should be included.

3.2. Survey audience

Most of the survey respondents were listed as contact people for LISA in their various organizations, and the companies surveyed represent a large variety of sizes and types. Unfortunately the data sample is not big enough to draw any conclusions about specific sub-groups of the LISA membership. As a result of the Kent State University LEIT meeting, the decision was made to extend the survey to recent graduates of existing programs and to individuals who have just entered the localization field to determine which of the listed skills they found the most job-critical. Although the survey of recent graduates has not yet been distributed, it is currently in preparation and will be similar in form to the survey discussed in this section.

Most of the survey respondents were in positions to determine or influence hiring practices for their department or company (in the case of companies that dealt strictly with localization-related services).

3.3. Survey results

The LEIT survey results are available in Appendix A. The appendix gives a ranking of skills. Basic skills are those skills needed even outside of a localization-related context. Additional skills are those which are relevant specifi-

cally to a localization-related context. The results are also available on the LEIT website, temporarily at http://www.ttt.org/leit.

The average for all job descriptions was 2.22, indicating that most of these skills are considered to be part of the mandatory experience required for these jobs. The highest priority score is 1.31, the score given for technical writing ability in technical writers. The lowest priority score given is 3.35, given for translators' ability to format check outside of their preferred languages.

The overall average indicates that education prior to beginning a job is viewed as extremely important by the survey participants. Individual responses varied considerably, but the jobs ranked as most important in this survey tended to have greater agreement among those surveyed than did the jobs given higher scores, which some people considered vital and others did not (e.g., machine translation).

For LEIT purposes the most useful data is contained in the following section (section 4), which matches the skills list with topics covered by specific courses.

4. An analysis of the market needs survey results vis-a-vis existing educational materials

Appendix B gives charts on which skills from the LEIT survey programs actively teach. Not all courseware providers in the courseware matrix have responded to this query, but enough have responded to indicate certain trends when taken together with discussion with individuals in the localization industry:

1 All of the 'additional' skills that were in the LEIT skills survey are taught somewhere in at least one of the courses, with the exception of 'use of desktop publishing software' (but this is taught in many courses not specific to localization). Thus, all of the skills particular to the localization industry are being taught somewhere in some capacity.

2 Despite the fact that all skills are taught somewhere, the set of given skills that are taught at any one location varies tremendously. Therefore, there is no real guarantee that any particular course teaches the particular skills and knowledge that industry needs.

3 While training programs like TGP Consulting and Henes Inc. offer a wide variety of training in a number of subject areas, this training is not widely available to individuals entering the field before they are hired. The burden of training in most locations is on the first company to hire an individual in a localization-related position.

4 Informal discussion with individuals associated with LEIT-listed courses and seminars indicates that individ uals graduating from academic courses in the localization arena are typically hired as project managers. Entry-level applicants typically have no previous localization experience (i.e., they have no localization schooling).

5 Project management skills are not learned by most translation students, although some of the courses examined do include training in project management. Nevertheless, many localization professionals become project managers. ETP, in conjunction with LISA has made project management seminars available to the industry for the past two years.

6 Current estimates as to the number of trained translators produced each year is 300 in the U.S. Roughly similar estimates seem to apply to Germany and Austria (based on estimates given at the KSU conference), and most countries probably have even lower figures. Most of these have little or no exposure to localization.

7 Recent searches on DICE.com (http://www.dice.com) yielded the following information. (DICE.com is an online high-tech job search service in the United States. Job postings on DICE represent at best a fraction of jobs since many jobs are never posted on DICE.) Searches of the keywords *internationalization* and *globalization* (both being used in the software industry to mean LEIT's use of *internationalization*) returned 1,896 jobs; *localization* returned 1,925 jobs; and *technical writing* returned 2,621 jobs. Open questions are how many of these positions are entry level and how many of the technical writing jobs involve writing for subsequent localization. Even assuming 10-15% in each case gives an idea of the number of new professionals needed each year. (The numbers of jobs on DICE are constantly increasing as well.)

8 Localization is the area with the best educational coverage, but even this falls short of world-wide need for trained and educated professionals.

9 Those software internationalization courses which are offered cover internationalization methodology well, but these courses are extremely few in number (LEIT knows of only three, two in the University of California extension system, and one in Singapore, and all three are aimed at working professionals rather that at computer science students). Internationalization courses are inaccessible in most of the world. When compared with DICE's figures, it is clear that there is a *distinct* mismatch between training at the university level and the requirement for training in software internationalization needed by the market.

10 Training in technical writing for translation is considered important, but only two university level courses and one seminar (as well as some for-hire training) discovered by LEIT dealt with these topics. Although it is difficult to say how many tech writers write for subsequent localization, the numbers are likely higher than the number of technical writers trained in writing for translation. Most technical writers in entry-level positions are unlikely to be previously trained in writing for localization.

11 The number of jobs and the demand for localization professionals, if DICE.com is any indication, is considerable, and the number of individuals the present university courses are capable of producing (anywhere in the world) is far smaller than present demand, even granted that many of the jobs on DICE.com are not entry-level jobs (where formal education would have the most effect).

12 There is clear shortage in terms of numbers of trained persons applying for entry-level positions. A common complaint among LISA members is the amount of time spent on training new personnel to achieve basic

skill levels needed for their jobs. This puts a burden in terms of resources and time on smaller companies that provide entry-level positions for people who are all-too frequently then hired away by bigger companies once they have achieved a certain skills level. In this way smaller companies with fewer resources often bear the cost of training for wider sectors of the industry.

5. Recommendations for further LEIT/LISA action

Given the observations above which are derived from the LEIT surveys, it is clear there is a gap between the educational state the localization industry desires and what actually exists. This is not to downplay any of the current efforts by various organizations and individuals to remedy this situation. Unfortunately, it seems as if most efforts reinvent the wheel by duplicating efforts made elsewhere. Typical courseware in localization is dependent on a skilled instructor who has developed the materials himself or herself.

Typical materials consist of some simple PowerPoint presentations, some handouts, and maybe a text which can be referred to for specific information (often a packet of photocopied articles). The courses are therefore instructor-dependent and instructor-developed. Materials are neither standardized, not easily *portable*. (Portable would mean that the materials could be easily transferred to and applied by instructors who had not developed the materials themselves.)

Because many efforts have been made already in developing educational material, any educational endeavors undertaken by LISA need to cooperate closely with individuals who already have experience in teaching localization. Most LISA impact would be felt in localization courseware at the university level, but a careful approach to courseware development would make LISA-sponsored courseware materials highly flexible.

LEIT members currently see three options for continuing efforts in localization, as described in the following sections. At this stage the intermediate plan of action is the one which LEIT recommends to LISA as the one most likely to gain active support from educational bodies.

5.1. Minimal plan for action

The minimal action recommended by LEIT would be for LISA to fund ongoing maintenance of the courseware matrices and market needs information currently available at the LEIT website (temporarily at http://www.ttt.org/leit). This would involve continued monitoring of web sites and continued effort to keep abreast of the educational situation in localization-related fields. In addition, materials to aid in instruction of localization will be included in the LEIT website as they become available. The LEIT webpage could become **the** source of educational materials in localization-related fields. This plan is a requirement if LEIT efforts to date are not to be quickly outdated. The state of educational materials changed substantially even over the few months during which LEIT has gathered information.

The matrices and information would be kept publicly available and updated. In addition, a LEIT listserver has been established to promote the exchange of educational materials on an informal basis. Based on observations made at the KSU conference there is considerable support from industry and educational bodies for this effort since no other resource like it exists anywhere.

Estimated costs of this option would be $300–$450/month, including all work on the LEIT website. This cost is based on $15/hour and 20–30 hours/month for one person to maintain the matrices.

5.2. Intermediate plan of action

The intermediate plan of action would be the development of model curricula for localization and internationalization training in cooperation with already existing courses. These would provide a framework for anyone teaching localization or internationalization and would provide a standard set of skills and knowledge that could be taught by any knowledgeable instructor using the model curricula. These curricula would provide a common standardized framework for instruction that could be used anywhere in the world (helping to resolve points 1 and 2 in section 4). The model curricula option would promote communication between academia and industry in the localization world by listing a set of skills and knowledge that could serve as a common reference point in discussions. This option would also need to include LISA 'train-the-trainer' workshops on how to use and teach the curricula.

The model curricula approach does not fully address the current problem that course materials are not easily portable, although it does help in this regard. Instructors implementing the model curricula would still need to develop lesson and teaching plans and gather teaching materials, but this task would be much easier since there would be a clear outline of instruction. Any model curricula would need to contain comprehensive bibliographies of localization materials to aid potential instructors. Such information and resources could be placed on the LEIT website and there made freely available to anyone accessing the site. The curricula would also need to be based on

educational consensus and the approval of business contacts who could affirm that the skills and knowledge taught met real demands both from an educational perspective and from a business perspective. The curricula would need to be subject to ongoing review in order to ensure that they would remain up to date.

The model curricula would require the real support of tools and hardware vendors to make both software and hardware available to courses implementing LEIT curricula. A common complaint voiced at the KSU conference was that many tools vendors do not discount their tools enough to make them affordable in an academic environment. Tool companies could establish their own criteria for determining which courses could receive special prices, but each company would need to have one designated contact person to whom instructors could go. This person would need to be familiar both with LEIT curricula and with company educational discounts policy.

Both the model curricula and a standard academic pricing and support policy from localization tools providers would greatly encourage the development of new courses by reducing the initial investment required to start localization training programs at the university level.

The question remains open as to how LISA might want to release these curricula. At this stage, LEIT strongly encourages that they be made freely available to any institutions or individuals looking at implementing them. Making curricula freely available would also serve individuals who do not have access to formal training by providing them with a framework for self study.

It is currently estimated that each curriculum could be developed for about $6,000 plus the ongoing costs of maintaining the LEIT website. The cost of developing a 'train-the-trainer' workshop, which could be put on in various locations, would be $10,000. Current estimates of travel costs to fund meetings of LEIT curricula developers would be approximately $20,000/year, although this subject needs further evaluation. Since current LISA Workshop fees are higher than most academic entities could pay, scholarships would need to be made available for localization trainers to attend train-the-trainer workshops

EST (the European Translator's Association) has expressed interest in working with LEIT to provide train-the-trainer workshops, perhaps with E.U. funding.

Based on response of individual educators at the KSU conference, this option is the one for which education and industry have the most support at this time. There was considerable approval for this plan, as well as for the 'tool box' described in the next section.

5.3. Optimal plan of action

The optimal plan of action would call for the development of a 'tool box' for the teaching of localization. This would include detailed exercises, sample data, detailed PowerPoint-type presentations, as well as everything needed in the intermediate option. This option is the logical extension of the model curricula approach, and its requirements in terms of long-term commitment would be very similar to the intermediate plan of action.

The full courseware option would require that LISA work closely with various academic entities and provide funding in the form of grants, graduate student assistance, travel costs and costs for sub-contractors. LEIT estimates a cost of $150,000–$200,000 to complete the development of the 'tool box'. This is essentially the same cost as was given for the 'black box' approach mentioned in the August LEIT report, but the results would be much more easily 'localized' than would any black-box courseware.

LEIT highly recommends that any development be done in conjunction with existing endeavors in order to not duplicate efforts made elsewhere. There are a number of potential partners in this endeavor, but a list would potentially include at least the following: Kent State University, ISSCO, Monterey Institute of International Studies, Fachhochschule Köln, and Brigham Young University.

Currently Kent State University it developing courseware materials in localization training, as described below, and these efforts, with LISA funding, could serve as the core for the LEIT tool box:

> In Fall of 1999, the Institute for Applied Linguistics will offer a workshop course in Project Management and Localization Technology. The course will be offered to second-year graduate students in the Institute. It will be technically an elective (workshops are not required courses), but students will be so strongly recommended to take the course that it can be viewed as a quasi-requirement for all students with the exception of those who wish to specialize in literary translation. It will be strongly practice-oriented, with significant hands-on experience working with the relevant computer software. Topics address will include:
>
> - Project Management—project management topics will be prominently featured
> - Localization Tools
>   - Integrated systems
>   - Terminology management (review: treated in previous course)

- Translation memory
- Machine translation
- Specific localization tools (Corel, etc.)

Course development will be facilitated via close cooperation with industry leaders in the localization field: LMI, Microsoft, SDL, ILE, JD Edwards, Logos, TRADOS, IBM Diebold, Equipe, Lucent Technologies

5.4. Certification

As initially conceived, certification would have involved either LISA's certifying of educational programs or of individuals. At the Kent State University conference these ideas were modified as follows.

5.4.1 Certification of programs

From reaction at the KSU conference, it is clear that there is little support for a top-down approach to certification. A self-certification approach, however, would likely be supported. In a self-certification approach course-instructors could state whether or not their courses meet LISA/LEIT requirements for localization courseware offerings. This option would involve no monitoring on the part of the LISA and would be based on models such as ISO 9000 statements of compliance. Thus the cost to LISA would be minimal (probably entirely free).

5.4.2 Certification of individuals

A more ambitious step would be to implement a program of certification for translator-localizers or for internationalizers in the areas of programming and/or technical writing. This concept is already under serious funded study for both program managers and localizers in Ireland. LEIT recommends that LISA examine the results of SLIG's initiative before considering any further action in this area. LEIT needs to constantly coordinate with SLIG on the content of LEIT model curricula compared with the content of SLIG's examinations in order to ensure a close match between the two.

5.5. Possible initiative in areas other than localization

Localization is the area in which LISA-developed courseware can have the greatest impact, but LISA can potentially influence other fields as well.

5.5.1. Software internationalization

As mentioned in sections 5.2, LISA could fund the development of model curricula for a course module in software internationalization. The cost of this would be similar to that of developing curricula for localization except that scope here should be more limited. LEIT members do not feel that it would be practical at this time to develop a full course in internationalization since it is unlikely that any computer science programs would utilize an entire course.

Support for the development of a complete software internationalization module plan would also be an option. A course module would stand a much better chance of being integrated and used in computer science programs that would a full course. BYU is currently developing such a module, which could serve as the foundation for a LISA module in internationalization.

Many industry analysts maintain that the greatest cost savings and efficiency improvements can be realized by investing skills and resources in internationalization. Internationalization, when properly carried out, need only be done once, but its impact on multiple localizations is considerable. Proper internationalization results in lower overall costs and a faster time to market. Thus it is advisable that LISA consider some courseware development in internationalization.

5.5.2. Document internationalization

Options for document internationalization are similar to those outlined for software internationalization above, but for the present a much more conservative project would likely suffice. In the survey phase of LEIT's activities, it was noted that technical writing programs in the U.S. were generally unaware of a need to train students to write for translation or of a market for writing for translation. LISA could fund the development of informative literature to sensitize teachers of technical writing to issues of writing for translation.

This option would involve a study to determine the number of positions involving writing and would demonstrate a differential in pay rates for those already trained and those not trained to write for translation (if a differential exists). Then informative literature would need to be developed and distributed. The costs for this option depend on the amount of research involved plus distribution and production costs of any literature.

5.5.3. Globalization

Two options exist for globalization, as outlined in the LEIT report for the August LISA GA meeting (http://www.ttt.org/unready/report.html). These options are:

1. The development of informative literature on the requirements of localization and internationalization to be made freely available to those in positions to influence upper management decisions. These materials could be distributed in a number of ways, and the scale of this project would depend entirely on the resources LISA would want to put into it. A simple version might involve the development of informative materials that could be downloaded from the LISA website in PDF format. A more complex version would involve the development of printed materials which could be ordered free of charge or at low cost from LISA, as well as advertising of these materials in venues likely to be noticed by upper management.
2 The development of a course module at BYU by the BYU Marriott School of Management, which could be then distributed through the network of CIBER chapters. BYU is ideally placed to develop such courseware since the president of the CIBER chapters is on the BYU Business faculty. The estimated cost of option number 2 is $25,000.

5.6. Financial summary and funding opportunities

5.6.1. Financial summary

1. **Minimal Plan:** The minimal plan would cost approximately $300-$450/month on an ongoing basis.
2. **Intermediate Plan:** The intermediate plan would cost approximately $6,000 per curriculum. In addition, the following costs would apply:
    a. Workshops: $10,000
    b. Travel for LEIT members: currently estimated at $20,000/year
    c. Scholarship funds for localization trainers to attend LISA/LEIT workshops: The amount for this need to be determined.
    d. Ongoing costs of maintaining LEIT web materials: $300-$450/month

    Total costs: approx $40,000+
3. **Optimal Plan:** Total cost for the optimal plan would be $150,000-$200,000. For this amount LISA would be buying everything needed to implement LEIT-developed courseware.
4. **Certification:** As currently envisioned, the costs of certification plans would be zero for LISA since course certification would be self-statements of conformance and since individual certification will not be pursued directly by LISA.

5.6.2 Funding opportunities

There are a number of funding possibilities for LEIT Phase II. These include: LISA membership (through the LISA 2000 Initiative), industry support, and possible governmental sources (both in the U.S. and in the E.U.). In specific,

preliminary discussions were held with with LeTrac at the KSU conference on jointly seeking funding for future endeavors under the E.U.'s Fifth Framework. Details of these possibilities still need to be worked out.

LISA is a non-profit organization dedicated to promoting the localization industry. As a non-profit organization, LISA does not have the resources to fund initiatives such as LEIT without the help of industry and motivated indivduals. Any contributions which you, or your organization, would like to make would be gratefully appreciated. For financial contributions or inquiries, please contact Alison Rowles, LISA Business Manager via e-mail <alison.rowles@lisa.org>, phone (+41 21 821 3210), or fax (+41 21 821 3219). For specific inquiries about LEIT content, or to arrange to contribute teaching materials, examples, etc., please contact Arle Lommel via e-mail <leit@ttt.org>.

Appendix A. LEIT industry needs survey results

The following data were obtained from an online survey form (http://www.ttt.org/leit) and from paper-based survey forms filled out by members of the Localisation Industry Standards Association.(LISA)

As of 1998 October 20 fifty-three respondents (approximately 1/6 of LISA membership) have responded to this survey, enough to give statistical significance to the data for the whole of the LISA, but not to break the data into smaller categories (e.g., supplier vs. requester, large company vs. small company or Europe vs. America).

Survey participants were asked to rank various job skills with regards to the priority of previous educational experience on a scale of 1 to 5, as follows:

1. a job critical skill—employee must be highly skilled at this task
2. a job requirement—previous training or experience in this task mandatory
3. a necessary skill—employee should have some training in this task area
4. a needed skill—minimal training or experience required
5. a skill which could be learned on the job—no previous training required

These skills were divided into five job descriptions, which approximate the sorts of jobs found in many companies (although they do not attempt to match any specific company structures). These profiles were:

1. Upper management
2. Project managers
3. Software engineers
4. Translators
5. Technical Writers

Each of these categories was further broken down into what LEIT members felt were basic skills and additional skills:

- A **basic** skill is one that any person working in any of these job descriptions should have as matter of fundamental training, even in cases where they are not trained for work in the localization industry.
- An **additional** skill is one which is important for working in a localization-industry context.

In a localization environment certain additional skills will be considered more important to job success than will some of the basic skills. This is not a surprise as the localization industry is an industry with specialized needs. Consequently, it is worth note that some of the 'additional' skills were felt to be more important than some of the 'basic' skills.

The average for all scores was 2.22, a relatively high priority score which indicates the general importance placed upon education in the localization industry. This score is very close to the score given to skills that are 'a job requirement—previous training or experience in this task mandatory'. Please note that even the highest scoring items were still scored as being necessary skills that employees should have at least some training in.

Skills are given two scores in each table:

- **Average score:** This is the average of all scores gathered for this skill
- **Relative importance.** The second figure is derived by subtracting the average for all scores from the average for the particular skill. This figure is useful because it indicates how important a skill is relative to the importance of all skills. The lower this figure is, the more important the skill was felt to be. Please note that this score only indicates the relative importance of skills with respect to other scores, not to their specific importance in any given situation. This score would be useful for determining how much time to spend in a course on each subject.

In addition to the scoring, these tables make use of colors to indicate at a glance the relative importance of individual skills according to the survey data, based on how far its score is above or below average.

Lower	Upper	Relative priority
	-0.5	Highest
-0.5	0.0	High
0.0	0.5	Low
0.5	1.0	Lowest
1.0		Extremely

The scores in these charts do not indicate that any skills are unimportant. It should be kept in mind that the average score was quite low and that all of these skills are considered valuable and desirable.

Comments on the forms

Comments were also solicited, both in terms of jobs that we did not consider that respondents thought should be considered, and of a general nature. A summary of frequent comments is provided after the tables for each section.

Upper Management

Skill	Average score	Relative Importance
Basic Skills		
Basic management skills	1.52	-0.70
Experience in management	1.72	-0.50
Additional Skills		
Opportunity cost with respect to speed of L10N	2.06	-0.16
Awareness of how to measure return on investment with respect to I18N, G11N and L10N	2.20	-0.02
Awareness of marketing issues	2.28	0.06
Awareness of cultural issues	2.32	0.10
Awareness of internet and its impact on global business	2.35	0.13
Awareness of project development issues	2.38	0.16
Awareness of linguistic issues	2.49	0.27
Awareness of legal issues involving L10N	2.59	0.37
Awareness of L10N beyond legal requirements	2.88	0.66
Awareness of ergonomic factors	3.29	1.07

Comments:

Many people in the course of all aspects of our research have verbally expressed a desire to have upper management recognize the needs of localization and the need to plan for localization from an early stage. The common perception though is that upper management will not be easily reached or motivated to invest more in localization.

The skills that seem to be the most needed, based on the survey, are those that relate to upper management planning for localization and knowing how to decide to what extent to localize. Specific localization life-cycle knowledge and awareness of the process do not seem to be seen as nearly important.

Project Managers

Skill	Average score	Relative importance
Basic Skills		
Analysis and project planning	1.46	-0.76
Problem solving and decision making	1.73	-0.49
Budget analysis and time-line tracking	1.75	-0.47
Task allocation	1.75	-0.47
Negotiation skill	2.06	-0.16
Management of external partners	2.10	-0.13
Implementation and review	2.10	-0.13
Organizing and running meetings	2.27	0.05
Time/risk analysis	2.38	0.16
Time-to-market issues	2.46	0.24
WP/Spreadsheet/Project-management software	2.62	0.39
Additional Skills		
Knowledge of general linguistic and cultural issues	2.17	-0.05
Identification and elimination of redundant effort	2.31	0.09
Liaison with software developers	2.42	0.20
Technical knowledge	2.51	0.29
Identification and use of linguistic resources to support translation	2.55	0.33
Ability to decide on tool use	2.61	0.39
Awareness of ergonomic factors	3.18	0.96

Comments and analysis

One frequent comment we received in the course of the survey is that project management as a skill is not something that necessarily depends on education and that a skilled project manager, regardless of background, should be able to work in a localization environment with minimal training. Interpersonal skills and managerial abilities were cited as being far more important than anything in our survey.

Project management seminars and training are very common in (non-localization-specific) industry and none of the additional skills in our survey that relate to language-engineering projects are ranked significantly above average, a clear indication of the above-mentioned comments.

Software Engineers

Skill	Average score	Relative importance
Basic Skills		
Information technology: hardware and software	1.60	-0.63
Information systems: theory and practice	1.71	-0.51
Analysis and software development	1.79	-0.43
Data structures	1.80	-0.42
General Q/A methodology	2.15	-0.07
Networks and telecommunication	2.33	0.10
Database management systems	2.33	0.11
Project management	2.83	0.60
Additional Skills		
Character-encoding issues	1.85	-0.38
Resource manipulation and tools	1.94	-0.28
Implications of locale differences	2.10	-0.13
Standardization issues	2.14	-0.08
Text swell/expansion	2.15	-0.07
Awareness of language issues	2.22	-0.01
Formatting issues	2.25	0.03

Programming strategies for I18N	2.34	0.12
Localization-specific Q/A methodology	2.38	0.16
Interchange formats	2.41	0.19
Localization process knowledge and life-cycle awareness	2.55	0.33
Management of large linguistic resources	2.94	0.72

Comments

According to our survey, the localization-related skills for which training is the most vital are those which have the potential of saving the most time downstream—character encoding, resource manipulation skills, and text-related skills and knowledge. Interestingly enough, I18N programming strategies are not particularly high on the list, perhaps because companies expect to undertake training with regard to proper I18N techniques. The LEIT courseware list certainly indicates that there is relatively little available with regard to internationalization courseware.

Comments received from survey participants were varied, and the overall variability of the data may reflect some uncertainty as to what exactly the job description of a software engineer would be.

Translators

Skill	Average score	Relative importance
Basic Skills		
Proficiency in translation skills and methodologies	1.39	-0.83
Awareness of cultural issues	1.51	-0.71
Basic word-processing skills	1.73	-0.50
Basic terminology management and research skills	1.86	-0.36
Proficiency in a number of languages	2.02	-0.20
Basic internet and web skills	2.29	0.07
Additional Skills		
Culture-specific translatability problems	1.69	-0.54
Familiarity with translation-oriented terminology management	2.00	-0.22
Flexibility to work in technical fields	2.08	-0.14
Familiarity with translation technology tools	2.16	-0.07
Translation memory systems	2.20	-0.03
Team-oriented translation work	2.20	-0.03
Terminology management systems	2.25	0.03
Detailed word-processing capability	2.39	0.17
Expert terminology search, including web-search strategies	2.44	0.22
Experience with translation support tools	2.55	0.33
Experienced users of tools	2.56	0.34
Use of desktop publishing software	2.64	0.42
Stress-management	2.98	0.76
Machine Translation	3.24	1.01
Ability to format check outside of preferred languages	3.35	1.13

Comments

Tools familiarity and the ability to learn to use tools are seen as good skills, but detailed training in specific tools is not seen as nearly as important. Apparently this is an area where companies expect to train translators.

DTP and detailed word processing skills were not ranked as highly as we would have suspected from verbal comments we have received about translators typically lacking good computer skills.

Technical Writers

Skill	Average score	Relative importance
Basic Skills		
Technical writing skills	1.31	-0.92
Additional Skills		
Adaptation of source documents to facilitate localization	1.88	-0.34
Awareness of cultural and linguistic issues of localization	2.06	-0.16
Ability to liaison between program developers and translators	2.29	0.07

Comments

One comment which which reflects other verbal comments is that technical writers needs to be aware of many of the same issues as software engineers, such as text swell and expansion, knowledge of locale-related implications, and other similar aspects of document preparation. There was also come concern that the survey was very imprecise with regards to skills of technical writing. Ideally, if LEIT continues the survey effort, it would be wise to consult with technical writing experts in the industry to refine the technical writing portion of the survey.

Appendix B. List of courseware features compared to LEIT list of skills

These charts show which of the LEIT skills are being taught where, except for upper management skills, which were excluded from this listing since LEIT found no management courses. **Please note that all of the following information was obtained directly from individuals involved with the materials listed. LEIT and LISA make no guarantee as to the accuracy of these charts, nor is any endorsement, real or implied, made for any materials presented herein.**

The following abbreviations are used in the charts:

1	UCSC	University of California Santa Clara/Santa Barbara Extension software internationalization course
2	TGP	TGP Consulting materials, either in the text TGP sells, or taught in training programs
3	Aust	Localization seminar taught by Bjorn Austraat
4	Merc	Mercer University's documentation internationalization/globalization course
5	Saar	Saarbrücken University's three course program
6	LimT	University of Limerick Technical Communications
7	UMTr	UMIST translation program
8	UMMT	UMIST Machine Translation program
9	Köln	Cologne University of Applied Science (Fachhochschule Köln localization/terminology course
10	ETP	ETP project management workshops
11	KSU	Kent State University CAT and terminology courses
12	MIlo	Monterey Institute of International Studies localization course
13	MICA	Monterey Institute of International Studies CAT course
14	BerT	Berlitz Writing for Translatability Seminar

For more information on these materials, please see the LEIT courseware matrix at http://www.ttt.org/leit.

Project management basic skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Analysis and project planning		X	X	X	X					X				
Budget analysis and timeline tracking		X	X	X	X					X				
Task allocation		X		X						X				
Problem solving and decision making		X		X						X				
Implementation and review		X		X	X					X				
Management of external partners		X	X							X				
Negotiation skill		X								X				
Organizing and running meetings		X								X				
Time/risk analysis		X								X				
Time-to-market issues		X		X						X				
WP/Spreadsheet/Project-management software		X			X					X				

Project management additional skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Knowledge of general linguistic and cultural issues		X								X				
Identification and elimination of redundant effort		X								X				
Liaison with software developers		X								X				
Technical knowledge		X	X							X				
Identification of linguistic resources to support translation		X			X					X				
Ability to decide on tool use		X	X		X					X				
Awareness of ergonomic factors		X								X				

Software engineering basic skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Information technology: hardware and software		X	X	X										
Information systems: theory and practice		X												
Data structures		X												
Analysis and software development		X	X	X										
Networks and telecommunication		X												
General Q/A methodology		X												
Database management systems		X												
Project management		X	X	X										

Software engineering additional skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Character-encoding issues	X	X	X											
Resource manipulation and tools	X	X	X											
Implications of locale differences	X	X												
Standardization Issues	X	X												
Text swell/expansion	X	X	X											
Awareness of language issues	X	X	X											
Formatting issues		X												
Programming strategies for I18N	X	X												
Interchange formats	X	X												
Localization-specific Q/A methodology		X												
Localization process knowledge and life-cycle awareness		X	X											
Management of large linguistic resources		X												

Translator basic skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Proficiency in translation skills and methodologies		X			X		X		X		X	X		
Awareness of cultural issues		X		X	X		X		X		X	X		
Basic word-processing skills					X		X	X			X			
Basic terminology management and research skills		X			X		X	X	X		X		X	
Proficiency in a number of languages					X			X	X		X			
Basic internet and web skills		X		X	X		X				X	X	X	

Translator additional skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Culture-specific translatability problems		X		X	X		X		X		X	X		
Familiarity with translation-oriented terminology management		X			X		X	X	X		X			
Flexibility to work in technical fields		X			X			X	X		X	X		
Familiarity with translation technology tools		X		X	X		X	X	X		X	X	X	
Translation memory systems		X			X		X	X	X		X		X	
Team-oriented translation work		X			X						X			
Terminology management systems		X			X			X	X		X		X	
Expert terminology search, including web-search strategies		X			X		X		X		X	X		
Detailed word-processing capability					X		X	X			X			
Experience with translation support tools		X			X		X	X			X		X	
Experienced users of tools		X									X			
Use of desk-top publishing software														
Stress management											X	X		
Machine translation		X		X	X		X	X	X		X		X	
Ability to format check outside of preferred languages											X			

Technical writer basic skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Technical Writing Skills						X								X

Technical writer additional skills

	UCSC	TGP	Aust	Merc	Saar	LimT	UMTr	UMMT	Köln	ETP	KSU	MIlo	MICA	BerT
Adaptation of source documents to facilitate localization		X		X		X								X
Awareness of cultural and linguistic issues of localization		X		X		X								X
Ability to liaison between program developers and translators		X		X		X								X