
Designing an Arabic User Experience: Methods and Techniques to Bridge Cultures

Hala Hemayssi

Pathfinder Associates, LLC
55 East Washington Boulevard
Suite 1540
Chicago, IL 60602
hala@pathf.com

Elyse Sanchez

Pathfinder Associates, LLC
55 East Washington Boulevard
Suite 1540
Chicago, IL 60602
esanchez@pathf.com

Robert Moll

Pathfinder Associates, LLC
55 East Washington Boulevard
Suite 1540
Chicago, IL 60602
rmoll@pathf.com

Charles Field

Pathfinder Associates, LLC
55 East Washington Boulevard
Suite 1540
Chicago, IL 60602
cfield@pathf.com

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Copyright © 2005 AIGA | The professional association for design.

Abstract

An effective Arabic user experience can be designed employing a strategic approach to handling the unique aspects of the language and culture. Distinctive issues in Arabic challenge non-speakers of the language. The cultural is tightly woven with the linguistic. Successful design must accommodate the traditions and expectations of Gulf Arabic users and feel right in the context of their tasks and limitations. Essentially, User Experience designers function as “cultural translators.”

In creating two versions each of two successful custom applications, Pathfinder developed insights in designing for Arabic cultures. A primarily English-speaking team designed effective layouts supporting both English and Arabic speakers. By defining a disciplined approach to naming and translation and consulting with an Arabic expert, terms could be chosen that would be meaningful to both cultures. Additionally, Arabic visual

patterns, preferred colors and clear icons were built into the design to appeal to Arabic users.

Keywords

Cross-cultural, localization, internationalization, Arabic, anthropology, cognitive psychology, content, education, information architecture, application development, web application, usability research, user-centered design, user experience, user interface design, user research, visual design.

Project/problem statement

In early 2003, Pathfinder Associates contracted with a large Research and Data Analysis firm to research, design, and build user interfaces in Arabic for data gathering and logistics management applications for ongoing educational reform in an Arabic Gulf State of under a million people.

We would be responding to the unique challenge of creating a bilingual application for those indigenous users, who themselves comprised members of multiple cultures. Thus, we were not tasked with *globalization*, which assumes the creation of a base design that can be changed to meet the needs of multiple countries, nor with *localization*, the process of infusing a specific cultural context into a previously internationalized product. [1] Nevertheless, we would find ourselves addressing many of the issues relating to both of these activities.

The Arabic interfaces desired by the research firm had to be usable to workers with varying degrees of technical expertise needing to complete time-sensitive tasks, which included gathering data on the classes

each student was taking and then tracking exams through the phases of the testing process (such as distribution, grading and recording) using bar code scanners. In one case, the application interface was to be implemented in both Arabic and English. Of key interest to stakeholders was obtaining reliable data and implementing a manageable national assessment process involving millions of exam documents and hundreds of schools.

Background

The first phase of the project began in August 2003, and called for the development of a user-focused, custom web application, called "Enumeration," that would enable the research firm to efficiently collect a wealth of data on nearly 100,000 students, teachers, principals, and schools. This application would drive a new—and greatly expanded—process of gathering information about schools, teachers, and students in the Arabic Gulf state. The Enumeration application would deploy in autumn 2003 for four weeks of data gathering. Users would work on location at schools on laptop computers.

The second phase of the project called for the development of an application called "Receipt Control," which needed to be usable for both Arabic and English speakers with varied education and experience levels. Receipt Control would be used to manage the distribution and tracking of exams in a standardized testing program administered over a four-week period in the spring at several hundred schools. The application would need to handle nine million exam and answer books.

Challenges

An immediate challenge was that the actual interface design would be done primarily by monolingual English speakers, plus one native Arab speaker who was positioned as the team's cultural expert. From the beginning, the entire group would have to become skilled in thinking in the particulars of Arabic such as bidirectional reading flow and script-like letterforms. It was also necessary to gain an understanding of the cultural behaviors of the project stakeholders as well as the ultimate end-users.

Certain stakeholder assumptions presented a persistent challenge. As a culture, these project sponsors stepped into the technology curve at a comparatively late stage and thus lacked context and tolerance for some of the predictable bottlenecks inherent in a development project of this type and magnitude [2]. Both stakeholders and end-users were unfamiliar with having rough edges exposed, and expected a finished deliverable at each stage of development. There was an expectation that nothing would break and that everything would work all the time. In particular, this affected the usability testing, which was performed with paper prototypes, a format that shocked the participants with its relative crudeness.

Another challenge was facilitating human performance in entering (and avoiding re-entering) complex Arabic data. Workers are time-constrained at schools because they close at specific times each day. Workers had a range of technology experience, most toward the lower end. Additionally, we learned that in one specific user group, comprising workers foreign to the Gulf State, there was a hesitancy to ask for help. Thus, the

interface would need to be very intuitive and lead the user easily from one step to the next.

Managing a cross-cultural team working on two continents in significantly different time zones also called for creative strategizing. The design and delivery of the general user experience were the explicit expectations for the project. However, another project, equally complex, soon emerged. Pathfinder's UXD team assumed the role of "cultural translators," doing connection and liaison between two worlds. Dafoulas and Macaulay have proposed an elaborate strategy to bridge cultural differences in virtual software teams by creating multidimensional cultural "profiles" to be employed as a framework for team development; we largely proceeded more informally and directly [3].

Throughout the entire lifecycle of the projects, a relentless and unforgiving timeframe exacerbated the difficulties inherent in this complex project. This was compounded by the sheer number of people involved, and the diversity of their skill sets, which drove many aspects of the business process. Involvement of so many people in so many different aspects of the project necessarily dictated a waterfall of decision-making because of the interrelationships within the project sectors. Obtaining consensus or agreement had to go through many levels of approval. Every change had a cascading effect on the other aspects of the project.

Solution

A. Process

We started with our highly visual, iterative UXD process because we'd had success with our methodology on

One of our goals was to achieve "cultural transparency": to encourage users feel at home culturally with the solution.

Design discovery phases and techniques guided discussions around processes that went beyond interfaces and applications to the actual fabric of the project spanning numerous people and multiple disciplines.

previous projects. In particular, we felt that our Requirements Visualization process would overcome many communication and logistical barriers. Initially, prototype screens were built and delivered to the Research and Data Analysis firm to pitch the project. Based on this, 3-year project commitment was awarded to the firm, with Pathfinder commissioned to address the user experience aspect of the application. Our high-level process included the following steps. Wireframes were iterated with business, development and linguistic experts at an early stage to resolve issues in information architecture. Next, click-through rapid prototypes were created and used to distill business logic details and nuances. We created a style guide to guide future design enhancement. A translation strategy was innovated to anticipate the placement of text on the screens. Soon, the task flows and wireframes our team created became the vehicle for fleshing out requirements and deliverables for business and technology teams. These became widely adopted and were the primary tools used across team functions and disciplines, bridging language gaps and skill differences. The development team, business analysts, and stakeholders negotiated their prioritization and scoping using these tools as well. Hence, our deliverables were woven into every project plan. The lesson learned from this experience was that our Requirements Visualization strategy was even more critical for cross-cultural projects to ensure effective communication. Our user-centered approach was improved and refined over time. Example personas and requirements visualization became part of every project plan. Additionally, sessions of rapid prototyping that included UXD and lead business analysts in the Gulf State

permitted user feedback to be implemented quickly in iterative mode.

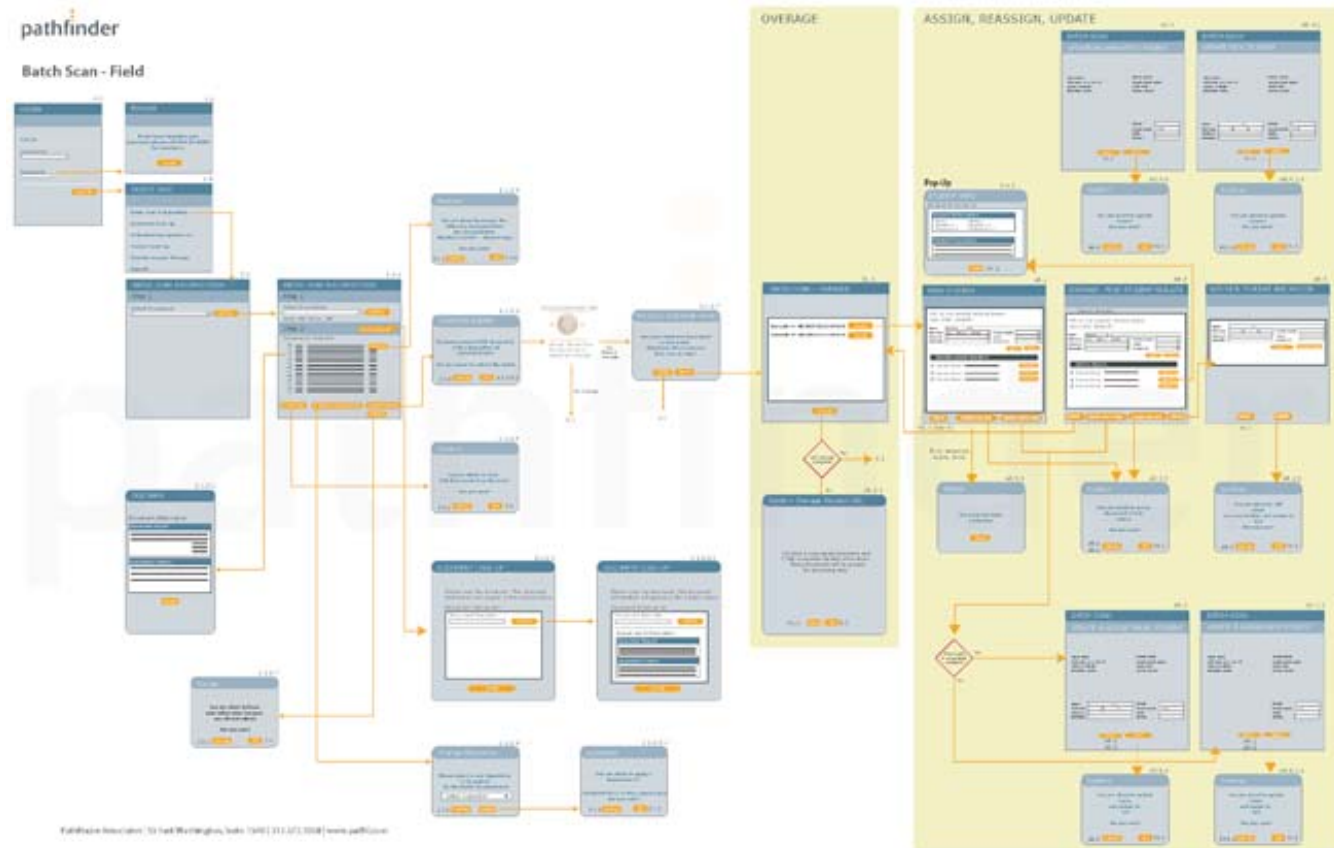
Our User Experience Design lead, a native Arabic speaker, served as our cultural “bridge” throughout the project and provided essential skills and capabilities. In addition to linguistic fluency, her personal knowledge of the target school system provided domain expertise. She was sensitive to the unwritten subtleties of cultural difference and facilitated many of the project processes.

In execution, we predictably encountered a combination of wins and losses. The most critical absence we experienced was the lack of sufficient user data. Unfortunately, we were extremely constrained in our ability to employ user research, and there were few resources to consult for meaningful first-hand research. Field observations, interviews and anthropology studies would have been very helpful to the process as well.

We would have preferred to conduct more extensive formal usability testing. The optimal amount of testing could not be conducted due to several constraints. First was budget, as time and travel across the globe are very expensive. Second was our limited access to users, as many are employed only during the 4-week enumeration and 4-week testing period.

We had a single opportunity to gain feedback, from a combination of stakeholders and end-users, but again, cultural differences dictated the format. We wanted to do individual testing, and the proposal was immediately rejected, in part because the client team was locked into a rigid, hierarchical collectivism. Thus, they functioned as a group, which tended to lead to unfocused sessions that drifted into herd thinking with a few louder, more senior people setting the tone.

Figure 1. An example taskflow document from Receipt Control., outlining the process of batch scanning. We found that including specific elements greatly aided inter-team comprehension.



Our client's culture tended to exemplify Hofstede's dimension of a high power distance [4]. They expected things to be done for them, as they felt they were paying for the best. It was not collaboration. They had no realization that they needed to work with us to make it work for them. Also, our end client was excluded from sufficient participation in the design review process because of the complexity of the

relationships of the companies involved. The scope of the project as a whole meant that the development of these two applications was component of a larger solution and deliverables.

B. Solution

Our work in many ways expanded upon the notion of “Culturability” described by Barber and Badre [5]. Reflecting on the development history of these multiple applications, we realized the importance of four components of the projects. The details of the solution are described from the standpoint of translation, information architecture, visual design, and interface development.

Translation

Creating applications in a target language other than one’s native tongue is a daunting prospect; the vast differences, on many levels, between Arabic and English contributed to the challenges.

The correct expertise in key roles is of primary importance. Language proficiency absent cultural knowledge is insufficient, and complicates the translation process in many ways. Although this insight appears self-evident, it was crucial to our complex translation process, whose team was distributed among Texas and Illinois in the United States, as well as Egypt and the Gulf State. These sensitivities range from an awareness of the formalities of Arabic culture to the different nature of letterforms.

Over the duration of the projects, we refined our methods and reduced time and errors significantly. Initially, there were many contextual miscues resulting from the translator’s inability to select appropriate terms. Also, there are dialectical changes to local Arabic from formal Arabic. Some words simply don’t translate literally but must be described in a longer, more conceptual way. This is fine as an abstract notion, but potentially challenging if you have 80 pixels of width for

a button. Arabic does not have the concept of acronyms, and many technical terms caused translation challenges.

Information Architecture

The information architecture for these applications needed to be optimized for repeatable, efficient, task-based interactions. Additionally, we discovered the influence of the IA in guiding the processes that were taking place within the users’ physical environments or in facilitating goal-directed approaches.

In Receipt Control, for example, the interactions of the application were optimized for linking documents and contextual data-finding to minimize errors in the data. Thus, physical process was modeled in the interaction.

In Enumeration, the IA dictated how the physical process was sequenced. Information was input in the following order: Principals (data), teachers, and students. In this intentionally linear process, input fields were grayed out until the preceding steps had been completed—but all the necessary steps were visible.

Because one of the applications would be used by two sets of users that were mutually exclusive linguistically, we were required to design a flexible information structure that could be reversed, enabling one design to function for both right-to-left and left-to-right reading patterns. Page layouts had to take into account the wider and taller Arabic fonts.

We developed an understanding of the users’ context(s), and then optimized design for speed and

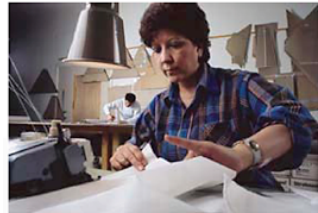
Culture influences characteristics of data. For example, Arabic names can be quite long, including up to six or seven components tracing family lineages. This dictated column width in tables, and form fields were redesigned to accommodate this. Columns had to wrap to two lines

efficiency. Iterative design changes exposed issues, we learned constantly, and as a result altered design solutions to incorporate improvements.

The user tasks addressed were not overly complex, but needed to be accomplished repetitively at high speed. So, fewer steps would result in greater accuracy. The IA solution was contextually sensitive, supplying activities on an as needed basis. This minimized interruptions to the workflow. To lessen the burden of repetitive data entry, solutions were devised to synthesize data entries with a single click.

pathfinder Receipt Control Application - Warehouse - Spring 2006 - 132147004

Warehouse Shredder Clerk



Chitra

Demographics
Chitra is English speaking and from India. She is 24 years old, university educated with medium to low computer experience.

Job Title
Clerk (Shredder Clerk)

Environment
Chitra works in the production center or warehouse. The facility is indoor and though work space is somewhat constrained the lighting is good. Chitra works an eight hour day, working the afternoon shift starting at 2:00 pm. She works for about 45 minutes of each hour, with 15 minutes or so for a break.

Tools/Equipment
Chitra has a desktop PC with the latest browser software running the Receipt Control application. She also has a bar code scanner and carts to sort documents into when she is finished scanning.

Goals
Chitra does not want to make mistakes, as she values her job highly as work can be difficult to find. If she has any problems, she calls a Supervisor for help.

Contextual Scenario

1. Arrives at work at 2:00 pm.
2. Chitra receives a set of documents to verify for destruction.
3. She runs Receipt Control and goes into Document Lookup.
4. She scans the document using her bar code scanner.
5. She looks at the document type and verifies it is OK to destroy.
6. If it is not OK to destroy, she call over a Supervisor.
7. She will repeat this for the eight hour shift.

Figure 2. A persona was developed for each role in the process to define the users in detail. This fixed their tasks, needs and aspirations.

Prior to final completion, behavioral notations were expressed in all wireframes to assist communications with developers. The actions of each button, click, and input field were thoroughly documented to avoid ambiguities and errors in the costly development stage.

We learned the importance of sensitivity to the physical environment. Strong visual and sound cues can be especially important to extend the interface off the screen and cut through the chatter of different environments. Appropriate and timely exposure to the information allowed users to anticipate events, which built a sense of comfort and trust in the interface.

Figure 3. This shows the evolution of the design from Enumeration 1 to Enumeration 2, as well as the Arabesque patterning designed for the interface.



The organizational identity had to be defined and maintained, yet distinguishable between applications

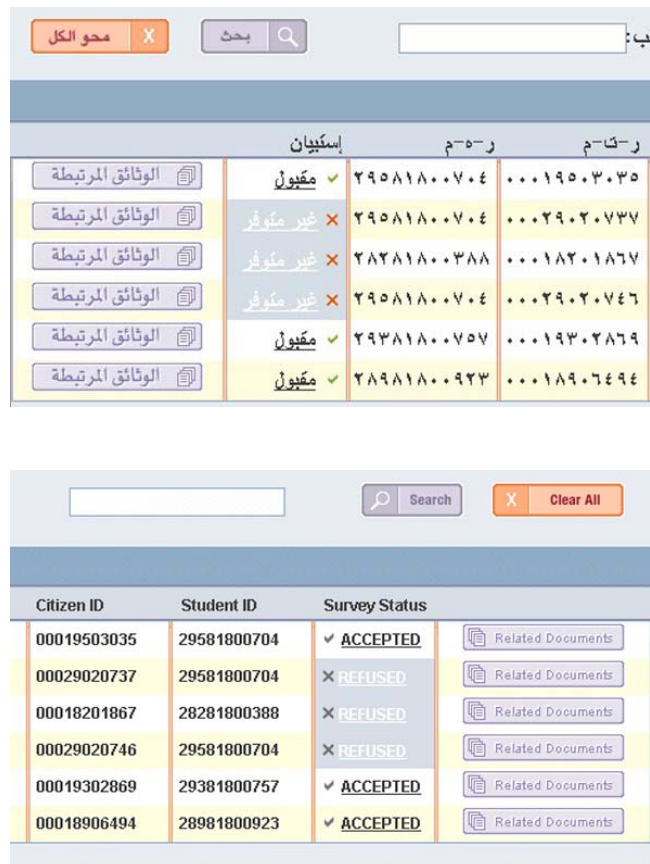
Visual design

The visual design resonated with the local users. Color combinations were refined over iterations to accommodate cultural preferences and the work environment. The visual language captured the essence of the reform effort by using traditional Arabic patterns as a linking element.

We employed a rigorous approach to visual systems. Icons were deployed with consistency to draw attention to actions and transcend the reliance on language. Color combinations maintained a sense of continuity across applications with significant overlap in user groups.

Visual consistency established the organizational identity across applications, making it a manageable, extensible system. The two applications are distinct but feel related.

Figure 4. A close-up of the translation challenges in a typical data table. Arabic text reads right to left, but Arabic numbers read left to right. Icons flip in their entirety. Any design that assumes a fixed width font must be tested carefully.



We had to ensure that icons worked culturally, as they are read like text. Pictures are orientation-based; buttons are flipped in form as well as language.

The two applications were linked through the use of a custom-designed Arabesque pattern at the top; this linked them visually and reflected culturally specific visual cues.

Typography was a challenge. Compared to English, Arabic words occupy more space horizontally, and set, with the chosen typeface, four points larger than the English font. Letterforms change, depending whether the glyph is at the beginning, middle, or end of a word, altering the rhythm of ascenders and descenders. Arabic fonts had to be bold to increase legibility.

Over time, the color choices were refined to higher-contrast colors and clear typographic hierarchies because of the environment in which the applications would be used and the repetitive nature of the tasks. Our user feedback alerted us to an apparent cultural preference for stronger, more saturated colors.

The primary result was the evolution of palette and contrast levels from Enumeration 1 to Receipt Control 1 to Enumeration 2. Less ornamentation, less texture, and fewer visual distractions reflected the realities of task-specific interactions. The lessons learned were implemented iteratively.

Interface Development

The research done by Portaneri and Amara on the Arabization of GUIs [6] prepared us somewhat for development issues and constraints, but in true pioneering fashion, we managed to come up with a few challenges of our own.

The application was to be deployed in a browser, yet function and appear as a desktop application. This platform choice had a downstream effect on all aspects of the project. The applications were standardized for Microsoft Internet Explorer (IE) which was standardized

throughout the workflow. However IE is coded in English, adding another layer of translation.

Additionally, programming was restricted to the use of HTML and JavaScript, to maintain customability and control of the application through future iterations. However, this choice meant that functionalities such as objects and system-level controls could not be used.

This had a consequent impact on coding. There was considerably more client-side coding, estimated at 10,000 lines for the 25 to 30 screens in Enumeration 2, which complicated other translation issues like page orientation.

As with interface and visual design, the building of the applications had to accommodate English-language development. We worked out most issues in English, and then transferred to Arabic. We worked out a production system that allowed coding in the English direction and creating a single interface that would work in both directions, both languages with only minor tweaks—two style sheets, one interface. Our process evolved to building the page backwards in English with images flipped. Then we would drop new images in after translation and tweak accordingly.

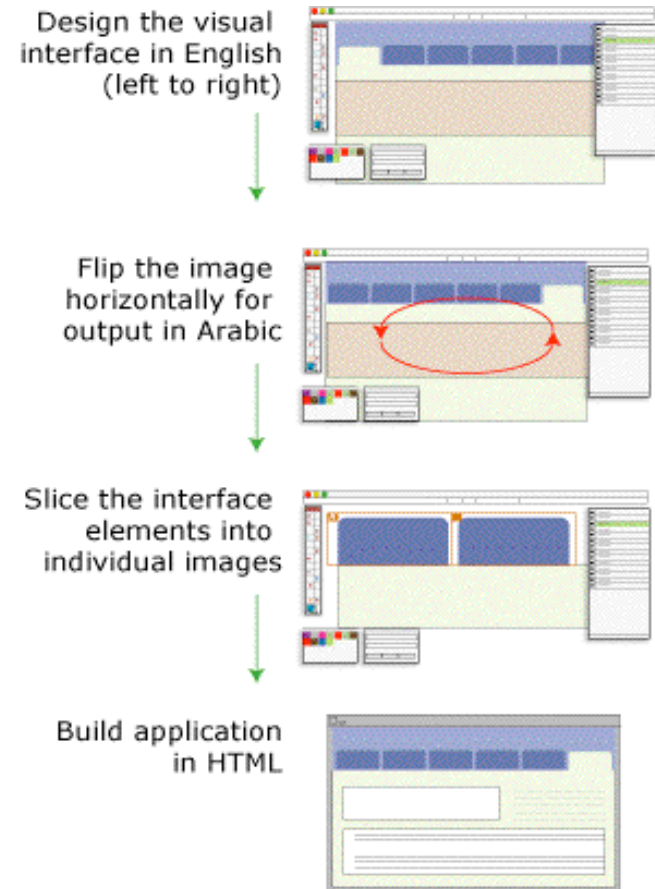


Figure 5. A schematic representation of the production process for translation.

This involved changing the direction of the page in html by adjusting coordinates and direction flow of text (left-to-right to right-to-left).

When we designed the interface we had fixed font in form cells as a default. The Arabic fixed width font was found to be unsatisfactory and illegible through observation and testing. This was implemented in all style sheets.

Drag and drop interactions were employed to speed formation of class groups. This created a 300% efficiency gain. These advanced interactions delivered the twin benefits of increased speed and a more enjoyable experience.

C. Results

Pathfinder's UXD strategy enabled the design to work in the Arabic culture yet be produced by a largely English-speaking team. The effectiveness of our solution enabled us to create design methodology conventions that could be re-used across cultures.

For the client, timely enumeration and exam tracking was achieved on a national scale. The applications are now going into a third year of use. Successive iterations of both applications, with incremental improvements have proven the basic design to be solid.

For end users, the following results were achieved:

1. Saved time in the data collection process by creating drag and drop functionality, like a desktop application, leveraging other uses of rich interaction design.
2. Used sounds to increase efficiency and accuracy of tasks that had to be repeated thousands of times.

3. Created an information architecture that brought information to the user contextually when they need it, thus reducing the need for training.
4. Created an interface that connected with the local preferences for design and visual cues.
5. Guided processes, increasing the speed and efficiency of high-volume, goal-oriented tasks.

During our interface design process, we created strategies that can be added to a design process for effective Arabic-English user experience design. These techniques can be used to produce repeatable results in other languages as well. The key points are as follows:

- Ensure that you have a person who can function as a "cultural expert," equally familiar with the home and target cultures
- Have everyone on the design team develop a clear understanding of the target language structure, flow and letterform variations
- Have everyone on the team understand at least the basics of the cultural preferences for visual elements
- Design layout structures, if possible, to flexibly accommodate both English and the target language
- Keep a translation glossary
- Check to make sure technical terms and abstract concepts can be translated
- Develop and test a production translation model
- Develop rapid prototypes and vet them with users early and often.
- A design team *in situ* can facilitate effective and timely communication

- Although this may seem obvious, be vigilant in cultural sensitivity. Our project was subject to delays and needless travel because of misunderstandings about our clients' holiday and workweek schedules.

Further work

From an American perspective, further work can be done to formalize the Arabic user experience design approach and extend it to other cultures and languages. By nature, user centered design is well-equipped to facilitate our understanding of other cultures and hence our ability to design from a deeper awareness of value systems, needs, goals, and being.

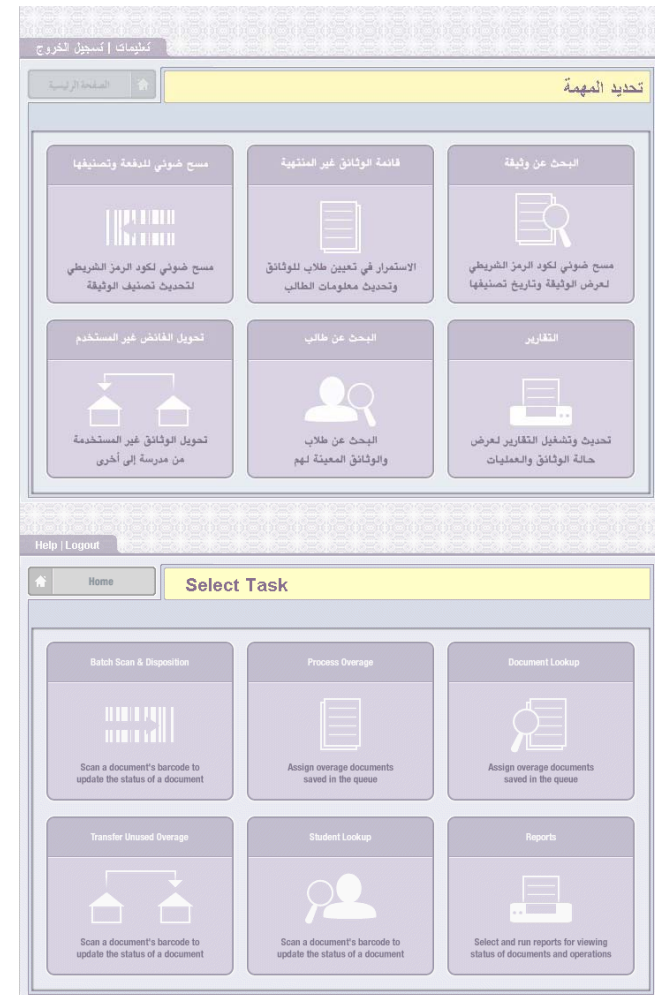


Figure 6. Examples of the opening page of the Receipt Control 05 application in Arabic and English. Extremely controlled choices.

References

- [1] Definitions of globalization and localization:
Badders, Leon, Komlodi, A. International User Interface Design Topics.
www.research.umbc.edu/komlodi/cross_cultural_hci_bib.pdf
- [2] Erumban, Abdul Azeez, de Jong, S. B. "Cross-country Differences in ICT Adoption: A Consequence of Culture?" (2005) SOM Research School som.eldoc.ub.rug.nl
- [3] Dafoulas, Georgios, Macaulay, L. "Investigating Cultural Differences in Virtual Software Teams." Electronic Journal on Information Systems in Developing Countries. (January 2002)
www.ejisd.org
- [4] Hofstede, Geert. Cultures and Organizations: Software of the Mind. McGraw-Hill (London, New York 2005)
- [5] Barber, Wendy, Badre, A. "Culturability: The Merging of Culture and Usability." Proceedings of the 4th Conference on Human Factors and the Web (Basking Ridge, NJ, June 1998)
www.research.att.com/conf/hfweb/proceedings/barber
- [6] Portaneri, Franck, Amara, F. "Arabization of Graphical User Interfaces." Published in *International User Interfaces* (previously cited)

Matthew Nolker, and Shalom Sandalow for their help on this submission.

Acknowledgements

Thanks to all the teams that worked on all the applications. Special thanks to Bernhard Kappe,