

# Usability Evaluation of the Tablet Computer ‘Aakash-2’

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## INTRODUCTION

A tablet computer is a mobile computer with display, circuitry and battery in a single unit. It is equipped with sensors, including cameras, microphone, accelerometer and touch-screen, with finger or stylus gestures replacing computer mouse and keyboard. It is provided with physical buttons to control basic features such as speaker volume and power, and also an interface in the form of ports for network communications and to charge the battery. These computers are typically larger than smart phones at 7 inches (18 cm) or larger, measured diagonally. An on-screen popped-up virtual keyboard is usually used for data entry.

The tablet computers were conceptualized in the mid-20th century. Several commercial tablet-like products were developed in 1980s. They included products such as ‘Pencept’ by Communications Intelligence Corporation, ‘GridPad’ by Jeff Hawkins and ‘Linus Write-Top’. Then, ‘MessagePad’ was the first tablet computer by Apple in 1993. By 1997, Jeff Hawkins was back with ‘PalmPilot’, the first affordable Personal Digital Assistant (PDA). Microsoft’s first tablet computer – ‘Tablet PC’ was arrived in 2000. By the mid-2000s, many versions of tablet computers came into market like the ‘LS800’ from Motion Computing and the Lenovo ‘ThinkPad’. In 2010, the ‘iPad’ from Apple arrived with a gorgeous touchscreen that people loved (Bort, 2013). Then, Android tablets like the Samsung’s ‘Galaxy Tab’, Amazon’s ‘Kindle Fire’ and Sony’s ‘S2’ also entered the market and became popular. This article attempts to introduce the world of tablet computers through example of ‘Aakash 2’.

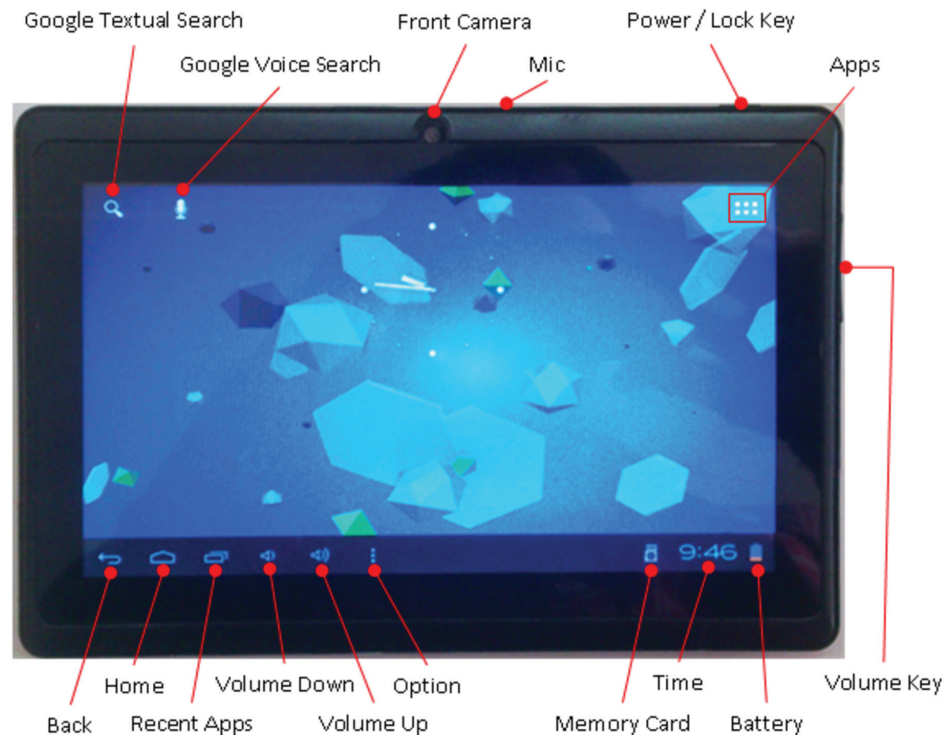
## BACKGROUND

Though there is a huge attractive market for tablet computers with variety of user-friendly features, the main hitch is their affordability, especially in the Indian market. A cost of a high-end tablet computer is more than INR 40,000 (USD 640) for higher versions of Apple iPad, Microsoft Surface or Samsung Galaxy Note (Thinkdigit.com). The top-selling vendors of tablet computers in India include Samsung, Micromax, Datawind, a maker of ‘Aakash’ and Apple (Tripathy et al., 2013). The average sales value of tablet computers is about INR 13,000 (USD 210), while two-third of the sales is below INR 10,000 (USD 160). Considering this challenge of affordability, Government of India has promoted World’s cheapest tablet computer – ‘Aakash’ and its versions.

‘Aakash’ is an Android-based low-cost tablet computer, which is launched as a part of an initiative to link 25,000 colleges and 400 universities in an e-learning program (BBC, 2010). It is produced by British company DataWind and is manufactured by the India-based company Quad. It was officially launched in New Delhi, India on 5<sup>th</sup> Oct., 2011. The Ministry of Human Resource Development (MHRD) released an upgraded second-generation model called ‘Aakash 2’, code-named as ‘UbiSlate 7Ci’ in Nov., 2012. The current commercial price of ‘Aakash 2’ is about INR 3,499 (USD 56). However, it is offered at much lower subsidized price of INR 1,130 (USD 18) for Indian students and teachers.

Figure 1 depicts the tablet interface for ‘Aakash 2’, highlighting physical buttons for volume control and

Figure 1. Tablet interface for 'Aakash 2'



power/locking. Being a low-cost tablet computer, the features of 'Aakash 2' have certain limitations; still they are interesting as given below:

- 180 millimetres (7 inch) capacitive touch-screen with resolution of 800 x 480 pixels,
- Light weight of 350 grams (12 oz),
- ARM Cortex A8 processor with frequency of 1 GHz,
- 512 MB RAM with 4 GB internal flash memory,
- Operating system - Android 4.0.4,
- Wi-Fi and GPS capacity,
- One Universal Serial Bus (USB) port.

Though the customers of 'Aakash 2' are happy about the affordable price, they are not satisfied with its performance (Aakash.org, 2013). Therefore, there is a need for further investigation of this tablet computer from the viewpoint of college students and teachers as target audience.

## RELATED WORK

Several technical articles have highlighted problems related to usability and design, in tablet computers and related applications. Few obvious issues include tiny touch targets, displaying flash contents, cumbersome data entry, poor battery life, confusing gestures, incompatibility with file formats and poorly scaled designs (Hillary, 2011; Nielsen, 2013; Seward, 2011). These studies are helpful in developing an improved understanding about tablet computers.

As part of usability evaluation practice, the widely used methods are – Heuristic Evaluation (HE), GOMS Analysis, Cognitive Walkthrough (CW), Field Survey (FS), User Testing (UT) and Think Aloud (TA). Of these methods, Jasper classifies HE and CW as two of the most adopted expert-based methods (Bhutkar et al., 2013; Jaspers, 2009). Lewis et al. have compared the popular Usability Evaluation Methods (UEM) (Lewis et al., 1997), and our selection is based on this study.

There are many studies, which evaluate tablet computers and related applications. Sandefer et al.

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