Localization Bridging the Digital Divide

Inequitable Access to Education and Technology in a Knowledge Economy

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Abstract – In this paper, a proposal has been given to make an equitable access of education and technology among the people of the underdeveloped and developing countries of the world. Here a concept called localization has been studied and the impacts that localization can bring in the daily life of a person is highlighted. The proposal highlights on the benefits of localization and how it can act as a bridge to reduce the digital divide. This paper proposes all the available and flexible methods that can be used to implement a localization project systematically. The paper also highlights how students can participate in these types of projects and can work for the welfare of the country and its people.

Overview

Every person in this world speak at least one language. And that single language is the mother-tongue of that person. And in this world no matter what other languages are present a person in most cases is found to be communicating or interacting very comfortably using their mother-tongue. In this present world there is this one language "English" which is considered as almost the universal language of communication. And with this in mind people tend to learn more English and communicate more in English. And thus all the latest technological advancements can be seen to incorporate the English language within itself for interaction with the people. But this brings a certain disadvantage for those people speaking or understanding only their native language. Thus a gap is created between the people knowing English and the ones not knowing English. And this gap can widen to a certain extent that the person not knowing English can be deprived of the basic rights of the present world. Thus comes the need of a concept called "Localization" which means to present something at a place in a language the people living there understands (Sarmad 2005). Localization will mainly translate a solution to the people of a place in their own language so that people can get most out of it. And this concept of localization can be applied in any form for the betterment of the people. One such place where localization can bring a big impact is in reducing the digital divide. "Digital Divide" is a term used to highlight the difference or discrimination among people having access to the technology (Digital 2006). As already stated most of the technological advancements are limited within the frame of the English language and thus people not knowing English is deprived from using those latest technologies. One solution to this problem can be to teach those people the English language but learning a new language is not that easy. So a better solution can be *if the technology itself can be translated in to a language the person not knowing English will understand*. This way the person only knowing his or her native language, which is not English, can have a fair access to the technology developed for everyone to make their life easier.

In this present digital world, information is the most valuable thing a person can own. But that valuable information has to be accessible to everyone and technology is making that possible. But there is also a need to make that technology available to everyone and localization can help in giving a fair access of technology to everyone. *And thus localization can reduce the digital divide and can give an equitable access of technology as well as education in this present knowledge economy.*

Needs

Computers today have become a common household tool in developed countries. However, the technology made possible by the use of computers is not equally accessible in all areas of a developing country like Bangladesh. In a developing country like Bangladesh only a limited amount of the citizens get fair access to technology (SDNP 2000). The reason behind this can be the effect of many factors. Bangla is the mother-tongue of the people of Bangladesh. So almost everyone in the country is fluent enough in communicating in Bangla. But the literacy rate of Bangladesh is still below 50% (BANBEIS 2006) and thus approximately only half the population can read and write in Bangla. Among the literate population of Bangladesh a very small percentage know some other language like English. And as this country is still developing, almost all of the latest electronic devices and technological services are being imported from other countries. And this imported technological products do not have support for the Bangla language. So those new products only serve a small portion of the population.

Bangladesh though a very small country is a very highly populated one in the world (BANBEIS 2006). The country consists of several small towns, big cities and villages. The people living in the cities can be considered the most privileged ones. They are found to be the most literate among the population and avails the maximum infrastructural and other benefits offered by the country. Then comes the people of the small towns. They also avail a portion of the infrastructural and other benefits offered by the country. But the ones living in the villages are the most poor and neglected ones. They earn their living mostly by farming, fishing etc. And among the entire population of Bangladesh, a big portion are the ones living in the villages. People in the villages are not that literate and they mainly focus on their small agrarian businesses to earn their living (CIA-TWF 2006). The country produces a good number of agricultural products and most of them are even imported outside the country. And the population that is producing these products live in the villages. However, the most unfortunate thing is that the ones living in the villages though playing a vital role in the economic growth are deprived of many basic facilities of the present world. They are deprived of the latest technological advancements, infrastructural benefits and lot more when compared to the people living in towns and cities.

However, this trend is slowly changing. Recently due to a huge revolution in the telecommunication sector, the people of the villages are getting an opportunity to make their living better (GT 2006). With the popularity of the mobile phones in the country the business man or a farmer living in a village can easily call someone in the city to know about the market situation and then can produce the goods accordingly avoiding any potential loss. Also different other measures are being taken by the government as well as some private organizations to bring the technology nearer to this rural people so that they can get the benefit and thus the country can grow economically. Some organizations are even setting up small kiosks in the popular places of the villages from where people can get access to certain informations (Pallitathya 2006, Abolombon 2006, GT 2006). Also due to strict government measures the literacy rate is improving. Children are given free education in villages so that they at least have the knowledge of reading and writing in their mother-tongue.

With all these good measures of bringing technology nearer to the people, there lies another big problem that acts as a barrier in reducing the “Digital Divide”. The language in which the technology is being presented. As already stated the country imports almost all the technological products from other countries. And these products are not in the language which is familiar to the population of the country. So the technology is not serving accordingly for the people. All the mobile handsets that are being imported only support the English language in their interface. So the villager who only knows Bangla cannot operate a handset like that and so is deprived of the benefit that he or she was supposed to get from it. As already stated, some organizations are setting up small kiosks with a computer having relevant data that can be of help for the villagers. They are training the villagers even to use the computer/kiosk so that they can operate it themselves. But *though the contents may be in Bangla, but the interface of the system is still not in Bangla and thus the people not knowing the language of the*

interface hardly gets a benefit from it. The situation can be considered as having the solution in front of you but still not knowing how to use it.

Thus, comes a great need of the technology being presented to the people in a language the user understands. And that is the concept of localization. And if this concept of localization is applied appropriately we can eventually reduce the digital divide and can give *equitable access of technology to the entire population.*

Target Groups

The effect of localization can help people who are in need of it. And the ones who need this mostly are the ones who only know a single language and that single language is not supported by the technology around them. These types of people are mostly found in underdeveloped and developing countries of the world. Technology can help people in many ways. The poor people can bring a big change in their living if they can use the technology properly. A fisherman having a mobile phone with him can call different markets for the prices of the fish. Then he can sell his fish at a market where he will make the maximum profit. He can also plan his fishing using a device giving him the latest forecast of the weather. A farmer can get information about the profitable crops of the season from an information kiosk and can then plan accordingly. There are some government projects that provide computers to primary schools so that the students can make use of it. If the interface and content both are in the language familiar with the student, then can only the effectiveness of such projects be evaluated. These are some examples of the effect of technology on very ordinary people. But these technologies will only serve effectively when they are easily accessible.

In countries like Bangladesh, these trends are seen increasing day by day. But as stated earlier a very few among the fishermen or farmer can be found to be literate and among those none knows English. And the mobile handsets or any electronics gadgets that might help them all have an interface in English. So a problem remains. The solution can be to make them learn English or present the interface in the language they understand. And the second solution is more feasible. When the user manual and the interface of a mobile phone will be in Bangla then the person knowing only Bangla can go through the manual and get the most out of the device. But in case the interface of the device is in English but the manual is in Bangla, then the person knowing only Bangla can just make an assumption of the services provided by the device and will not be able to make a good use of the device.

Thus it is quiet clear that presenting the technology in a language the people will understand will have a greater impact than otherwise. A question may arise that in a country where the literacy rate is very low, and where only a few among the huge number of farmers working in the field can be found literate, then how feasible would be an initiative like this? Apparently such an initiative may surely not seem very feasible but at least a measure like this will be of some help to the ones that are literate. And as already stated, strict government measures are taken to improve the literacy rate and even primary schools for the elders are being set up to eradicate illiteracy from the country. Similar measures like these are quiet enough to make a localization project feasible, may be not in the near future but at least in the long run.

And this concept will not only benefit a single segment of the population but can play a very good role giving equal access of technology for everyone. Starting from students, adults, people from rural and urban areas, almost everyone will be benefited by the concept of localization. The evaluation of a project like this can not be done from an apparent view but it is quiet certain that a gradual change can be observed in the quality of life being led by the people of the country.

Goals

The goal of a localization project would be to present a work in a way that the people living in a locale would benefit from it. And in a developing country this can bring a good impact. In the context of a

developing country like Bangladesh, it can be seen that the most poor ones among the population are deprived of the basic facilities of the country but they are the ones who play the vital role in the economic growth of the country. Thus the goal of a localization project should focus mostly towards the poor people. It should be done in a way that the inequitable access of the basic facilities are reduced or eliminated completely.

Localization of a technological product can be done in many ways. A technological product can vary from an intangible product to a tangible product. The tangible products are the devices and gadgets like mobile phones, machineries, computers etc. An intangible technological product can be the software that are used within the devices. As already stated that in Bangladesh almost all these kinds of products are imported from outside the country. Thus the countries producing these products do not actually take into account the idea of giving the support of the language which would help the ones importing those products. And so remains the problem of effective use of the product by a mere farmer. So there should be an initiative taken by the government as well as some private organizations to avoid these kinds of problems.

In Bangladesh, literacy rate is still very low. Thus there might be a question of the feasibility of these kinds of projects. However an initiative taken at least for the literate population can help in the growth of the economy. *Maybe a project like this will not give a sparkling result from its beginning but at least it can create a path for eliminating the digital divide in the long run.*

Activities and Methodology

Localization can be divided into many phases. The first phase of a localization project, which can be considered as a shallow localization, will be to translate the physical interface/control panel of the device in to the language that the users of the device would understand. For instance the keypad letters of a mobile phone can be changed in to the language the user will understand. This way more people knowing that language can use the device properly. This method can be applied for any devices starting from big industrial machineries to small hand held gadgets by simply replacing the control panel label stickers with new label stickers.

Fig: A mobile phone set with a keypad in Bangla.

The second phase of a localization project would be to translate the intangible parts of the devices. They are the software that are used to run the devices. This phase and all the subsequent phases are not very easy to implement and requires careful attention. The localization of the software used within the devices can not be done as easily as replacing label stickers. A well planned initiative must be there to do this. First we need to get hold of the source code of the programs/software that are running within the devices. Then all the strings within the source code need to be identified. After the strings are identified, they need to be translated to the other language for example Bangla. And the translation work should be done according to a standard. Thus a standard glossary of terms should be created and maintained all throughout this phase. After the translation of the strings are done and edited properly, the source code needs to be compiled again with this new set of strings that are in a different language now. And after a successful compilation process some testing should be conducted to check the integrity of the software and then it should be put back into the device. This way another phase of the localization of a technological product can be done. And this will lead to a more productive use of the device for its users who only speak their native language. The user after the second phase will not only have a device having labels in their native language but also the interface of the system in their own language.

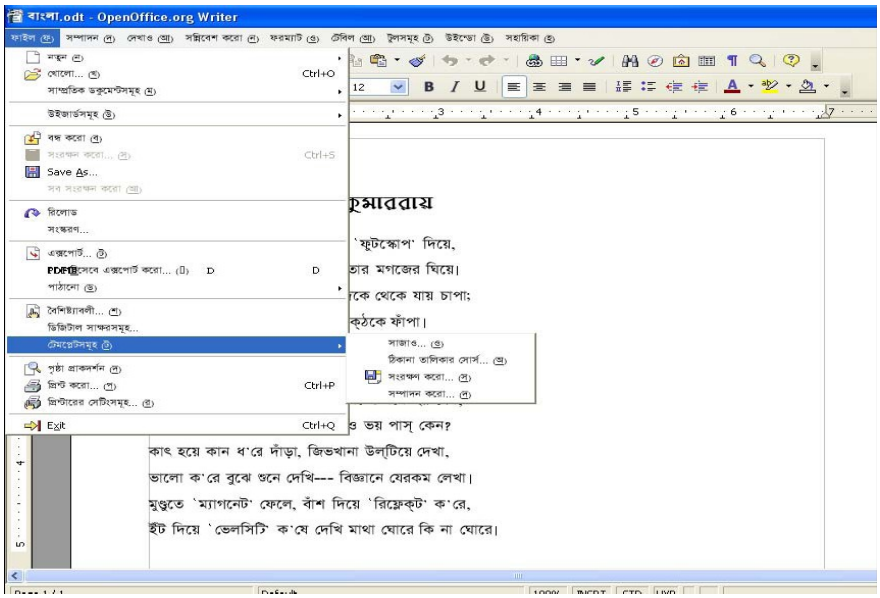

Fig: An interface of an Office Suite in Bangla.

The next phase would be to implement new options within the system with local language support so that the system can be of more help for its users. An example can be implementing a dictionary within a mobile phone set, giving spelling check support for the short message services, allowing T9 support in the local language etc. Until this phase what we have is a phone set with the keypads having labels in a local language for instance Bangla, then we have the menu within the phone set in Bangla too. Now we plan to give more supports in Bangla for the user. In this phase many language specific tools can be built depending on the product being localized. For instance, while localizing an office suite for the local computer users, grammar checkers, spelling checkers can be implemented. Even speech recognition support can be given. Localized knowledge bases can be built for the local users. Thus at the end of this phase of localization the user can expect a device having its labels and interfaces, in their native language along with language specific tools that can help them in various other ways.

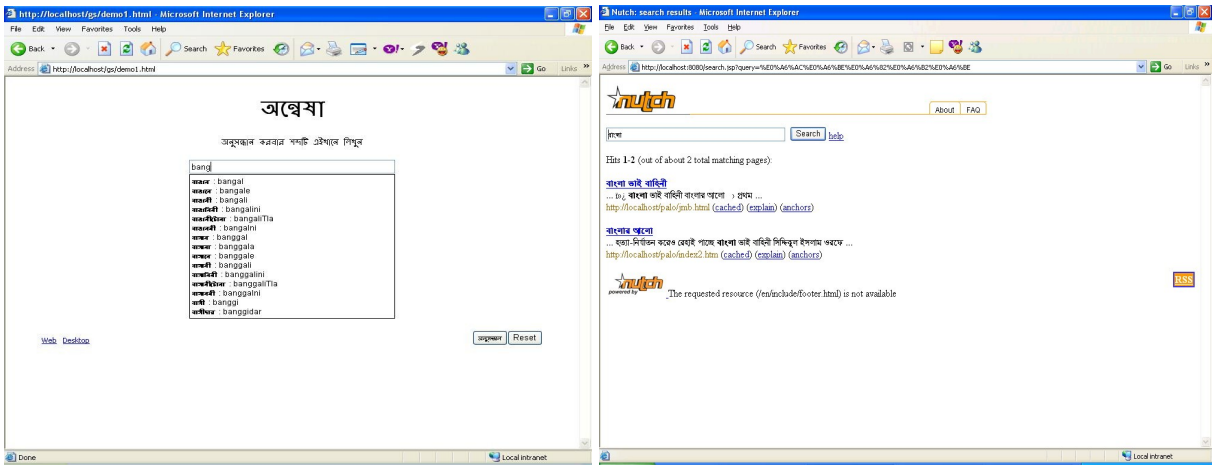

Fig: A Bangla Search engine with nearest suggestions.

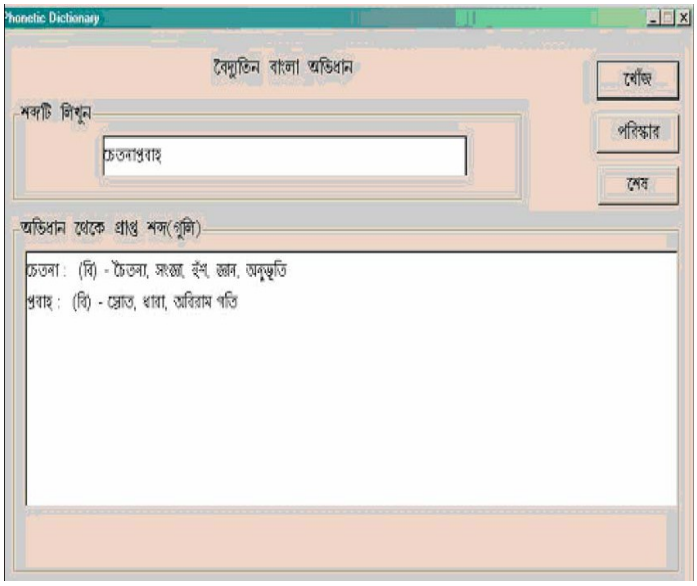

Fig: A Bangla Dictionary.

The localization of a technological product can be done to the extent until the users get all they expect in their very own language. But the basic parts can be divided in to above three phases stated. And the first two phases are the most important ones. The third ones needs a long term planning and implementation method and can continue endlessly.

Implementation and Time frame

The implementation of these types of projects require a careful planning and organization. Thus it would be very good if an organization be it private or public, can control the overall work of this kind of project. The implementation workload can also be divided among the people of different disciplines. As stated earlier, the shallow localization can be done without any special expertise for that work. All we need to do is produce the labels accordingly under the supervision of a control body and then implement them on the devices. The next two phases of localization requires more technical expertise. To translate the strings of the interface of a product the first thing needed is to identify the strings to be translated. After that a glossary of strings should be formed and maintained throughout the project. With the help of that glossary the strings should be translated. The translation can be done in two ways, on-line and off-line methods. In an on-line method a set of certified translators can translate the strings with the help of the glossary. The translation would be done in a computer network where each translator will get a set of strings to translate and after they are translated the

server of the computer network will store the entire work. Later all the translated strings can be verified by some higher authorities and the new strings can be deployed into the system. For the off-line method, the certified translators can collect some set of strings from the project authority, translate them on a paper and later give it back to the project authority. The authority can then type it in the system, verify it and release it when done.

For the third phase of the localization where language specific tools are being built and implemented, a more stronger authority should head this part. Building language specific tools requires thorough research and testing and thus the result of this phase cannot be expected very early. And all these research works need not to be done by a single organization. Different organizations can collaborate together to work for this phase of localization. Here independent research organizations working with software development and linguistics can take the lead. Also different educational institutions like universities can take part in the research and development work directly or indirectly.

The time frame for these types of projects can waver a lot depending upon the product being worked on. If a small device is being worked on where the third phase of the localization has very less or no importance at all, then the project duration would be very small depending upon the workforce working on the project. But projects where the third phase will play a major role will require a good amount of time until the project can be officially declared as over. However, the project undergoing the third phase work need not to wait till the official declaration of the project termination. The third phase work can be done in small modules and after a module is successfully completed, it can be released with the product. And as subsequent modules arrive they can be integrated within the system. This way the third phase can continue its work while some part of it is already under use.

Resources

To implement these types of projects the most important thing required is the dedication. The dedication to work for the welfare of the people, the dedication to work for the welfare of the country. A set of dedicated people can set up a body who can monitor the projects being worked on. The cost of a project like this will vary depending upon the type of project being worked on and the details to which the work needs to be done. But still the cost of this kind of project will be very small compared to the benefit that will be obtained by the successful implementation of the project.

The funding of a project is a very important thing for its successful implementation. In a localization project, funding can be obtained from various sources but it would be very good for the government to have a certain budget for this kind of projects for any financial year. Governments can allocate an amount every year to support this kind of projects and can monitor and administer even for the successful implementation of these projects.

To keep the cost of the project low, some other measures can be taken too. Open-source and free solutions can be used for the development of the software. Thus eliminating the cost of buying high priced proprietary software for the systems. Students can be encouraged to work for this kind of projects as volunteers and thus reducing some cost of maintaining a fixed workforce.

Project Organisation

This type of project can be implemented very easily if there is an organization that can control and monitor the overall progress of the projects that are running. The organization can be headed by any individual or the government of the country. Localization projects can even be carried out independently by individual organizations. *The most needed thing for a project like this is the dedication of a number of people to work for the country and to work for the people of the country.* And any person interested to work for this type of projects can be trained to make them part of the team.

People working in the IT sector can play a major role in projects like these. They can use their IT skills to bring the technology nearer to everyone in the country. Apart from the IT experts, students studying IT related subjects can play a major role in these projects. Under proper guidance by some experts, they can be used to develop the language specific tools required for the localization projects. Students can be used to translate the strings in voluntary basis. Students can be trained and encouraged to take part in research works on developing problem oriented localization tools that can help the local people. Students can take part in every part of a localization project. They can be supported by the institutions to organize camps and small training sessions to create an awareness of the available technologies in the country. They can study different needs of the people who are deprived from the technological facilities and they can themselves produce localized solutions for those needs. In a way students can end up being young entrepreneurs by themselves if proper guidance is given to them for this type of projects. Overall, any person interested can work for this type of projects if some guidance is given to them. And those guidance can be provided by an organization that will be responsible to monitor the progress of the projects. That organization should also be accountable to the Ministry of Science and Technology of the government of the country so that there is nothing against the law.

Projects like these can take part in any part of the world. But the underdeveloped and developing countries would benefit more from these projects. In the underdeveloped and developing countries, it is more common to observe an inequitable access of technology and education among the population. Technology is meant to help people. And technology can be used to educate people, it can be used to make the living of the people better. Thus country specific initiatives should be taken to make the access of education and technology equitable among the population.

Evaluation

The results of a localization project in a developing country like Bangladesh can not be felt suddenly after a project has been successfully implemented. The effect of a successful implementation would be felt over time. The result would not be like a sudden boom in the economy of the country but rather it can be evaluated by the impacts it has on the population. If the technology can be made accessible to a poor farmer according to his needs, the impact of technology can bring a change in the quality of life he used to live before the technology reached him. A good example for this can be a farmer going to a local information kiosk where he can use his own ability or can take help of an intermediary who can use the system to give him the information about selling his vegetables at a certain place with the best price. Thus the farmer will be selling his product with a good profit and this would be possible only by making the technology available to the farmer according to his needs. Another way the result of a successful implementation of a localization project can be felt by the increase in the number of people using ICT for their daily living.

Projects like these can bring a good change in many aspects of the rural lives of a developing country. People can use the technology to communicate with relatives living in distant places. Many specialized services can be offered to the rural people in the language they would understand. Some minor medical services and counselling can be done remotely from cities to the remote areas of the country in the local language. Educational services like E-learning, on-line exams etc. can be conducted at remote places very easily because there will be no issues like “the language barrier”. Some government services can be conducted electronically in the native language by using the technology and resulting in more awareness about technology for day to day life.

Thus it is quiet obvious that a carefully planned initiative can help the population of a country in many ways. It is not always a good criteria to evaluate a project success by the monetary gains achieved from the implementation of the project. *Sometimes initiatives should be taken for the welfare of the people without looking for an apparent gain achieved by the initiative taken. And as long as the people are benefited by a cause over the years, even with a slow progress at the beginning, the project can be called a success because it has managed to be of help for the people.*

Special Considerations

In Bangladesh, some localization projects can been seen already taking place but they are all done by individual groups without maintaining a proper standard. As the individual groups work independently, it is seen that a common task is repeated at times. Also they are hardly seen to follow a common glossary of terms used to translate strings. Thus there seems to be a lack of uniformity in the end product. A single label is translated in many ways in different projects and thus users get confused at times while working with the systems. Thus a good coordination among the groups working in these projects is very important.

A localization project can be implemented in any country very easily as long as there is a set of people ready to get their hands dirty to work for their country. In this paper a basic outline has been presented on how localization of a technological product can be done and how this can help to reduce the digital divide. A good initiative and some dedicated souls can refine this outline further to give a fair access to technology for the people and make their living better and easier.

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