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Computerization Of Thaana
And Its Impact On Media And Literacy

By

Mohamed Abdul Gadir
COMPUTERIZATION OF THAANA
AND ITS IMPACT ON MEDIA AND LITERACY

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1. COUNTRY BACKGROUND

The Maldives consists of some 1200 coral islands which form a chain, 820 km in length and 130 km at its widest point, set in an area of 90,000 sq km of the Indian Ocean. The islands form 26 natural atolls, which for purposes of administration are grouped into 19 units, also called atolls. Most of the islands are small, few with a land area in excess of one sq km, and are low-lying, with an average elevation of 1.6 m above sea level. The Maldives has an Exclusive Economic Zone of some 900,000 sq km, more than 3000 times its land area.

The climate is warm and humid, with two pronounced monsoon seasons. Daily temperatures vary little throughout the year, the daily minimum temperature averaging 260 C and the daily maximum 30.70 C. The average annual rainfall in the period 1981-90 was 1875 mm. Monthly variations in rainfall are significant, ranging from 58 mm in February to 231 mm in September. The Maldives falls outside the main areas of tropical cyclones.

The population of the Maldives was estimated at 213,215 in July 1990. This population is scattered over 200 inhabited islands. Around 26% of the nation's population are to be found on Male', the capital island.

Maldives' population is a young one, with 45% under 15 years of age and 17% under the age of 5. The median age of the population is 16 years. The population growth rate is high. It averaged 3.2% per annum in the period 1977-85, but edged up to 3.4% in the period 1985-90, mainly as a result of a further decline in the death rate. At current rates of growth, the country's population at the turn of the century will be around 300,000.

The adult literacy rate, at 97.3% in 1990, is among the highest for all least developed countries, with the literacy rate for the atolls, at 96.2%, differing little from the Male' figure of 98.5%. The literacy rate among women is higher than for men, and Maldivian women, traditionally economically active, are considered to be among the most emancipated of the Islamic world.

The Maldives is a remarkably homogeneous nation in terms of a shared history, language, religion and culture. The nation embraced Islam in the 12th century and, although a European power sought to impose its suzerainty in the 16th century, the Maldives was never colonized. In the period 1887-1965 the Maldives was a British Protectorate, with the British recognizing the sovereignty of the nation. The country achieved full independence on 26 July 1965 when the Protectorate came to an end.

The Government is headed by the President of the Republic, who is elected every five years. The Citizens' Majlis, is the country's legislative assembly. The Majlis consists of 48 members, 40 of whom are elected from Male' and atoll constituencies, with 8 members appointed directly by the President. The atolls and islands are administered by Atoll and Island Chiefs who are appointed by the President and who report to the Ministry of Atolls Administration.

Since 1978 the Maldives has implemented a strategy of transformation that has brought significant improvements in all of the indicators traditionally used to measure a nation's development. During the 1980s, GDP grew at an annual average rate of around 10%. GDP per capita increased from RF 1930 to RF 4360 over the same period, or by around 7% per annum, more than twice the rate of population growth.
This increase in GDP has been more than matched by improvements in the well-being and welfare of the nation's population. The infant mortality rate has been slashed, from 121 per 000 in 1977 to 34 in 1990, while the crude death rate per 000 fell from 18 to 7 over the same period. In the 12 year period 1977 to 1989, 17 years were added to the life of a Maldivian at birth, bringing the figure to 64 years. Daily per capita calorie intake and protein supply have recorded major improvements, and there were nearly three times more doctors per 000 population and no less than 10 times more nursing personnel in 1990 than there were in 1977. Some debilitating diseases, such as malaria, once widespread, have now been eradicated and child immunization is almost universal.

2. THAANA

The national language is Dhivehi, which has affinities with several Indo-Aryan languages. Dhivehi is a language rich in poetry. The written language is Thaana, and has its origins in the 16th century. The characters representing the consonants of Thaana is believed to be a modification of the Arabic numerals and the vowels are directly borrowed from those of the Arabic language. Given the specific characterization of the script one could say that Thaana is a non-graphic script.

3. COMPUTERIZATION

3.1 Difficulties

Thaana presents a conundrum of problems for computerization, or more particularly, word processing. Some of these problems stem from the nature of the language's script, other problems arise from the advancement—or lack thereof—of computer hardware. Take a look with me, if you will, at these difficulties in order that we may understand the current state of the computer's effects on printed media and literacy in Maldives.

3.1.1 Graphology

The Maldivian script, or THAANA, has several features which present problems for developing Thaana word processing software. These problems are: Thaana's inscription direction, irregular character spacing, vowel location, and character shape.

Thaana is written from right to left just as is Arabic. The language's written direction means that pure character translation, as is possible in some scripts, will not work for Thaana. In addition, cursor placement, movement and editing becomes near-impossible for character-based screens and printers, which are designed to work from left to right.

Add to inscription direction the factor of Thaana vowel placement, and it becomes a programmer's nightmare. In Thaana vowels (called fili) are not placed between consonants (called akuru) as in English and many other languages, but rather are placed above or below their respective consonant.

Irregular character spacing and character shape are related features of the Dhivehi script that only exasperate the computerization obstacles. Some akuru occupy three times the width of some other characters. Therefore a proportionally spaced font is necessary both on the screen and for printed output. The variations in width cover the range between the widest akuru, seenu, and the narrowest, faafu. Characters such as faafu highlight another difficulty: that of characters occupying
adjacent characters' space. This overlapping is difficult for most programs to reproduce on the screen and printer. This requires individually adjusted spacing between characters, otherwise known as kerning.

Since Thaana has strictly been a hand-written language for so long, there are two more minor considerations which must be taken into consideration before claiming the computerization of Thaana. These considerations are the following: character proportions vary with size, and character style is variable. In normal writing, letter spacing is very irregular, as mentioned above; however, as the characters increase in size (in a headline, for example), the font becomes more evenly spaced and block-styled. Therefore, a large set of the font cannot be made and then reduced for photo-reproduction or printing purposes.

The final and least significant consideration is that even though there are written standards for writing Dhivehi, experts disagree when it comes to the practical finished product. Each calligrapher has his own style which he defends with devotion. Therefore there is a need for multiple font handling.

3.1.2 Hardware limitations

Early computer hardware had severe limitations designed into it. These limitations were considered features by the designers since they greatly simplified computing in the Latin script.

Teletype Mode: One such feature that complicates Thaana's computerization is the left-to-right teletype mode of showing characters on the screen and printing them. In addition, Latin characters were all built right into the graphics card or printer. Graphics, the only way to represent non-Latin characters or pictures was not possible in the early days without great pains.

Resolution: Computers use dots to make pictures and characters on the screen and printer. One way of defining a screen or printer's quality is by its resolution, which is measured in dots per inch, or dpi. Low resolution (not enough dots per inch to draw accurate characters) was an insurmountable problem in the days of CGA screens and early 9-pin printers. CGA (color graphics adapter) was so limited that the Dhivehi word processors designed which used CGA could only display seven or so single-spaced lines of text on the screen. Printing on 9-pin printers was unacceptably poor in quality, though legible. Both of these problems arose because Thaana characters are quite intricate.

All of the above mentioned features of Dhivehi writing have and still do pose as obstacles to developing a computerized word processor in the Thaana script. Most of the computer problems have now been overcome by modern computer hardware and ingenious programming.

3.2 Efforts/Products:

The Maldivian language, Dhivehi, has an ancient history; the history of its computerization also goes back several years. Almost as soon as IBM compatible PCs were introduced to Maldives (1984), there have been attempts to computerize Thaana. Some attempts fell by the way, and others are still going on. Following is a brief historical sketch of Thaana's computerization. For the purpose of this report we have chosen not to mention the more obscure attempts, as there is little or no information available regarding them. The attempts we will mention include Thaana Star, Thaana Writer, Com Thaana, Thaana Liyaa and MLS.
3.2.1 Thaana Star

UNESCO has been helping Maldives with Thaana computerization from the beginning. The first result of UNESCO’s work, Thaana Star, was publicly demonstrated in 1987. The work started long before that, however.

With cooperation between foreign programmers and Maldivian officials, the UNESCO project had the makings of a successful project from the beginning. Considering the year and the hardware available at the time, Thaana Star was a remarkable accomplishment. Barry Scott, the main programmer and designer of Thaana Star, showed the first version to the government in 1987. The program was even shown on TV to the general public. During this first visit the government officials involved suggested several changes.

Scott returned in 1988 with the updated version of Thaana Star. Even with the second version, the output to the screen and printer needed revision. Unfortunately Thaana Star was not used in the private sector and I therefore know very little about the package. The project was thus not considered finished at its second version, and work is still ongoing in this valuable project, mainly though the resident UNDP office.

Thaana Star overcame only some of the problems with Thaana computerization. It did feature Thaana both on the screen and the ability to print relatively quickly in Thaana. It overcame the direction and vowel placement problems. It also included a font editor with which it is possible to change the font shape. The font size could be changed, but since the program worked only with mono-spaced characters, and that with only one font per document, the limitations were extreme. The latest version I have seen has not yet successfully overcome the problems of character spacing, character shape, character size variation, or multiple fonts.

3.2.2 Thaana Writer

It could be said that UNESCO’s program, Thaana Star, was the occasion for Thaana Writer’s production. Thaana Star was a foreigner’s solution to an indigenous development problem; Thaana Writer was in indigenous solution. Upon Thaana Star’s publicity, people realized the computer’s potential for Thaana word processing and got to work on providing a solution. Thaana Writer was the first such indigenous solution to Dhivehi word processing to be released. Thaana Writer was first introduced in a local newspaper in 1987, just two months after the television demonstration of Thaana Star. Thaana Writer was the product of one person, a computer enthusiast from the private sector. Version 1.0 of the program was released to the public in 1988. Version 1.0’s font editor was sold separately, and was capable of editing a character in context with other characters, enabling its author to design an extremely realistic font set. The author says he later made a screen print preview module and a screen editor for the program. These would have, incorporated with the existing version of the program, made a complete Thaana word processing program. An integrated word processing package, in other words a new version of Thaana Writer, was not released. People are still using version 1.0.

Thaana Writer was the first real standard for writing Thaana on the computer. Both government offices and private parties bought the program and are still using it today. The reason for the program’s success was the excellent quality printing
it produced. The main drawback was that it used an English word processor rather than showing Thaana on the screen, so often typing errors were not caught until the document was printed. The text file conversion program was easy enough to use, and friendly too. If it caught errors during the conversion process, it pointed out the error's location by telling the user which line number in the file and which word on that line the error occurred on. The word in which the error occurred was also shown on the screen along with its line and word number. The program did not force the user to stop at the first error: it continued through the whole document to find all the errors in one sweep before asking the user to re-edit the file to correct the spelling errors.

How did Thaana Writer tackle the problems presented by Thaana? Its printed output was considered to rival the quality of English print, drawing a lot of interest. The hardware problems, and screen resolution in particular, made Thaana Writer's author opt for doing the word processing using any English word processor which was saved to a pure text file. WordStar was used by most people for the initial file creation and editing. Thaana Writer converted the text file for printing and printed it. One advantage to Thaana Writer, as a result of its capability of converting standard text files for printed output, was that it could also print Thaana from the commonly available database programs. The program could print a page of Dhivehi as fast as any program could print a page of English.

Choosing to avoid the problems of screen editing exempts Thaana Writer from many of the benefits and problems of a full-fledged Thaana word processing program. The program was capable of text alignment such as centered text and justified text when the document was printed. So, for the printer only, Thaana Writer solved the problems of direction, vowel placement, character spacing, and character shape. Multiple fonts in a single document were not handled, as was not the ability to vary the size of fonts.

3.2.3 Com Thaana

Thaana Writer was not the only indigenous effort to arise. In 1988 some people started using a new program called Com Thaana. Com Thaana was similar to Thaana Writer in that it used a commercial word processing program such as WordStar for its initial input and editing, and then a printer conversion program to do the actual printing. Developed by two programmers working in the government, it was the first program to be developed using a traditional programming language by Dhivehi nationals.

Com Thaana has the same advantages and disadvantages of the above program, Thaana Writer, in that it also used WordStar or an equivalent word processor for the pre-printed input and editing. Although a significant contribution to the progress of Thaana word processing (it did, after all, use a traditional programming language), Com Thaana had several disadvantages when compared to Thaana Writer.

The conversion process was not a very smooth, fast, or user friendly process in Com Thaana. If the program detected a problem in the input text file, it would tell you what line the problem occurred on, but not what word it was. When an error was found, the user was forced to exit the conversion process then and there and correct the text file before attempting another conversion. It often happened that there were several problems on one line, in which case the user was faced with the frustration of making one correction, only to be told there was
still a problem on that same line. To further frustrate the user, the conversion process was very slow.

Printing was also inferior when compared to Thaana Writer. Com Thaana used third-party software called Lettrix as its font designer and printer handler. Lettrix is a commercial program designed to give 9-pin printers various and multiple font capability in English. It is a memory-resident (TSR) program which has two modes: one to create or edit fonts, and the other mode to actually intercept text going to the printer and replace that with the font specified by the user. Com Thaana's programmers used these features of Lettrix to design a Dhivehi printer font and, after Com Thaana had done the conversion, to print it using the Lettrix Dhivehi font. The main problem was that the version of Lettrix used could only be used to print on a 9-pin printer. Because of the intricacy of the Dhivehi script, 9-pin printouts were not of highly enough quality to be widely accepted.

Like Thaana Writer, Com Thaana was a pre-printing conversion process of text files. Com Thaana did a good job at handling the direction and vowel placement problems. Com Thaana was weaker than Thaana Writer, however, in that characters could not be overlapped as is needed in Thaana (a character spacing problem), and the fonts were of too low resolution to be accurate. Like Thaana Writer, Com Thaana did not deal with the problems of multiple fonts in a document or different sized fonts being available.

3.2.4 Thaana Liyaa

Thaana Liyaa was developed concurrently with and by a computer programmer from the same office as Com Thaana. The word Liyaa is Dhivehi for Writer. Like Com Thaana, it was released in 1988. Thaana Liyaa's printing mechanism was the same as that of Thaana Writer, and was also designed for 24-pin dot matrix printers and therefore better than Com Thaana's 9-pin printer output. Thaana Liyaa's author designed his own font designer and editing screen.

The editing screen incorporated Thaana on the screen; however, it had severe editing limits. For example, if the user wanted to insert a word or even one character into the text the user had to retype all following text: there was no insert mode, only overwrite mode. Documents also had a length limit of fifteen screen-length pages of about 7 lines per screen. The visual appearance of the screen was worse than Thaana Star's screen, which itself was not good. The characters appeared stretched vertically on the screen in a very unnatural way. Because the program was designed for 24-pin dot matrix printers, the printed output was quite an improvement over both Com Thaana and Thaana Star. However, the author did not take the pains at making printed characters overlap as did the author of Thaana Writer.

In summary, Thaana Liyaa overcame the Thaana direction and vowel placement problems for both screen and printer. Character spacing, character shape, multiple fonts and various sized fonts are problems which were not overcome by Thaana Liyaa.

3.2.5 MLS

Multi-Lingual Scholar, or MLS for short, is a commercial program produced for the purpose of editing in several languages simultaneously. Produced by Gamma Productions, Inc. of Santa Monica, California, USA, it was first brought to Maldives in 1991 by an American doing research. An American computer consultant, Gene
Keller, laid the foundation for the program's acceptance in Maldives by designing the first set of fonts and keyboard layout using version 3.x of the program. Multi-Lingual Scholar version 4.0 was introduced to Maldives in 1992. A major upgrade from 3.x, MLS 4.0 was a giant step forward, incorporating pull down menus, online help, cut and paste, search and replace, and even spelling checking, all in a windowed environment which uses a mouse.

The advantages of MLS over the programs already described are many. The font editor allows the user to draw characters from scratch using the mouse or scan in a professionally designed font set, with full zoom, screen preview in context, and full printer support. The printer support for both the font design editor and the word processing program is very good, supporting most 9-pin and 24-pin dot matrix printers, jet ink printers, and laser printers starting from the HP LaserJet Plus and including laser printers all the way to the HP III. Proportional spacing is assumed, although mono-spaced fonts can just as easily be designed. Font size is limited only at the upper range, depending on the type of printer used.

The word processor's editor is also very advanced. The screen is almost WYSIWYG, greatly facilitating layout. Style sheets are fully integrated into the program, greatly simplifying consistent document production, whether it is a business letter or a bi-language dictionary. MLS fulfills its purpose very well, providing editing in any language the user desires, and allowing the user to mix languages at will. Font sizes and styles are almost unlimited. In fact, MLS is so close to being a multi-language word processor rivaling Microsoft Word or WordPerfect that its users complaints mostly center around the fact that it is not a fully featured desktop publishing program.

MLS does have limitations. It is copy protected, and as with any graphical environment, it is sluggish compared to text-mode word processors. However, it does have the capability of working on almost any IBM compatible computer: memory seems to be the main limitation. An XT cannot provide enough memory for version 4.0, so an AT or better machine is required. All common screen displays are supported, as are most printers and mice. Line drawing and importing graphics is not supported, but the tabs are as sophisticated and easy to use any package I have seen.

How does MLS stack up to our list of Dhivehi word processing obstacles? It handles the direction and vowel placement problems with aplomb. The ability to support both mono and proportional spacing takes care of the character spacing problems. And since fonts can be designed by scanning in the best sample available, and then further touching those up using the font editor, character shape ceases to be a problem. In fact, MLS was the first program able to print better than Thaana Writer. MLS also allows multiple font faces as well as multiple font sizes, which brings us to the end of our list. That does not mean people are not wishing MLS would do more than it does. Users wish MLS could import graphics and draw lines, and it cannot kern characters, but overall MLS is the best solution to Dhivehi word processing I have seen so far.

3.2.6 Windows (etc.) Fonts

With the popularization of scalable fonts in Microsoft Windows, new possibilities for non-Latin scripted languages became more viable. Although not released to the public yet, a private company has a working scalable Dhivehi font for Windows. Although a font-only solution has inherent problems, it is wonderful to have true
WYSIWYG ability at any size and style you desire at the press of a key. If there were a Windows program that provided the bi-directional editing control MLS does, this would be the best of all worlds. Could you imagine using PageMaker or Ventura Publisher with any language you want? That possibility seems to be just around the corner. However, at the moment, we are stuck with good-looking fonts which can be used in any Windows application (a font set is also available for Corel Draw) but that have to be manually forced to type from right to left. Line wrapping is even more noticeable an issue than typing direction. At present Windows can handle the vowel placement problems, character spacing and character shape, and all other problems except that of direction.

This brings me to the end of my overview of the development of Thaana's computerization. Now take a very brief look with, if you will, at the situation of media and literacy in the Maldives and the computer's effect on them.

4. IMPACT ON MEDIA AND LITERACY

Allow me to begin with printed media. There are two daily newspapers with current circulation in Maldives, Haveeru (meaning 'evening') and Aafathis (meaning 'new dawn'). Aafathis hand scribes all their Dhivehi. Haveeru uses a combination of both computers and calligraphers for their 6-8 page daily, the first ever newspaper in Maldives to use the computer for Dhivehi writing. They started by using Thaana Writer in 1988, and have recently switched to MLS 4.0. Both newspapers are printed and distributed from a centralized location in Malé, where they have the largest circulation.

Because there are no printing presses registered outside of the capital city, Malé, the need for electronic transmission via modem is at this time not needed. Maldives' demographical profile is very centralized, making it infeasible, for media publication, to establish a printing centre outside Malé. Because of the demographics concerned, both Aafathis and Haveeru are distributed to the other population centres via post. Radio is well established in Maldives, and as such it is the preferred method of news reception by the outlying town and village people. Most houses own radios, which are on most of the day. Important announcements are printed in the newspapers, but most people hear the announcements over the radio or television first. Printed matter is considered by most to be a secondary source of information.

From time to time locally produced newspapers or leaflets have started up, but none of these have survived in the long run. This is due primarily to the difficulty in gathering news-worthy information for publication. Almost all the news was, in one way or other, just a rehash of the news already broadcast over the radio.

What about future possibilities? The obstacles to distributed printing and publication of news must first be overcome before it can become financially viable. What are these obstacles? In the past, most towns and villages had electricity for only a few hours per day. Computers were not popular there for obvious reasons. Telecommunication was also an obstacle in the past in the outlaying areas. Maldives is now in the process of the decentralization of both its population and resources. Both telecommunication and electrical power are actively being upgraded. Computers are also being placed in some areas. The possibilities are thus widening for the future.

There is a possible negative effect of the computerization of media. There are currently calligraphers who make their living by writing the final copy for the daily papers. These will loose their jobs when computers are used to do the printing. However this may not be a stumbling block for the country given the small size of the labor force and ample job
opportunities in the tourism, trade and fisheries sectors. I am positive that, in the long run, more computers in the media sector will have a net positive effect on both the Maldives in general and specifically on Maldives' media sector.

Now please look with me at literacy. As mentioned earlier the Maldives has a very high literacy rate and the Government is quite confident that by the end of 1993 the country will reach 100% literacy with the ongoing programs and without any new inputs. As such computerization of Thaana will not be considered critical in this area. Nonetheless, it will play a major role in the educational system as a whole.

5. CONCLUSION

With that, I come to the end of my report. Before I resume my seat, however, allow me to conclude by summarizing the more salient points I have mentioned. Maldives is a small but beautiful country with a unique language and script. Starting with UNESCO's substantial help, several programs designed to produce Thaana printing have been developed. At this moment in history the Multi-Lingual Scholar program seems to be the best overall choice for Maldivian media. The pace of computer development is quick, however. Notwithstanding our unique Thaana printing problems, Maldives is looking to the future for brighter solutions.