IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, 2022

DIGITALISATION OF INDIAN TYPEFACES IN THE PHASE OF DIGITAL INDIA

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ABSTRACT

This research paper explores the bird's eye view of the Digitalisation of Indian Typefaces in the era of Digital India campaign, which was officially launched in 2015 Initiated by Government of India. While examining possible solutions, the researcher describes the view point of the common man while using the Indian typefaces in daily routine. The paper will review historical development of mechanizing Indian scripts and the computer processing of Indian languages. The focus is on the Devanagari script and Hindi language, and on the technological solutions for processing them. The 1990s was a historic decade in India, the rise of the internet ushered in a radical new era of communication, business and entertainment. The 1990s saw advances in technology, with the World Wide Web, the evolution of the Pentium microprocessor. This era has introduced the India to the modern computer systems. It was the era of big companies using computers instead of manpower for their day-to-day work.

The Indian scholarly articles and books were digitally published in Indic scripts over the internet for open public access. Fonts/Types were the key element for digital publishing. In the early days, no one gave its attention towa rds the standard format of these Indian language fonts.

This paper helps in understanding the cause of this information loss during Indic font substitution with reason st ating the backend problem of these legacy Indic fonts in digital documents.

India is a land of diverse cultures and traditions. It is highly multilingual with 22 constitutionally recognized languages. Besides these, hundreds of other languages are used in India, each one with a number of dialects. The officially recognized languages are Assamese, Bengali, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Malayalam, Manipuri, Marathi, Nepali, Oriya, Punjabi, Sanskrit, Sindhi, Tamil, Telugu, Urdu, Bodo, Santhali, Maithili and Dogri.. As a result, it has many languages that people use to communicate across various geographies of the nation. However, it is said that Indian languages didn't get attention in the world of fonts until the past few years, is not the case anymore. With the need to personalize experiences for users, it became quite important for designers and creators to actually dig into Indian languages to improve the user experience of any product.

Keywords: *Languages, Vernacular, Multilingual, Indian scripts, Letter legibility, Font Technology*

INTRODUCTION

The change in letter forms leading to new scripts was probably so slow, generation by generation, that the process did not necessarily involve conscious change from one script to another, but a slow evolution of differences in letter formation as texts were copied throughout the ages. The first digital typeface—Digi Grotesk—was designed by Rudolf Hell in 1968. Early digital fonts were bitmaps, which resulted in less-than-ideal readability at small sizes. In 1974, the first outline (vector) fonts were developed, which resulted in better readability at the same time as reducing file sizes. A similar development occurred in medieval Europe with the Latin script, but the development of the printing press, and Renaissance ideas about how the Latin script ought to look like led to a typographical convergence. A language usually refers to the spoken language, a method of communication. A script refers to a collection of characters used to write one or more languages. A language is a method of communication. Scripts are writing systems that allow the transcription of a language, via alphabet sets. The present paper intends to explore the applied growth of the evolution of Indian typefaces in the phase of Digital India. The linguistic landscape of the subcontinent changed dramatically during the 2nd millennium BCE, so that is impossible to determine if there is a connection between the IVC script and the next clearly

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attested script in India, the Brahmi script found in the inscriptions of the Mauryan Emperor Ashoka (ruled 268-232 BCE), especially since they probably represented vastly different, unrelated languages. But that fact that this knowledge was lost over time and that Indian scripts differentiated into so many forms does seem to indicate that literacy was not widespread and was limited to pockets of individuals, a trend which probably accelerated due to the eclipse of a pan-Indian literary culture after the 12th century. Before the emergence of a modern, mass culture throughout India, writing styles and scripts were particular to regions, and even castes, with scribes and merchants often utilizing their own scripts, which were usually simpler forms of the more formal monumental alphabets used for official or religious purposes. While India's scripts are ancient, technology and modernity are changing their usage patterns, and are in fact allowing them to thrive as never before in standardized and widely used forms, as more people gain literacy and access to the internet. Digitalization and the widespread proliferation of Roman-alphabet keyboards in India meant that Indian users would often transcribe Indian languages using ad hoc Romanizations on the internet and via text.

Seven hundred and eighty languages and 400 scripts: that's the number the People's Linguistic Survey of India identified in 2013. Of these, how many scripts do we see daily? Giving text a unique 'voice' are typefaces and fonts, created by type designers across the world. It's safe to say that India is a prime player in this market because of the sheer number of languages we have.

LITERATURE REVIEW

The origin of type design in Indic languages goes back to the history of print in India. "Scroll.in/magazine/919214" Girish Dalvi, co-founder of Ek Type Collective and professor of design at the Indian Institute of Technology Bombay, says the earliest type foundry was Nirnay Sagar Press. Established in Bombay in the year 1834, the publisher of Sanskrit texts produced several high quality Devanagari typefaces.

Innovations like those continued for a century and a half, but the production of modern Indic fonts began in earnest only after the proliferation of computers – and, more specifically, the internet.

A turning point came with the introduction of Unicode. A computing industry standard, Unicode attaches a unique number to every written character – no matter what language or platform – making it possible for the first time to create a font in an Indian language that could be used and seen across platforms. Of course, fonts could be, and were, developed before, but they were system-specific: if you sent a text in an earlier Indic font, the receiver could see it only if the receiving system supported that type.

Those pre-Unicode fonts are today called Legacy Fonts. "They were very basic and not conducive to design intervention," said Nallaperumal. "The maatras were a bit off and you had to create 1,000 versions to make Devanagari work. Most software was created with Latin type design in mind and could not support complex Indian languages."

The complexity of writing systems in India still poses a challenge for designers. Every major language has its own structure and aesthetic that rarely translates into another language – a sharp contrast from the Latin script. "The structure of the Latin script is pretty straightforward and linear for the most part, where one letter follows the other, with an occasional diacritical accent mark thrown in," explained Kalapi Gajjar-Bordawekar, type designer and co-founder of the studio Universal Thirst. "But in the case of most Indic scripts, letter shapes transform based on context." One instance of this is when a maatra is applied to a consonant or when two consonants conjugate to form a compound unit. Such transformations, says Gajjar-Bordawekar, aren't enabled on systems by default and "explicit instructions have to be included in the font files by programming all possible combinations, which is followed by a series of systematic tests on multiple computing environments and platforms to ensure that they function as intended. This process is time-consuming and requires specialised knowledge".

The first known modern Indian fonts that supported two scripts – Mangal for Hindi and Latha for Tamil – were designed by RK Joshi, who was an academic type designer, calligrapher and professor of type design at the Indian Institute of Technology Bombay. They were released in 2001 by Microsoft to support the Windows 2000

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operating system, and were followed by custom fonts developed by the UK-based Tiro Typeworks for Vodafone Hindi.

Some five years after Indian Type Foundry released the Devanagari font Fedra Hindi in 2009, Ek Type launched the first open source font family that supported Devanagari, Gujarati, Gurmukhi, Bengali, Tamil and Latin. It was called Mukta. "[It] being open-source ensured everyone could use it free, including students, which made it one of the most popular in the country," said Dalvi. Several independent Indian designers and studios were being commissioned around this time to create open source fonts to populate the Google Fonts library, an initiative that fed back into the trend by creating a resource of base fonts. The result: the development of more popular Indic type families.

LACK OF INFORMATION

Dalvi, who has a PhD in typography from the Indian Institute of Technology Bombay, has written extensively about decolonising type design, and believes that the graphic design industry is burdened with a cultural hegemony in which even a popular script like Devanagari is marginalised. It is something, he says, that is easy to see in Indic language text with scattered English words. "The English word always stands out and is larger than the Indic language text with its two-storied system."

"While there are many books, online or offline, about Latin scripts, or even marginal scripts, such as Armenian or Hebrew, there is very little information about the shaping of Indic fonts," said Bilak. For Devanagari, the primary reference book – *Typography of Devanagari* by BS Naik – was published in 1971 and is barely relevant for the digital age. On other languages and scripts, such as Odia or Telugu, says Bilak, there is even less information.

"Young designers find the lack of information discouraging, and there are not many places where one can learn how to design functional Indic fonts," Bilak said. "There is also a lack of digital tools made for designing Devanagari [or other Indic] fonts." He is hoping to develop open source tools that will make the process easier.

The Indic type industry in India is still largely dependent on custom design projects, in which a brand identity is created using multilingual font systems. "The majority of work comes in the form of custom commissions from technology and media companies looking to expand their presence globally," said Gajjar-Bordawekar. "These custom projects are usually large in scale with long development periods. They include multiple scripts in multiple weights and styles, often with challenging technological requirements due to continuous technological innovation."

All languages aren't made equal and there is greater demand for Devanagari, followed by widely-spoken ones like Bengali and Tamil. "Nearly 50% of my business in Indic fonts comes from Devanagari," said Rajpurohit. "For every 10 Devanagari licences we sell, we sell two Bangla and one Kannada."

Indian scripts: Background Ten major modern scripts are currently used in India: Devanagari, Bengali, Oriya, Gujarati, Gurumukhi, Tamil, Telugu, Kannada, Malayalam, and Urdu. Of these, Urdu is derived from the Persian script and is writ- ten from right to left. The other nine scripts, written from left to right, originated from the early Brahmi script (300 BC) 7, 8 and are also referred to as Indic scripts. The early Brahmi script split into two major branches, one consisting of the north Indian scripts (Devanagari, Bengali, Oriya, Gujarati, and Gurumukhi) and the other south Indian or Dravidian scripts (Tamil, Telugu, Kannada, and Malayalam).

Some Indian type designers have worked into developing Indian typefaces. One such remarkably well typographer can be mentioned here is Shiva Nallaperumai is a Graphic Designer, focusing on the intersection of design, culture and typography. As a type designer he has worked with ITF, Lost Type Co-Op and Typotheque. He now works into the field of developing new typefaces.

India's New Font Family:

As a designer, you need to use history, technology and language to identify the problem while creating a typeface and solve it with the use of the aforementioned elements.

Indian type Foundry (ITF)

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Started by Peter Bilak SN Rajpurohit and Rajesh Kejriwal in 2009, Indian type foundary has designed the fonts foor major companies like Google, Amazon, Apple, Samsung and lot of others. The Ahemdabad- based company first created Fedra Hindi (Devnagari font) designed especially for the Indian market, which was further extended to develop typefaces on major scripts in India)Kohinoor) Devnagari, Tamil, Oroya, Bengali, Telugu, Malayalam, Kannada, Gurumukhi and of course Gujrati. They also included a sans serif font for 12 main Indian languages (Akhand) that reflects the linguistic diversity of India. They have designed more than 80 font families and are undoubtedly one of the most successful type foundaries in India.

'Lewis, N. (2019c, December 7)' The People's Linguistic Survey of India (PSLI) published a surprising report two years ago which stated that by the year 2100, 80% of India's scripts would vanish. In a country that is defined by plurality—be it in terms of culture, geography, traditions, and languages, this is rather shocking. While the complexity of the patchwork of Indic scripts like Sanskrit, Bengali, Odia, Urdu, and so on, is represented in the nation's diverse ancient literature, as we advance towards the digital age, our typeface designers struggle to upgrade our rich linguistic legacy over to a digital interface. "Language is culture, and our visual culture suffered as a result of poor design. Books and newspapers in Indian languages are noticeably lower in aesthetic quality than their English counterparts in the post-digital era. We think that good typography leads to better design and better vehicles for content, be it on the web or in print," observes Nallaperumal, on the local Type industry's state of affairs. The process of unifying disparate Indic scripts under one visual medium hasn't been easy. Nallaperumal admits having very few precedents to refer to and the most significant challenge was choosing the appropriate weight and character heights to match all the scripts. "If a script is drawn in the wrong height or volume in proportion to its complement, association, recall and compatibility levels fall low. Each Indic script has its own matra system. Some scripts like Telugu have three levels of below-base forms, therefore they need a lot more vertical space than Latin does. Unifying this was the toughest part," he says.

EK Type

Ek type is a hub for type designers, researchers, and academicians working towards developing and distributing Indian fonts. This Mumbai-based type design studio brings together multiple scripts and languages under one platform and creates typefaces that can be used in multiple applications and devices. To address the need for Indian typefaces and challenges in designing them, Ek type also creates various resources to create awareness about Indian fonts. While creating contemporary typefaces, the foundry also focuses on script grammar and script tradition to bring out the most realistic and authentic typefaces that are viable in the Indian linguistic system.

Objectives

- To create awareness about the need of digitalization of Indian Typefaces.
- To explore the applied growth of the evolution of Indian scripts, and also the nature of the development.
- To find the flaws in digitalization of Indian typefaces and work towards its improvement.

The Current Scenario

Many phones and computers in India are not specifically designed with Indic script keyboards and instead use the Roman alphabet keyboards common in the West. Transliteration software renders this moot. The increased use of Indic-language scripts has also lead to newer and more artistic fonts for Indian languages.

In short, this is a golden age for Indic language script usage, due to technology and increased literacy. This is despite both the proliferation of English-language education in India, and the shoddy quality of public schools in that country. The very nature of modernity, with its mass communication, advertisements, social platforms, and the spread of information and entertainment to everyone with a smartphone, means that everyone will eventually gain and utilize basic literacy, even if by osmosis and not formal education. And most of this literacy in India will be in local languages. This will be the first time in India's recorded history that its scripts are being used so widely.

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India has a long history of writing. While India has been a literate culture for millennia, it has also greatly valued oral knowledge. The ancient Hindu scriptures, the Vedas, the oldest of which dated to around 1500 BCE were memorized verbatim for at least a thousand years, if not more, before being committed to writing. The oldest writing found in the subcontinent is the as yet undeciphered script of the Indus Valley Civilization (IVC), which seems to have been somewhat logo-syllabic in nature. The script fell out of use by 1500 BCE.

Challenges that type Designer's Face

- Most software was created with Latin-type design in mind and could not support complex Indian languages in the Unicode system.
- Experienced professionals such as analysts, engineers, programmers, managers, artists, writers, entrepreneurs and designers, addressing different structures and aesthetics of various languages in India (A country with 22 official languages and almost 1600 including dialects).
- Using technology to align the letters to create patterns.
- Lack of information on Indian-typefaces.

Challenges to Digital India – There are many barricades in the way of its successful implementation like digital illiteracy, poor infrastructure, low internet speed, lack of coordination among various departments, issues pertaining to taxation, etc.

Digital India is achievable but it has its set of challenges. Some of the Challenges to Digital India are

1. Though India achieved the universal primary education target in 2015, its adult population still has a sizeable number of illiterate or semi-literate people, especially in villages. Taking Digital India initiatives to this segment of the population, which might have never touched a computer, would be a challenge. One solution may be to use a graphical user interface (GUI) so that even an illiterate user can understand it.
2. The above problem is further accentuated by the fact that almost all the content on the internet, all apps & software is in English. In a diverse country like India which has 22 major languages, it would be a challenge to provide all e-facilities in these many Indian languages. Usually, this is done by translating English content. But most of the time, this translation is done in a very shoddily mechanical way, making it dry and difficult to comprehend for the masses. I will have to be ensured that not only all the facilities under Challenges to Digital India are available in Indian languages, but the quality of the content in our own languages is up to the mark.
3. Digital literacy especially in rural areas is very low. Though Government has already announced a 'Digital Literacy Mission' for this, still it would pose a challenge in coming years.
4. The true value of being digital means that workflow becomes automated and administrative system becomes more efficient, faster, and transparent. But the Challenges to Digital India in this is, that the government has been working in a particular way and suddenly, they have to work in a completely different environment. Now they have to put information online and respond to grievances and criticism. This will be difficult for those officials who are not used to functioning in this manner. Also, digitization and automation will reduce the scope for corruption but changing their attitude would be a tough task. A beginning can be made by explaining to them the advantages that digital will bring in running the government.
5. Government alone cannot make Digital India a success. For this, the support and cooperation of the private sector will be needed at every stage. So clear principles and guidelines need to be developed for Public-Private-Partnerships in this field. Also, projects in remote villages may not be viable for the private sector, so special attention will have to be given to this.
6. Implementation of Digital India involves – Union Government, States, Union Territories, and the IT industry. Coordination among so many Govt departments and private players would be a gargantuan task and would largely decide the success of this initiative.

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7. There are different internet protocols in different states depending on what kind of hardware and software they use. This may cause problems in interoperability. Hence, all software protocols need to be standardized. Also, the software should be on an open-source basis, rather than propriety. Because propriety solutions are more expensive and would be different to integrate across states.
8. We need IT solutions suited to Indian needs. For this push need to be given for innovation and developing low-cost technologies. Hence the concept of Net Neutrality needs to be nourished and supported as it helps in innovation on the internet.
9. In the end, we come to the big question – can technology solve the inherent problems of society? Can inequality, cast/gender-based discrimination, and exploitive social and political structures all be dealt with by just automation and optical fiber cables?

RESEARCH METHODOLOGY:

Result techniques and methods:

- Mixture of several methods descriptive cum exploratory methodology

(Quantitative and Qualitative)

- Survey Poll conducted to examine the opinion.

Questionnaire:

1. Are Indian Typefaces fascinating to use?
2. Indian typefaces in digital format are not user friendly with its matras and kanas in most commonly used digital devices?
3. Digitalised Indian typefaces are not user friendly.
4. Roman typefaces are easy to use in comparison with Indian typefaces?
5. Indian typefaces can't be used in all the digital medium.
6. Not enough Indian typefaces are available in 22 state languages of India .
7. Indian typefaces are limited when it comes to its uses in Graphic design.
8. Increase of variation in Indian typefaces will be promoting Indian regional language.
9. Digitalisation of Indian typefaces will add up to go up the literacy rate in India.
10. Digitalisation of Indian typefaces and make it user friendly is need of Digital India.

Quantitative and Descriptive Research Methodology. Descriptive research, which classifies the type of research on the basis of "***purpose of research***". By adding the word "quantitative" so as to emphasize that the variables are measured using numerical terms.

The researchers employed a descriptive research design for it allowed them to establish an association between the view on digitalization and the need of digitalization of Indian typefaces. A sample size of 195 respondents was used to collect the data and information intended to answer the research question. This was composed of 108 females and 87 males. The casual sampling technique was employed whereby the study respondents were conveniently captured in the design college. The researchers specifically targeted professional learning and teaching Applied Art and Design in Applied Art colleges.

A pre-testing of the research questionnaire was done on 15 respondents who presumably resembled the characteristic features of the intended research participants. The reasoning behind pretesting was to reveal the flaws of the questionnaires so that the necessary changes can be made, if required so. This helped the researcher to eliminate excessive and unrelated questions and improve on questionnaire to extract the core expected valid information needed.

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Based on the pre-testing, 195 professional designers and design/Applied Art students were given a questionnaire to know their assertion about the research.

DATA Analysis:
A Likert scale was used for each constituent part ranging from 1 to 5 (1 as the lowest ranking and 5 the highest ranking). Collected data was analysed by using simple statistical method – mainly **mean method**.

The entire procedure of data analysis was based on **Likert type analysis.**

Scale of Measures

- Strongly Disagree = 1
- Disagree = 2
- Undecided = 3
- Agree = 4
- Strongly Agree = 5

A mean value which is **high in score** indicates that the **participants' high level perception or approach towards the given practices** or vice-versa. The obtained mean value score fall in the range of 1 to 5.

Scale	**5**	**4**	**3**	**2**	**1**	**Responses**	**Total**	**Mean**
Assertions (Numeric Value)	SA	A	U	D	SD			
	25	10	5	5	5	50		3.92
	125	40	15	10	5		195	
	50%	20%	10%	10%	10%	100%	50	

CONCLUSION
Type design / Indian Scripts / Letter legibility / Font technology are the main features of digitalization of Indian typefaces which need to be covered by the researcher in type design. Hindi written in the Devanagari alphabet is India's official national language and has the most speakers, estimated to be more than 500 million. Researcher mainly focuses on the objective of digital India campaign to get rid of India's great digital divide by addressing few majour issues. But one also needs to know how to use history, technology, and language to identify the problem while creating a typeface and solve it with the use of the aforementioned elements. India's growing typographic community not only caters to global majors trying to make a mark in the vernacular market but also digitises endangered languages.

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