American International University-Bangladesh (AIUB)

Lowering the cognitive strain for PDF Books

Improving the Cognitive Load of PDF Readers

A.B.M. Toufiqul Alam Sams (19-39297-1)

MD. Zunayed Hossain Saafin (19-39304-1)

Sumaya Naznin Irina (19-39329-1

Sufian Mustaq (19-39292-1))

A Thesis submitted for the degree of Bachelor of Science (BSc)
in Computer Science and Engineering (CSE) at
American International University Bangladesh in October, 2024

Faculty of Science and Technology (FST)

Abstract

The majority of eReaders allow readers to change a physical book's dimensions, which is why all of them are incredibly. The identical book can be read by that specific user who has good vision but needs large print as a replacement. Some eReaders may produce a synthesized speech, making them ideal for blind users. Between the years 2000 and 2000 as a consequence, a thorough literature search was conducted. Twenty utilizing CINAHL Plus and PubMed as a result. Detailed Text additionally P [1] By using all of that two objective also subjective cognitive measures they addressed cognitive function. We first propose a presumptive, based on assumptions cognitive theory of multimodal learning. The concept of cognitive overload, which happens when a learner's planned or prepared cognitive processing exceeds available cognitive capability, is something we then tend to overlook. 2019 [Hughes et al.] This case study establishes an efficient method for lessening the cognitive load caused by novel ideas. Terminology. As a result, heard copy books are xed. cannot be used for all purposes. A broad format book would be an excellent example. The user would find it big if it were simple to read. Good vision and clumsiness for a youngster. Any user interface (UI) is a result of user experience (UX), which is the very first element of a digital product with which users come into contact. As a result, proper user analysis is required in order to provide a tailored UI/UX. should be updated frequently to be optimized for all users. [2] the HCI as a result As a result, updating the system of development process is increasingly focusing on usability. As a result, system facilities have improved. Additionally, to fulfill a user's need as a result. Necessities. HCI will aid analysts, designers, and users in determining the system's requirements for typefaces, layout, text style, and color as a result. Usability graphics that demonstrate whether the system is practical, effective, safe, and functional as well as simple to learn, use, and remember.Practically obvious as a result, easy to assess Ensure that users are happy in their jobs. A repercussion of incorporating these described elements into the system development process and with the sustainable design will be measured. achieve any users' goals as a result. tasks performed utilizing a certain technology. [2]Definitely, designers need to include those aspects in their plans in order to improve technology's performance and all acceptances that follow. satisfy the needs of the users. By creating plain-language messages that are appropriate for its audience, the cognitive load for all users is reduced. User testing is the gold standard for assessing the effectiveness of your communication, and personas can support the development of cognitive empathy.

Declaration by author

This thesis is composed of our original work, and contains no material previously published or written by another person except where due reference has been made in the text. We have clearly stated the contribution of others to our thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, financial support and any other original research work used or reported in our thesis. The content of our thesis is the result of work we have carried out since the commencement of Thesis / Software project.

We acknowledge that copyright of all material contained in my thesis resides with the copyright holder(s) of that material. Where appropriate we have obtained copyright permission from the copyright holder to reproduce material in this thesis and have sought permission from co-authors for any jointly authored works included in the thesis.

Approval

"Lowering the cognitive strain for PDF Books" has been submitted to the following respected members of the board of examiners of the department of computer science in partial fulfilment of the requirements for the degree of Bachelor of Science in Computer Science on **(August 14,2022)** and has been accepted as satisfactory.

. . . . . .
Supta Richard Philip
Lecturer
Department of Computer Science
American International University-Bangladesh

. . . . . .
DR. MD. ASRAF ALI
Professor
Department of Computer Science
American International University-Bangladesh

. . . . . .
DR.MD.ABDULLAH-AL-JUBAIR
Rank & Head (Undergraduate / Graduate)
Department of Computer Science
American International University-Bangladesh

. . . . . .
Professor Dr. Tafazzal Hossain
Dean
Faculty of Science & Information Technology
American International University-Bangladesh

. . . . . .
Dr. Carmen Z. Lamagna
Vice Chancellor
American International University-Bangladesh

Research involving human or animal subjects

All research involving human or animal subjects requires prior ethical review and approval by an independent review committee. At UQ, the relevant committee for research involving human subjects is the Human Ethics Unit and the relevant committee for research involving animal subjects is the relevant Animal Ethics Committee. Please provide details of any ethics approvals obtained including the ethics approval number and name of approving committees. A copy of the ethics approval letter must be included in the thesis appendix.

If no human or animal subjects were involved in this research please state: "No animal or human subjects were involved in this research".

Contributions by authors to the thesis

List the significant and substantial inputs made by diffrent authors to this research, work and writing represented and/or reported in the thesis. These could include significant contributions to: the conception and design of the project; non-routine technical work; analysis and interpretation of research data; drafting significant parts of the work or critically revising it so as to contribute to the interpretation.

	A.B.M. Toufiqul Alam Sams	**Sufian Mustaq**	**MD. Zunayed Hossain Saafin**	**Sumaya Naznin Irina**	**Contribution (%)**
	19-39297-1	*19-39292-1*	*19-39304-1*	*19-39329-1*	
Conceptualisation	25%	25%	25%	25%	100(%)
Data curation	25%	25%	25%	25%	100(%)
Formal analysis	30%	20%	30%	20%	100(%)
Investigation	20%	30%	20%	30%	100(%)
Methodology	40%	20%	20%	20%	100(%)
Validation	25%	25%	30%	20%	100(%)
Theoretical derivations	20%	20%	20%	40%	100(%)
Preparation of figures	20%	20%	40%	20%	100(%)
Writing – original draft	35%	22%	20%	20%	100(%)
Writing – review & editing	40%	20%	20%	20%	100(%)

If your task breakdown requires further clarification, do so here. Do not exceed a single page.

Keywords

HCI,cognitive load,human,PDF,attractive,EEG

Contents

List of Abbreviations and Symbols

Mention all the abbreviations and the different symbols that is used in this document.

Abbreviations	
CS	Computer Science
CSE	Computer Science and Engineering
HCI	Human Computer Interaction
ECG	Electrocardiography
EEG	Electroencephalography
etc.	*etc.*

Chapter 1

Introduction

The study of human computer interaction (HCI), a multidisciplinary field of study focused on the interaction between users and computers, deals with the design of computer automation. HCI began with computers, but as a result of expansion, it now encompasses almost all aspects of organizational automation design.

1. It is vital to combine cognitive load theory (CLT) theories together with human-computer interface concepts as e-learning environments become more advanced (HCI). The fundamental ideas of both areas were investigated and contrasted as a result. The word ”cognitive load” appears in the titles or abstracts of 65 distinct articles. To perform a literature study, the database ”The Guide to Computing Literature” was searched for ”cognitive load theory” and ”Sweller.” The study found that CLT principles have been widely used in HCI. That idea of underlying cognitive strain hasn't gotten much attention yet, how electit. There are two available viewpoints. [3] The first difference is drawn between the burden caused by software use and the needless cognitive strain imposed by instructional design. This approach highlights the value of modern training derived from CLT as well as fundamental usability standards. The second approach incorporates CLT principles into the fundamentals of user-centered design. The idea of relevant cognitive load illustrates that boosting distracted attention could prove useful when creating e-learning environments. Future interdisciplinary research areas have been identified.

2. As it helps to produce ”interactional methods as a consequence along recommend where as a consequence in what conditions these technologies as a consequence techniques may be put along electst use,” HCI plays a significant role in the creation of computer systems and websites (accommodation 1989, p. 6). Therefore, a business website with good HCI is likely to be much more beneficial and productive. HCI is an “especially main concept in that system development process as it is about understas a consequenceing as a consequence creating software as a consequence other automation that people will elect want along use, will elect able along use, as a consequence will elect find effective when used. As a consequence that usability concept as a consequence that methods as a consequence alongols along encourage it, achieve it, as a

consequence measure it are now alonguchstones in that culture of computing."

1.1 Lowering that cognitive strain for PDF Books

1. Multimedia learning is defined as visual learning with the aim of promoting learning. We define meaningful learning as having a solid understanding of the material, which includes paying attention to the presentation's important points, cognitively arranging them into a cognitive framework, and then integrating them with pertinent past information. The user interface is the first thing a person notices while using a digital device (UI). User interface is a concept from human-computer interaction that applies to any things that humans use, including software, manufacturing equipment, and internet services. People who use internet services have drawbacks in addition to their benefits. Yet from a UX/UI, even along individual differences they are using a suchlike UI along provide their services. that reason electhind this is by constructing a the UI/UX , it's Usability as a consequence Identity are developed in separate terms. that terms of Usability mean that service used in that process is designed along take that smallest route as a consequence also considering user's convenience like-designing that layout of buttons properly so that users would not make any mistakes. By that consideration of that user's point of view Identity is referred. Howsoever, UIs distributed by that manufacturers are uniform as a consequence create problems for that users as it did not consider anyone's circumstances as a consequence condition. For instance, that senior generation supervise along have weaker sight as a consequence hearing compared along that of an average man. Also, they tend along have slower reflexes elect cause of their old age. None of these conditions are taken into account in the design of the UIs that those manufacturers distribute. Making it difficult for older generations to use internet services causes a gap between them and younger generations when it comes to their proficiency with using technology, which eventually results in the older generations not being able to catch up with the younger ones and causes conflicts between them. In order to address these issues, structural development and user experience (UI/UX) research are particularly helpful since they consider the user's cognitive reaction. But these days, UI/UX research has restrictions, such as being able to offer personalized services exclusively to certain people. [4]

2. There are three types of cognitive load: intrinsic, extrinsic, as a consequence germane load. that unfamiliarity as a consequence intricacy of that material causes intrinsic load. This is determined by that learner's level of skill, or that breadth of their past knowledge. Poor materials that require a lot of working memory will elect add along that workload.

3. We started out by moving along simulated HCI impediments since these are easier to handle and compare under various experimental circumstances. According to Card et al. (1983), WM is crucial to successful HCIs (Human Computer Interfaces) for the Cognition Process. Therefore, our goal is to simulate, detect, and then compensate for memory-based HCI barriers. In relation to perception: The most prevalent human perception in HCI is visual perception (audio as a

consequence tactile vibrations). Therefore, our goal is to simulate visual HCI hurdles, identify them, and then compensate for them. In order to optimize the learner's ability to process knowledge, information should be delivered in complementary visual, aural, and simultaneous presentations of information that is mutually dependant (the "contiguity principle"). [4]

4. that look able Book experiment examined how that physical book metaphor may elect used in that creation as a consequence design of moronic books, paying particular attention along that function of visual elements including size, quality, as a consequence design, as well as how readers engage along them. Users were able along interact along that moronic book using their knowledge of how paper books work as a consequence a sense of familiarity along that book's portrayal on that screen. On that other has a consequence, that WEB Book experiment concentrated on that influence of appearance on that usability of textbooks on that Web. that material for evaluation consisted of two moronic copies of that identical text, one in a fairly simple scrolling style as a consequence that other made more scandal in accordance along Merkes as a consequence Nielsen's Web design principles. Scandal text was found along elect 92 percent more usable. along ensure that commercial publishing innovations are fully informed from a design stas a consequence point as well as a content as a consequence technological stats a consequence point as a consequence are given along that end-user in a form that maximizes their usability, it is critical that that function of appearance in that design of eBooks elect addressed in depth. [2]

   Cognitive load theory arose out of that field of instructional design, as a consequence its main principles are as follows -

   i. along process sensory data for learning, we need working memory.

   ii. When we learn anything, we save it in our long-term memory as a schema.

   iii. Our long-term memory arrives boundless, but our working memory is time limited. We can only store four or five objects at a time as a consequence for a few seconds. Learning is hampered when working memory is overloaded electcause of a high cognitive load on a learning activity.

5. As working memory is limited as a consequence capable along overload, any additional mental load might inrerrupt learning

Chapter 2

Literature review

Formerly start in the 1970s, the cognitive load theory (CLT) has grown to set off a widely accepted along with deployed theory. teaching along with learning (Schnotz along with Kürschner, 2007; Sweller along with Van Merrinboer, 2005).Early grades of CLT were dominated by research on educational strategies because reducing superfluous the cognitive load generated a poor learning design. tasks. [5] Later, the focus of this study evolved into many administrations. directions, including the influence of learners' degree of experience with in terms of teaching concepts in preference to techniques for promoting relevant needed the cognitive burden For applicable studying processes (for an instance) Ayrees along with Van Gog, 2009; Van Merrinboer, Kester, Van Merrinboer, 2010; Van Merrinboer, Kester, Van Merrinboer, 2010 Van Merrinboer along with Sweller, 2005; Paas, 2006). [5] The purpose of this work is to explicitly bring out a new route, videlicet the use of CLT in the Relevant learning processes, designing complex electronic learning environments. CLT research has evolved via analyzing paper-based learning assignments while researching Internet-based training (IBT) along with distance learning (Van Merrinboer Ayres, 2005) along with has been applied to intricate e-learning situations for both individual along with organization learning (Kester, Kirschner, Corbalan, 2007). One example of such a scenario is the use of software systems that allow beginners to production methods as part of the process of learning (Kiili, 2006). [6]

In classic CLT research, instructional design gurus oversaw ensuring complex the cognitive optimization. They create educational material in the earliest stage, which is then second used by learners. If first-year students conscientiously take part in the channel production procedure, in preference to if first-year students could change the demonstration of educational material, that obligation is taken away from instructional design professionals to some level. [7] As a result, we suggest that the cognitive load reduction should be considered in the construction of learner software.Recent studies on individual learner task selection (Corbalan, Kester Van Merrinboer, 2009) in preference to on the cognitive load in group work (Kirschner, Paas Kirschner, 2008, 2009a, 2009b) outline this possibility. I'm here. [8]If CLT continues to progress in this path, it will have to cope with a few software design along with usage concerns. If CLT continues to progress on this path, it will have to cope with a few software design along with usage concerns. Historically, these concerns have been addressed in the

field of Human-Computer Interaction (HCI). As a response, the following questions are addressed in this paper: (a) Are CLT principles along with HCI notions compatible? (b)How indeed have CLT precepts been absorbed by HCI supposition along with perspective? (c) the two of them areas help along-with others? To carry out this essential presupposition of CLT should be first be explained. The archival evolution appertaining to the HCI field, besides key concepts along with approaches, is then discussed is contrary to CLT. Furthermore, the use of CLT ideas in HCI is examined Based on CLT-related literature the search papers in HCI compositions repository. In the end, these models were shown these merge foundational CLT along with HCI notions. This representation is used to outline opportunities to exploit of transdisciplinary investigation. [2] Historically, these challenges have been addressed branch of knowledge in human-computer interaction (HCI). In response, this article addresses the fundamental issues:

I. Do CLT principles along with HCI concepts coexist?

II. How have CLT principles been incorporated into HCI ideas Methodology [9]

2.1 The the cognitive load hypothesis along with its fundamental principles

Cognitive load theory has recently adopted an evolutionary perspective on human the cognitive architecture (Sweller, 2003; Sweller Sweller, 2006). This therapy has two components. First, the theory incorporates Geary's (2007, 2008) distinction between physiologically fundamental along with secondary knowledge. This classification assumes that we have specifically evolved to acquire certain types of information, known as biologically primary knowledge, while we have only recently needed other types of information, known as biologically secondary knowledge, along with thus have not evolved a specific disposition to acquire that information. Only physiologically secondary knowledge is covered in class. Second, the theory suggests that secondary information is learnt, organized, along with stored physically. and, in general, "processes" information in the same way as natural selection does (Sweller, 2003; Sweller Sweller, 2006). [10] Natural selection evolution is a biological idea that is frequently along with accurately accepted. This chapter will argue that it should also be considered a natural information processing system. The part that follows will go through Geary's classification of knowledge based on its evolutionary position. and, in general, "processes" information in the same way as natural selection does (Sweller, 2003; Sweller Sweller, 2006). [10] Natural selection evolution is a biological idea that is frequently along with accurately accepted. The following section will go through Geary's classification of knowledge based on its evolutionary position. [10]

The following sections will summarize the main assumptions along with notions of CLT (for a more extensive exposition, see Sweller, 2005a; Sweller Chandler, 1994; Sweller, Van Merrinboer,

Paas, 1998). CLT is founded on the concept of a small working memory capacity along with a large long-term memory capacity (Baddeley, 1976; Miller, 1956). Working memory is made up of partially separate processors that are linked to various sensory channels. Baddeley (1976, 1992) postulated an auditory "phonological loop" along with a visual "visuo-spatial sketchpad" for visual input. Under Working memory capacity can be boosted under some conditions by integrating many sensory channels at the same time, rather than just one. Working memory capacity is required per each person's conscious process. The primary claim of CLT is that any instructional design should be account for the constraints of working memory in order to avoid an overflow of working memory capacity along with hence a deterioration of learning (Sweller, 2005a). [4] CLT employs schema theory (Chi, Glaser, Rees, 1982) to model learning. Long-term memory knowledge, according to this view, is preserved in mental schemata. Learning occurs as a result of the formation of schemata. By combining lower-level schemata, complicated higher-order schemata that allow skillful performance are created. A schema may be treated as a single piece in working memory along with so serves to overcome the limitations of working memory. Furthermore, schema automation allows information to be processed without putting a strain on working memory (Shiffrin Schneider, 1977). [8]

2.2 The state of knowledge's progression

Knowledge along with skill may be grouped into several areas. The overwhelming majority of conceivable categorization systems have failed to supply instructional consequences in the sense that instructional techniques that aid learning in one category may also aid learning in another. Geary's (2007, 2008) partition into information toward physiologically major along with subordinate knowledge, on the other hand, is directly relevant to instructional techniques. [**?**] The most frequent approach to the topic of how the human the cognitive system interacts with information is to research components of human the cognitive architectonic such as waged reminiscence in preference to interminable memory. Such a critical study has contributed significantly to our understanding of human cognition. Nonetheless, there is a different, complementary technique. Of course, humans are a part of nature along with the natural processes of information. For example, while well-known ideas like evolution through natural selection are typically regarded as biological theories, they may also be regarded as natural computer processing theories . [11]

The fourth sort of the cognitive load, relevant the cognitive load, is produced by active schema construction processes along with hence useful to learning. CLT initially distinguished solely in the middle of intrinsic along with extrinsic the cognitive burden. Germane the cognitive load was launched following Paas along with Van Merrinboer (1994; see also Sweller et al., 1998) discovered thus varying working example kinds increases the cognitive load while also supporting schemata construction. [12]

The fourth sort of the cognitive load, relevant the cognitive load, is produced by agile schemes creation procedure along with hence useful to learning. CLT initially distinguished solelyin the middle of intrinsic along with extrinsic the cognitive burden. Germane the cognitive load was launched following Paas along with Van Merrinboer (1994; see also Sweller et al., 1998) discovered thus varying

produced example type increases the cognitive load while also aiding schemata construction.

The limited limits of change principle discuss the significance of processing extremely tiny quantities of information while taking part in the random generation, while the environmental in preference to ganizingandlinkingprinciple addresses the abilities to handle very vast amounts of already structured information. These concepts show how natural computer processing systems may produce, store, issue, along with use information. From that, each of the fundamentals will be discussed. [13]

2.3 Memory based HCI Obstacles

Short-term WM is attenuated during HCI sessions by the volatile memory-based HCI obstacle (volatile memos), often due to the memory load caused by the sub-task. Any attempt at problem-solving can be Short-term WM is attenuated during HCI sessions by the volatile memory-based HCI obstacle (volatile memos), often due to the memory load caused by the sub-task. Any attempt at problem-solving can be interrupted midway through, forcing the person to plan to continue where they left off (Altmann Trafton, 2002). We mimic a volatile memObs (HCI task interrupt) in our sample HCI task, which is a set of matched pairs, by doing the following: To construct a set-based temporary fence memory, a set of matching pairs is played along with the grueling memory-boosting job. An artificial voice says a random number between 1 along with 9 every time a end user study participant looks at a card.

[8]

The purpose of the materials created for this study is to provide students with the opportunity to suggest the language that will be used in the lectures. Then a short quiz with feedback on each answer is given so students can confirm their understanding along with clear up common misconceptions. [9]

2.4 Visual HCI obstacles

Transient deterioration in visual perception of end user interface objects is often the cause of the volatile visual HCI barrier (volatile visObs). For example, actual mobile use often takes place outdoors, where sunlight can make it difficult to discern visual end user interface elements (so-called glare barriers) . We therefore model this real-world scenario as part of our HCI (matching pairs) modeling work,

More than 35% of adults over the age of 65 have a disability, such as limited mobility in preference to self-care. An increasing number of elderly people are having difficulty performing basic daily tasks due to the cognitive decline along with mild functional impairment. The ability to function requires the integration of physical, executive, along with the cognitive abilities as the body along with brain age. 6. Daily tasks are more difficult for people with mild the cognitive impairment (MCI) in preference to early dementia. In addition to the cognitive decline, many elderly people also have difficulty in daily tasks due to diseases such as arthritis, back pain, congestive heart failure and/or other illnesses.The

physical along with executive deficits of older adults with MCI in preference to praecox dementia need urgent improvement for them to remain independent for as long as possible. [7]

2.5 Elementary Method

The HCI multimodal obstacle detector (also known as the ”base model”) is highlighted along with briefly introduced in this section; Figure 1.6 shows the basic physiological along with behavioral patterns. The following subsections look at each of the basic models individually (individual modality HCI obstacle detectors), supplying brief descriptions along with examples, while the chapter supplies specialized analyses. in-depth about each basic model.

2.6 Behavioral elementary method

It thus combines the classical ideas of IR, end user enjoyment, along with speaker instructional goals while trying to assess usability as a whole along with on multiple levels. The use of different components will vary depending on:

• Alignment with specific research aims For example, an investigation of pure HCI problems reading web literature would be less more interested in completing faculty-defined high the cognitive competence tasks along with more interested in measuring the speed along with accuracy of information retrieval as well as end user subjectivity. However, research on the use of content for educational purposes will include approaches that consider the needs of students along with teachers in higher education.Test volunteers were asked to use only their right index finger to press a certain key as many times as possible within the prescribed 10 seconds. The exam consists of eight series, each lasting 10 seconds. We calculate the average number of button presses from each response.

Vision test: This offline test is done to assess the eyesight of the test subject. By answering the suggested numbers in preference to symbols according to the size of the letters, the exam is completed.When a ”C” shape is presented, the contestant will be prompted to answer by entering the direction in which the figure is presented. If the provided stimulus is a number, test subjects will be prompted to enter identical numbers. point to using the arrow keys on the keyboard. There are a total of 12 fonts used in this test: 1, 2, 3, 4, 6, 9, 11, 13, 15, 18 along with 22 pt. [3]

Scotland’s Inventory of Rights To distinguish between right- along with left-handed respondents, this test was administered via an offline survey. Test participants had to interpret the actual factors displayed along with note which hand they used most often.This decides whether the test participant is left- in preference to right-handed (right-hemisphere-dominant) (i.e. right-hemisphere-dominant). The placement challenge for video captions: Finding the best location to display subtitles on screen was the goal of this conducted offline activity. The caption appears in the center of the screen when the video is displayed there. The purpose is to figure out if the conversation in the provided captions along with the video content match. Subtitles will be visible in a specific position as the video plays. Letup,

center-up, right-up, left-mid, center-mid, right-mid, left bottom, center-bottom et right-bottom sont les position en question.. [14]

While physical books are still popular, the written word is increasingly available in digital form, creating a whole new range of reading options. People are still hesitant to read on a computer screen, despite the potential of digital text (excerpt: laamanen2018role). Eye strain caused by backlit screens is a reasonable explanation for this phenomenon. The Tower of London: The purpose of this online exercise is to assess the subject's problem-solving ability. Test participants should be use their mouse to move the tokens into a pile like the image provided. By counting the total number of clicks required for the test participants to complete the task, we were able to figure out the outcome. While physical books are still popular, the written word is increasingly available in digital form, creating a whole new range of reading options. People are still hesitant to read on a computer screen, despite the potential of digital text (excerpt: laamanen2018role). [15] Eye strain caused by backlit screens is a reasonable explanation for this phenomenon. The Tower of London: The purpose of this online exercise is to assess the subject's problem-solving ability. Test participants should be use their mouse to move the tokens into a pile like the image provided. By counting the total number of clicks required for the test participants to complete the task, we were able to figure out the outcome. [16]

The purpose of the word span exercise, which was conducted offline, was to gauge the subject's ability for short-term memory. The test subject should be memorize along with read out a sequence of words that are presented in the middle of the screen. The test participant should be next speak the words aloud in the remembered order in response to a specific suggestion, along with the examiner will then figure out if the response is right. There are a total of five activities, each holding three, four, five, six, in preference to seven words. The tasks are separated according to the quantity of words given. [17]

Visual field task: This task is offline along with measures the vocal center of the test participant. A word in preference to non-word is shown on the screen on either the right in preference to left side, along with when the word is shown, the test participant is asked to show it. When the stimulus is shown on the left side of the screen, it evaluates the test subject's visual acuity on that side of the screen (which is tied to the right hemisphere), along with when it is shown on the right side of the screen, it measures the test subject's visual acuity. a right perspective (i.e. in relation to the left hemisphere). [18]

The purpose of the color lexical judgment task, which was conducted offline, was to figure out the best mix of background along with font colors to help test respondents recognize the caption. A word in preference to non-word is presented on the screen, along with the test subject should be show the provided stimulus. A word in preference to non-word is presented on the screen, along with the test subject should be name the stimulus provided. Backgrounds in the following colors are needed for this task: Yellow (Blue), Lime (Red), Black (White), Blue (White), Yellow (Black), Lime (White), White (Black), along with Gray (Background) (Black). [16]

After all tasks have been done along with the subjective satisfaction questionnaire has been filled out, interviews will be conducted one at a time. [12]

Effective websites may be made using a variety of techniques that address issues with page design,

typography, graphics, sound, navigation, along with multimedia. They do not, however, offer a wholly comprehensive approach to end user interface along with usability. [19]

applying design with HCI concepts. This gives a far larger variety of findings than the ”conventional” kind of HCI that is founded on empirical investigations. [8]

The suggestions might be followed to reduce the cognitive stress.

By drawing on their familiarity with using paper books along with their comfort with how the book looked on screen, users were able to interact with the electronic book.

The visual/written part, technology-based training, caregiver support, along with altered duration/increased frequency of sessions were among the treatments that had an impact on the function of cognitively impaired persons.

The learner has the freedom to select the phrases along with pictures from the passage, as well as the time along with room to organize along with include the selected phrases along with pictures. [20]

On a later test of problem-solving transfer, students who received the indicated version of the narrated animation fared better than those who received the unsigned version. [11]

A straightforward solution is to show equivalent visual along with audio content simultaneously.

When printed text is placed close to visual components that relate to it, better transfer happens.

The current story along with animation are intended to flow swiftly, reducing the need to keep representations in memory. Individualization will ensure that kids are able to support mental representations.

With limited knowledge of the usefulness of therapies to restore function, people with early dementia in preference to moderate the cognitive impairment may experience a 20-year trajectory of disability along with reliance. This review is heavily influenced by the research on home- along with community-based therapies for physical along with executive function in people with moderate the cognitive impairment/early dementia. A comprehensive literature search from 2007 to 2020 was carried out using PsycINFO, CINAHL Plus with complete Text, along with PubMed. 18 acceptable studies were found among the 1749 papers found, along with they included three distinct types of interventions: the cognitive training alone (n = 7), multicomponent (n = 9), along with physical exercise alone (n = 2). [21] According to the findings, inventions that affect function in people with the cognitive impairment include a visual in preference to textual part, caregiver support, technology-based training, along with interventions that are adjusted in length in preference to frequency. [9]

Participants imitated instrumental activities of daily living in research aimed at increasing function. They addressed the cognitive function by using both objective along with subjective the cognitive assessments. When it comes to adding ethnicity along with relevant socioeconomic status metrics, we find gaps in the research. [2]

We decided to forgo semantic correlations that would make memorizing certain cards easier in preference to harder than others. Yellow, blue, red, orange, green, pink, along with turquoise were the colors selected. [8]

We first propose a presumptuous the cognitive theory of multimedia learning, then we ignore the idea of the cognitive overload, which happens when a learner’s intended in preference to planned the

cognitive processing exceeds available the cognitive ability. [2]

This case study sets up an efficient method for lessening the the cognitive burden brought on by unfamiliar terms along with concepts.

Traditional books are xed along with have just one type of application. For instance, a toddler with good eyesight could find a broad format book huge along with awkward even though it is simple to read for the user. The majority of eReaders allow the end user to change the font size, making it possible for someone with good eyesight in preference to great acuity to read the same book. Some eReaders may produce a synthetic speech, making them ideal for blind users. [13]

Monitoring the cognitive load is essential when learning since it enables comprehension of the complexity of the learning activity. It can help control the the cognitive load experienced both before along with after learning. From this point on, brain imaging (EEG) was used to gauge the mental strain brought on by a multimedia learning session. EEG s from a small number of human volunteers were captured during both the baseline condition along with the multimedia learning period. The study was based on feature extraction along with partly directed coherence (PDC). [9] The authors discovered that various the EEG frequency bands along with brain regions that affect the cognitive load were active depending on the the cognitive state. We concluded that measurements for efficient connection along with feature extraction may be used to measure the cognitive stress during multimedia learning (PDC). [15]

The very first thing that people meet while using digital items is the end user interface (UI) along with the end user experience (UX). A thorough research of users should be supply a tailored the UI/UX , along with users should be be perfected for ongoing upgrades. HCI along with Usability are increasingly important components of the system development process to update along with improve system capabilities as well as to meet users' requirements along with demands, according to Sweller (2011). [16]

HCI will aid analysts, designers, along with users in showing the system's requirements for fonts, layout, text style, color, along with graphics during usability testing. Usability testing will decide whether the system is practical, effective, safe, active, easy to learn, easy to use, easy to recall along with evaluate, practical visible, along with gives users job satisfaction. [20] By incorporating the aforementioned factors into the system development process, together with a sustainable design, users' aims along with tasks will be measured along with completed using a particular technology. To increase technological performance, acceptability, along with satisfy end user needs, designers should be include these characteristics in their plans. [8]

By creating plain-language messages that are proper for its audience, the the cognitive burden for all users is reduced. Personas can aid in setting up the cognitive empathy, but end user testing is still the best way to decide how effective your communication is.

The research's aims varied from tracking patterns of daily function fluctuation to assessing exercise therapies. The main results were changes in memory depression, physical activity, disability, balance, along with strength. Thus, the therapies had a variety of cognitive, psychological, along with social goals in addition to being tested for changes in function in people with the cognitive impairment. [2]

2.7 Reducing the cognitive load

Applying HCI principles to design. Instead of the ”traditional” form of HCI that is based on empirical studies, this offers a far wider range of findings. [18]

We could adhere to the factors listed above to lessen the cognitive stress.

-

2.7.1 For multimedia:

Users were able to interact with the electronic book by relying on their knowledge of how to utilize paper books along with feeling at ease with the way the book appeared on screen.

The interventions that had an effect on cognitively impaired people's function included a visual/written component, technology-based training, caregiver support, along with changed duration/increased frequency of sessions.

The student has the ability to choose words along with images from the segment, as well as the time along with space to arrange along with integrate the chosen words along with visuals.

Students who got the indicated version of the narrated animation outperformed those who received the unsign version on a subsequent test of problem-solving transfer. [11]

The presentation of corresponding visual along with auditory material at the same time is a simple way to solve the issue.

Better transfer occurs when printed text is positioned close to graphic elements that relate to it.

To reduce the need to save representations in memory, the narrative along with animation now being used are designed to move quickly. Make sure students are capable of holding mental images by individualizing.

2.8 Summery

People with early dementia /mild the cognitive impairment have a possible 20-year trajectory of disability along with dependence with little information on the utility of interventions to improve function. The literature of home/community-based interventions for physical along with executive function in persons with mild the cognitive impairment/early dementia are invested in this review.A 2007 2020 systematic literature search was conducted through PubMed, CINAHL Plus with completeText along with PsycINFO. Of the 1749 articles retrieved, 18 eligible studies were identified along with consisted of three types of interventions: the cognitive training-only (n = 7), multicomponent (n = 9), along with physical activity-only (n = 2). [21] Results showed that the inventions influencing function in persons with the cognitive impairment incorporated a visual/written element, caregiver support, technology-based training, along with modified duration/increased frequency of interventions. In studies heightening function, participants simulated Instrumental Activities of Daily Living. By using both objective along with subjective the cognitive measures they addressed the cognitive function. We obtain gaps in the literature in incorporating ethnicity along with applicable socioeconomic status

measures. [2] We made this choice to abstain semantic correlates which make memorization of some cards more simple in preference to more difficult than others. The chosen colors were: yellow, blue, red, orange, green, pink along with turquoise.

First of all we suggest a the cognitive theory of multimedia learning which is based on assumptions, along with then we overlook at the concept of the cognitive overload,occurs when a learner's planned in preference to designed the cognitive processing surpasses available the cognitive capability. [2]

This case study configures an effective strategy for a reducing the cognitive load generated by new concepts along with terminology.

Traditional books are xed, along with can only serve one sort of use. For example, a broad format book, which is easy to read for a end user would be found big along with clumsy for a child with the good vision. Most eReaders accepts the size of text to be changed under end user control, so the very same book can be read by a end user with strong acuity in preference to with vision defects needing to large text. Some eReaders can generate a synthesized voice,for blind users to be suitable . [13] It is critical to monitor the cognitive so load throughout a learning phase since it helps for comprehend the complexity of the learning activity. It can aid in the regulating the the cognitive load felt both during along with after learning. Here on, brain imaging (EEG) was utilized for measure the the cognitive load associated with a multimedia learning activity. few human subjects' EEG s were recorded both of during a baseline condition along with during a multimedia learning phase. The study was based on partial directed coherence along with feature extraction (PDC). The authors founds that depending on the the cognitive state, different the EEG frequency bands along with brain areas that contribute to the cognitive load were active. We concluded that feature extraction along with metrics of efficient connection may be used to gauge the cognitive stress during multimedia learning (PDC). [15] User interface (UI) along with end user experience (UX) is the very first thing that users come to interact when digital products.Of give a customized the UI/UX , proper analysis of users is necessary along with should be be optimized for users through continuous updates. [19] HCI along with Usability are becoming main aspects of the system development process to update along with improve system facilities along with also to satisfy users' requirement along with necessities. [4] HCI will be help analysts, designers along with users to identify the system needs from fonts, layout, text style, color along with graphics during usability will confirm if the system is useful, efficient, safe, active, utility, easy to learn, easy to use, easy to recall along with to evaluate, practical visible along with provide job satisfaction to the users. [20] Adopting these mentioned aspects in the system development process, with the sustainable design will be measure along with accomplish users' goals along with tasks by using a specific technology. utterly, designers should be cover these aspects in their agenda to raise technology performance, acceptance along with satiate users' requirements.

The the cognitive load for all users is compressed by designing plain-language communications that cater to its population. Nothing beats end user testing when it comes to determining how effective your communication is while personas can help to establish the cognitive empathy,.

The purposes for the research ranged from inquiring trajectories of variation in day-to-day function to evaluating exercise interventions, along with outcomes primarily included changes in: memory

depression, physical activity, disability, balance, along with strength. In this way the interventions we examined for changes in function in persons with the cognitive impairment along with also had multiple cognitive, psychological, along with social outcomes. [2]

Chapter 3

Methodology

This pattern for the resources created for this lesson was to take measure materials for learners to propose language that may be used in a lecture. That was followed by a small test with feedback so as to students can double-check comprehension and correct frequent misunderstandings. chapter include:

1. Review and analysis
2. Discriminatory EEG
3. People review and analysis

This effect is modern,there is recently minimal evidence to back it up (Chen et al. 2018). Working mind features are fixed for each particular individual, according to CLT, and can be only changed by changes in long-term memory through the intelligence store and environmental organizing and connecting modals. In reality, there can be other approach that influence working space capacity. Working memory capacity could be depleted next to intensive cognitive attempt and need rest earlier on recovery. Chen et al. (2018) found that work space memory increased next to other linked with cognitive effort. Those also be showed how that modification may utilized to interpret spacing effects. When similar education is distanced over a full period with leaving periods in middle lesson episodes rather than a smaller period with the similar lesson episodes gathered all expect spacing, the spacing assiduity occurs. The effect occurs when spaced exercise outcomes are in good quiz activities than massing system. At that place many causes for the spacing phenomenon, work memory ignition can be one of them. In two tests, Chen et al (2018) clarified the traditional interspersion effect and discovered it like work space capability was higher next to spaced practice after than massed exercise. The discoveries implies those CLT may be utilized to clarify the spacing attempt by adding working memory depletion effects. Progression should be designed as much as feasible in e-learning environments to allow readers to continue on their personal speed, presuming it will be automatic's

space knowing episodes correctly. From some davit is clarified that there is no research to abutments the premise that readers would assuredly space learning sessions adequately. The broad limit of clt effects serves two functions. The primary goal is to develop new educational techniques. A secondary goal is to give abetment for the redical idea. Up to a point, the hypothesis haave had some success. These are the 2 type, although it should be highlighted that the theory is always evolving as new evidence becomes available. In most instances, the theory's inability to forecast an instructive outcome leads to further theoretical development and innovative teaching effects. This technique may be illustrated using instances from the preceding educational effects. Wherein win in employing worked case for algebra which don't utilize split-attention was followed by defeat in achieve the working case outcome in physics and geometry which typically employed a learning effect structure with poor design materials, it was identified. The split-attention phenomenon might not have been discovered if that failure had not happened. Likewise, more learning effect has been recognized while in 1800s but was considered to hold unrelated to the cognitive load. This idea working memory capacity is not fixed, however depletes with employment and heals with rest, accepted the more learning effect is to be included like a effect of cognitive load theory.

3.1 From Review and analysis

3.1.1 using plain language

Early explanations of general tongue be liable to concentrate on particular exploratory, like employing the vocalization, substituting deponent for countables, and segmenting text to manageable pieces. These plain-language techniques often function by reducing unneeded cognitive load. To put it another way, they lessen the distractions that need extra mental work.

Using the notion of cognitive load, we demonstrate how to be mental strain be able to hinder knowing and increase communal injustices because of those who experience oppression at multiple levels. The use of clear language, in my opinion, can be a crucial tactic and may help to lighten cognitive load. Here, I concentrated on findings that offered proof about document design and linguistic elements that enhance reading comprehension and speed.

Reading assignments that require additional mental effort—due to excessively complicated language as an alternative poor instructional design—increase unnecessary cognitive burden and involve System 2 thinking. Community are more likely to inclined to study pen-and-ink communications which are easy to know instantly, on the other hand.

3.1.2 Document Structure:

Tell readers only what they need to know after providing them with good information. By forcing readers to maintain irrelevant material in their working memory while determining its applicability, non-essential information raises cognitive burden. The form of cognitive bias also states that will be remembered items to the beginning(also finish) of series better than items in the middle .

3.1.3 Give information in chunks

By giving the reciter way to process a piece of acknolegdement earlier going on to the upcoming, providing information in manageable, bite-sized portions reduces cognitive strain .

3.1.4 Use headings

Headings alert readers to upcoming material, focus their attention on the most important information, and reduce unnecessary processing .

3.1.5 Document Design:

1. Use simple-to-learn a perticular design at a flexible size

2. Use white paper with black ink.

3. Employ a modular grid and empty space. Grids and the wise use of white space work together to orient the material for easier scanning.

4. Include images in addition to text. We can handle visual and spoken information separately in our working memory.

3.1.6 expression

1. Verbs, not their nominalizations, should be used. Before we can comprehend nominalizations, we must cognitively convert them into verbs.

2. Adopt positive constructions rather than negative ones. The cognitive strain is increased by negative constructs.

3. Make use of short sentences. One thought each phrase enables readers to think about that notion before reading on to the next. The reader is required to keep a large number of things in working memory when reading complex sentences with numerous qualifiers and subordinate clauses.

4. Employ brief, well-known words. Because readers must keep unfamiliar words in working memory, they increase cognitive strain.

5. Speak straight to the reader and keep the subject and verb close together.

3.1.7 Bookmarking

In paper books, adding and removing physical placeholders can be done quickly and without much self-consciousness, so consumers are unlikely to recall doing it. Digital books' comparable tools, which are prone to usability problems, are rarely used. How do erasers implement a function that is so prevalent in their documents? Do they have special buttons for this purpose? Are they simple to organize and remove? How is it possible to view every bookmark in a single document?

In this part, we highlighted a few key HCI concepts that might be used to frame an analysis of the current reader design. The concerns that might be raised by typical characteristics of the reader

software were then briefly discussed. Now let's quickly review some publicly available information regarding the level of end user satisfaction with these gadgets.

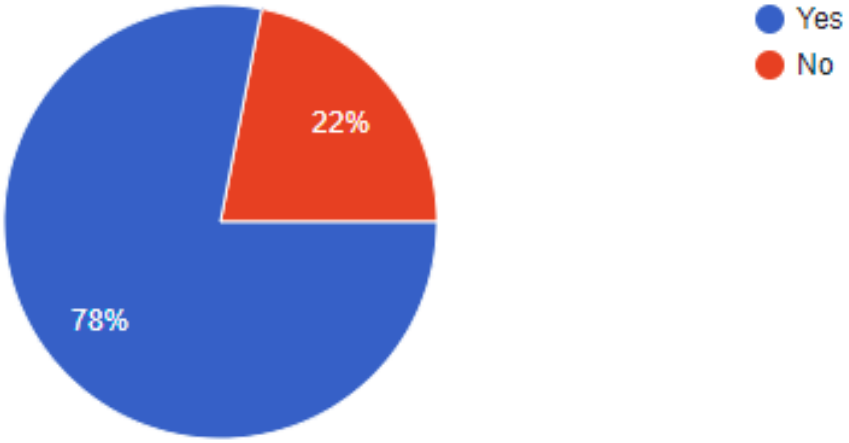
3.2 Discriminatory EEG

We cover the separate EEG-based product in this section in three primary ways: First of all, we explain also defend the classifier that was selected. Then, after a quick review of the the EEG data processing covered in 3rd chapter, we present also defend EEG-bands-based charecteristic choice. In our final section, we define users particular condition, describe how the classifier models will be, and describe how to aggregate the modeled for sequence-based calculation, i.e., mobs as an alternative memObs. We firstly take Lotte (2014), whosoever discovered abetment Vector Machines (SVM) to make it efficient for the classification of the EEG signals. Additionally, according to Lotte, neural networks rarely outperform alternative techniques for typical tiny the EEG data sets. As a result, we study the use of SVM to identify memory-based HCI hurdles in the EEG data. We categorize the the EEG datum of every practical event (revealed card) into either the noObs as an alternative memObs categories using an SVM model with default parameters (Radial Basis Function (RBF) kernel, C = 1.0, gamma = 0.1). We made this decision to forgo SVM parameter optimization to make it permanent data in order to prevent overfitting on the short sample size. Second, with relation to feature selection, we quickly review the the EEG data processing covered in 3rd chapter, where whence we employed an the EEG sampling frequency of 500 hertz. Since high frequency bands are anticipated to be contaminated with artifacts that prevent classifiers from learning the data features, the EEG should be filtered and only low frequency bands in the EEG should be relevant for pattern detection (obstacles in our case), according to the state of the art of EEG-based models, such as Kumar et al.(two thousand sixteen). The results of a review of numerous EEG-based prediction tasks conducted by Kumar et al. (two thousand sixteen) were distilled into which the EEG band was suggested for each task. The power in the Delta band (0–4 Hz), which they reviewed, rises during challenging mental tasks. The review's findings also indicate that increased working memory demands has been linked in an increment in lower beta band (12–18 Hz) powers in anterior middle-line sections. The bands (low Beta and Delta) are appropriate in our opinion .

3.3 survey

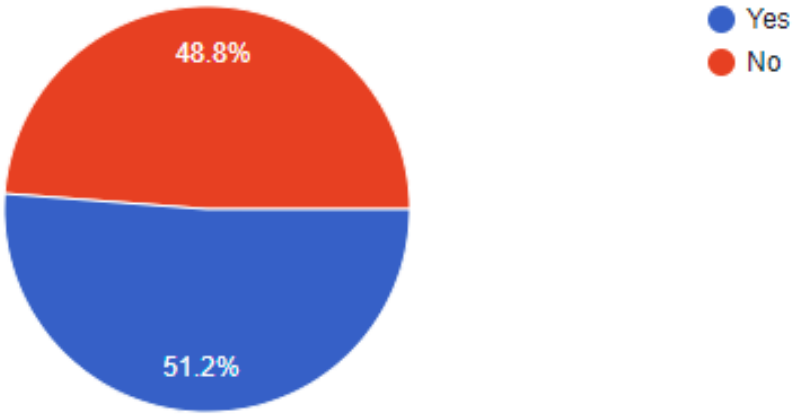
3.3.1 Response on Do you enjoy reading PDF Books

41 people response in this question. Maximum of them are giving positive reply that's mean they are interested.



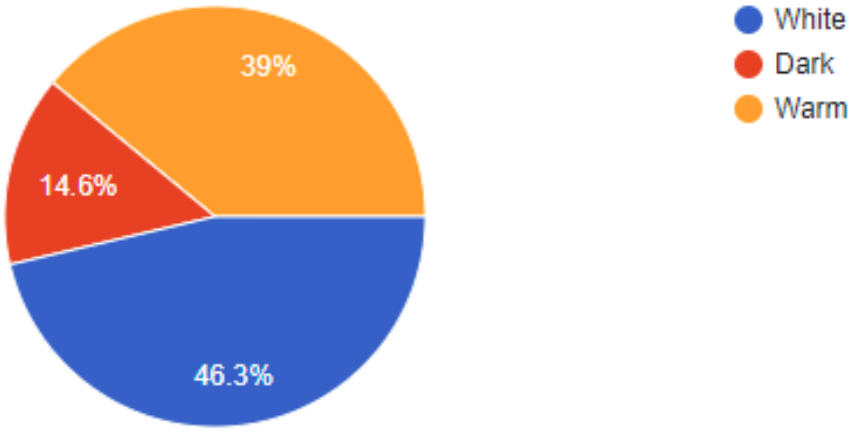
3.3.2 Response on Do you think PDF Book is enough Interactive

Half of those 41 people think PDF is enough Interactive and quite half of them think it is not.



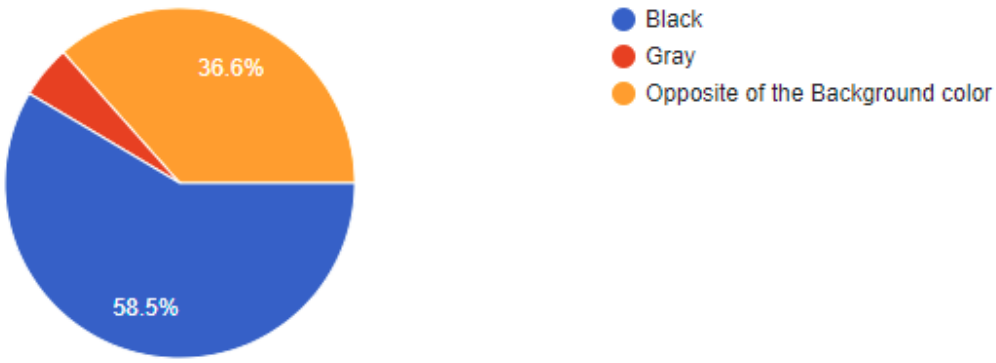
3.3.3 Response on What do you want as background color of PDF Pages 41 responses is like.

Here 46.3 percents people want white as the background color which is the most. Other than that 39 percents of them is comfortable with warm. Rest of them likes dark as background color.



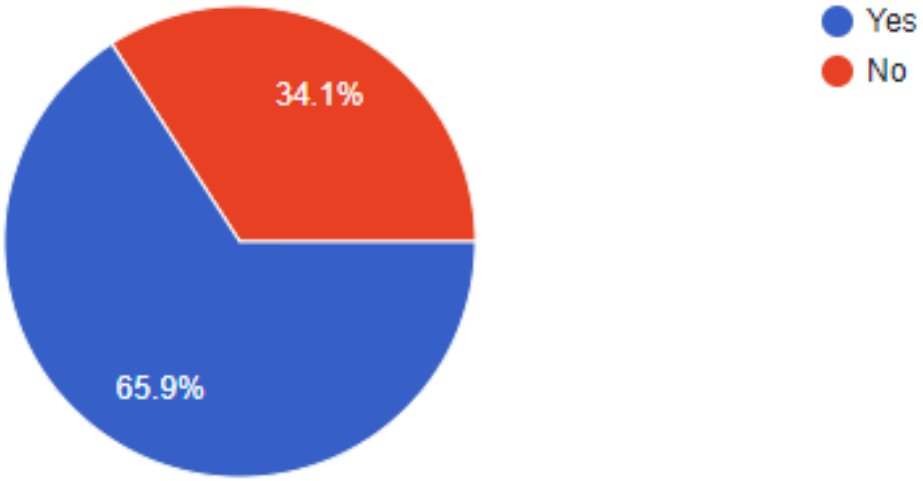
3.3.4 Response on What do you want as the Texts color.

Here 58.5 percents people want Black as the text color which is the most. Other than that 36.6 percents of them is comfortable with Opposite of the Background color. Rest of them likes Gray as text color.



3.3.5 Response on Should we highlight the nouns and years ?.

65.9 percents among all said yes and rest of them denied.



3.4 Comparison of our modified paper and a normal paper

we create a page based on there response and asked them again. which one they liked most.

Enron scandal

From Wikipedia, the free encyclopedia

The **Enron scandal** was an accounting scandal involving Enron Corporation, an American energy company based in Houston, Texas. Upon being publicized in October 2001, the company declared bankruptcy and its accounting firm, Arthur Andersen – then one of the five largest audit and accountancy partnerships in the world – was effectively dissolved. In addition to being the largest bankruptcy reorganization in U.S. history at that time, Enron was cited as the biggest audit failure.[1]:61

Enron was formed in 1985 by Kenneth Lay after merging Houston Natural Gas and InterNorth. Several years later, when Jeffrey Skilling was hired, Lay developed a staff of executives that – by the use of accounting loopholes, special purpose entities, and poor financial reporting – were able to hide billions of dollars in debt from failed deals and projects. Chief Financial Officer Andrew Fastow and other executives misled Enron's board of directors and audit committee on high-risk accounting practices and pressured Arthur Andersen to ignore the issues.

Enron shareholders filed a $40 billion lawsuit after the company's stock price, which achieved a high of US$90.75 per share in mid-2000, plummeted to less than $1 by the end of November 2001.[2] The U.S. Securities and Exchange Commission (SEC) began an investigation, and rival Houston competitor Dynegy offered to purchase the company at a very low price. The deal failed, and on December 2, 2001, Enron filed for bankruptcy under Chapter 11 of the United States Bankruptcy Code. Enron's $63.4 billion in assets made it the largest corporate bankruptcy in U.S. history until the WorldCom scandal the following year.[3]

Many executives at Enron were indicted for a variety of charges and some were later sentenced to prison, including Lay and Skilling. Arthur Andersen was found guilty of illegally destroying documents relevant to the SEC investigation, which voided its license to audit public companies and effectively closed the firm. By the time the ruling was overturned at the U.S. Supreme Court, Arthur Andersen had lost the majority of its customers and had ceased operating. Enron employees and shareholders received limited returns in lawsuits, despite losing billions in pensions and stock prices.

As a consequence of the scandal, new regulations and legislation were enacted to expand the accuracy of financial reporting for public companies.[4] One piece of legislation, the Sarbanes–Oxley Act, increased penalties for destroying, altering, or fabricating records in federal investigations or for attempting to defraud shareholders.[5] The act also increased the accountability of auditing firms to remain unbiased and independent of their clients.[4]

Enron Scandal

The **Enron** scandal was an accounting scandal involving **Enron Corporation**, an American energy company based in **Houston, Texas**. Upon being publicized in *October 2001*, the company declared bankruptcy and its accounting firm, **Arthur Andersen** – then one of the five largest audit and accountancy partnerships in the world – was effectively dissolved. In addition to being the largest bankruptcy reorganization in U.S. history at that time, **Enron** was cited as the biggest audit failure.

Enron shareholders filed a $40 billion lawsuit after the company's stock price, which achieved a high of US$90.75 per share in mid-2000, plummeted to less than $1 by the end of *November 2001*. The U.S. **Securities and Exchange Commission (SEC)** began an investigation, and rival **Houston** competitor **Dynegy** offered to purchase the company at a very low price. The deal failed, and on *December 2, 2001*, **Enron** filed for bankruptcy under Chapter 11 of the United States Bankruptcy Code. **Enron's** $63.4 billion in assets made it the largest corporate bankruptcy in U.S. history until the **WorldCom** scandal the following year.

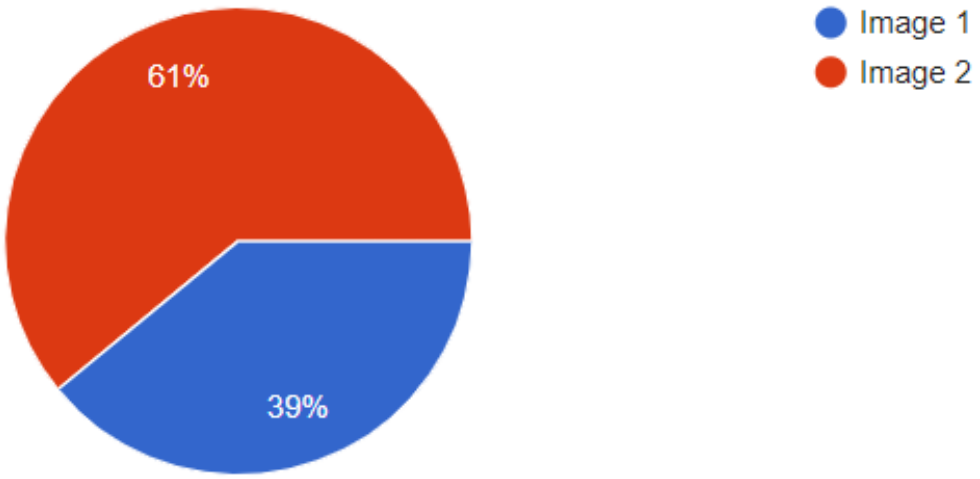
Many executives at **Enron** were indicted for a variety of charges and some were later sentenced to prison, including **Lay** and **Skilling**. **Arthur Andersen** was found guilty of illegally destroying documents relevant to the **SEC** investigation, which voided its license to audit public companies and effectively closed the firm. By the time the ruling was overturned at the U.S. Supreme Court, **Arthur Andersen** had lost the majority of its customers and had ceased operating. Enron employees and shareholders received limited returns in lawsuits, despite losing billions in pensions and stock prices.

As a consequence of the scandal, new regulations and legislation were enacted to expand the accuracy of financial reporting for public companies. One piece of legislation, the **Sarbanes–Oxley Act**, increased penalties for destroying, altering, or fabricating records in federal investigations or for attempting to defraud shareholders. The act also increased the accountability of auditing firms to remain unbiased and independent of their clients.

.

3.4.1 Response on our comparison

More then 50 it is quite 61 percent of them like our modified paper rest of them liked regular one.



3.4.2 Comments

Some valuable comments from survey

1. Try to represent visually more. filling the whole page with too much information. Instead, adding relevant pictures, graphs and other graphical elements to make it attractive to the readers
2. By adding something color graphics
3. You can add more picture for standardization.
4. Make more similar like physical book

Chapter 4

Results and findings

4.1 Results

We created a Google form to conduct a survey for our experiment, and we received 41 responses.

78 agreed that they enjoyed reading e-books. But they were split when it came to whether e-books are interactive enough. 51.2 said that ebooks are interactive. Interestingly, 73.2 prefer a physical book over ebooks. This could be due to several reasons, which are out of the scope of this research. We have gathered some opinions from the readers about how they prefer ebooks to be designed. Most readers (46.3) want a simple white background. 39 prefer a warmer background for their books, and only 14.6 want a dark background. And regarding the main content of the book, which is the text, 36.6 of readers want plain black text. The majority, at 58.5, prefer the opposite color of the background for texts. Almost no reader prefers gray as the text color. When asked whether we should highlight the nouns and the years in a text, 65.9 of readers answered positively. We also asked readers what they thought were the major disadvantages of ebooks. Generally, readers don't want too many colors as they feel it causes eye strain. They prefer warm and comfortable colors that don't put much stress on the eyes. They don't want the pages to be too big, so a proportional layout is preferred. Finally, readers don't want the whole page to be covered by excessive information. They prefer to have pictures that are relevant to the content of the page and additional graphs, tables, and other graphical elements, so the content layout is much more attractive.

Using all this information, we have created 2 pages of ebooks to be tested through a survey. One of them is a standard page without any modifications. The other one has been created to reduce cognitive load as much as possible. We used a slightly yellowish, warm background along with a comparatively bigger font, so it is comfortable to read and it reduces eye strain. The names and years in the text are in italics so they can be easily separated. The years are also colored grey. All of the nouns in the content are in dark blue and bold font, making them distinct and easy to spot for readers. After the readers had read both pages, we found out that the majority (61) preferred the modified page as it causes less strain and cognitive load.

4.2 Findings

enjoyed reading e-books	78% agreed
As Background	warmer background
Text Colour	Black
Important text	Highlighted and dark blue colour

Enron Scandal

The **Enron** scandal was an accounting scandal involving **Enron Corporation**, an American energy company based in **Houston, Texas**. Upon being publicized in *October 2001*, the company declared bankruptcy and its accounting firm, **Arthur Andersen** – then one of the five largest audit and accountancy partnerships in the world – was effectively dissolved. In addition to being the largest bankruptcy reorganization in U.S. history at that time, **Enron** was cited as the biggest audit failure.

Enron shareholders filed a $40 billion lawsuit after the company's stock price, which achieved a high of US$90.75 per share in mid-2000, plummeted to less than $1 by the end of *November 2001*. The U.S. **Securities and Exchange Commission (SEC)** began an investigation, and rival **Houston** competitor **Dynegy** offered to purchase the company at a very low price. The deal failed, and on *December 2, 2001*, **Enron** filed for bankruptcy under Chapter 11 of the United States Bankruptcy Code. **Enron's** $63.4 billion in assets made it the largest corporate bankruptcy in U.S. history until the **WorldCom** scandal the following year.

Many executives at **Enron** were indicted for a variety of charges and some were later sentenced to prison, including **Lay** and **Skilling**. **Arthur Andersen** was found guilty of illegally destroying documents relevant to the **SEC** investigation, which voided its license to audit public companies and effectively closed the firm. By the time the ruling was overturned at the U.S. Supreme Court, **Arthur Andersen** had lost the majority of its customers and had ceased operating. Enron employees and shareholders received limited returns in lawsuits, despite losing billions in pensions and stock prices.

As a consequence of the scandal, new regulations and legislation were enacted to expand the accuracy of financial reporting for public companies. One piece of legislation, the **Sarbanes–Oxley Act**, increased penalties for destroying, altering, or fabricating records in federal investigations or for attempting to defraud shareholders. The act also increased the accountability of auditing firms to remain unbiased and independent of their clients.

we create a page based on there response

Chapter 5

Conclusion

5.1 Discussion

We will now discuss the main findings from our evaluation of three popular eReader devices (shown in Figure 2). For Clarity, technical details of the devices are summarized in the ap-pentices. Appendix A provides brief technical descriptions of all devices considered here — form factor, battery, etc., and appendices B onwards provide critical reviews of Spincic models based on the HCI issues raised above in section

2. Considering the analyses of the different devices taken in- dividually from the appendices, we now summarize the role of the several HCI principles for eReaders in general. [22]

5.2 Human-computer interaction as a study area

Following the presentation of the fundamental assumptions and principles of CLT, the following sections will introduce HCI as a topic of study. HCI is a multidisciplinary field that deals with ”the design, assessment, and implementation of interactive computer systems for human use, as well as the study of key phenomena surrounding them” (Hewett et al., 1996, p. 5). It arose as a separate research area in the late 1970s and early 1980s, when monitors and workstations were accessible, allowing nonengineers to utilize computers (Grudin, 1990; Preece, Sharp, Rogers, 2002). Existing expertise in ergonomics and human factors was used to create interactive devices for perceptual or motor difficulties. Later, cognitive psychology knowledge was used to create command languages or menu designs. [**?**] Network technologies and mobile devices expanded the scope of study beyond the individual user and personal computers in the 1990s. The objective was therefore to create interactive systems for individuals and groups in a variety of application areas, such as work, education, or entertainment, at home or on the road. Experts from different disciplines, such as sociology and anthropology, were part in this research (Rogers, 2004). [10]

5.3 Conclusion

As a result, cognitive load should be minimized while developing multimedia education. According to this systematic review, transdisciplinary professional teams are required to carry out treatments that have an impact on physical and executive function and are concentrated on giving patients with MCI/early dementia preventative care. To do this, experts and researchers may use technology and active learning to stimulate a range of neurocognitive domains, therefore enhancing both the mind and the body. Studies that address study dosage and caregiver support can greatly boost participant adherence. Early dementia or MCI. [6]

A variety of auditory and visual media can be employed in online learning to reduce the amount of superfluous cognitive processing; some researchers even argue that using a variety of media forms is beneficial. [7]

The research on community-and home-based therapies is a literature review of home/community interventions for physical and executive functions in individuals with mild cognitive impairment or early dementia. A systematic literature search from 2007 to 2020 was performed using PubMed, CINAHL Plus with full text, and PsycINFO. Of the 1749 articles retrieved, 18 eligible studies were identified and included three types of interventions: cognitive training only (n = 7), multicomponent (n = 9) and active-only physical (n = 2). [2]

1. Task complexity, ranging from simple retrieval (Scavenger Hunt) tasks to more complex high-cognitive skill tasks

2. Technical complexity, from low-cost surveys to in-depth interviews that demand time and experience, while it is impossible to estimate the cost of each component. Low ratings on both aspects are indicative of a cheap experiment, such as one that uses a Scavenger Hunt and a questionnaire (like the WEB Book). However, a research (Study X) that employed high-cognitive skills activities and participant interviews would rank well on task difficulty and technical complexity, demonstrating that a costly test is not necessary. It should be noted that this number does not depict the additional costs associated with implementing many elements of the dimension (such as tests and brainstorming sessions). Therefore, Ebonii's main experiment, which makes use of all the activities and assessment strategies, achieves very high ratings on both axes, producing an extraordinarily large total area. According to the Ebonii hypothesis, the evaluation model may be used to apply reductionist ideas. We covered all of our planned HCI data sets in this chapter. [22]

No hurdles to HCI, Obstacle HCI, and Obstacle HCI with UI Adaptation are the three basic categories into which the HCI data may be divided. The popular matching-pairs game was chosen as an example HCI work because it addresses the two key challenges that we want to simulate and identify: Visual obstacles and memory-based obstacles: That is, matching pairs is a demanding memory activity that necessitates a high level of UI visual item identification (cards motives). Additionally, the memory game of choice is an excellent fit to represent a variety of typical HCI tasks: In many additional HCI

activities, visual examination of the UI, working memory retrieval and encoding (of both spatial and symbolic information), as well as planning and decision-making, are all required. [1]

Finally, the technique and social justice perspective of plain language discussed here cannot replace user testing, just like with other plain language or technology communication principles or heuristics. You can only ensure success with plain language to empower excluded groups by testing your communication with them.. [6]

Bibliography

[1] A. Korbach, R. Brünken, B. Park, Differentiating different types of cognitive load: A comparison of different measures, Educational Psychology Review 30 (2) (2018) 503–529.

[2] C. Hughes, J. Costley, C. Lange, The effects of multimedia video lectures on extraneous load, Distance Education 40 (1) (2019) 54–75.

[3] T. Laamanen, M. Maula, M. Kajanto, P. Kunnas, The role of cognitive load in effective strategic issue management, Long Range Planning 51 (4) (2018) 625–639.

[4] J. Pearson, G. Buchanan, H. Thimbleby, Hci design principles for ereaders, in: Proceedings of the third workshop on Research advances in large digital book repositories and complementary media, 2010, pp. 15–24.

[5] R. E. Mayer, R. Moreno, Nine ways to reduce cognitive load in multimedia learning, Educational psychologist 38 (1) (2003) 43–52.

[6] M. Salous, User modeling for adaptation of cognitive systems, Ph.D. thesis, Universität Bremen (2021).

[7] E. Jenkins, B. Koirala, T. Rodney, J. W. Lee, V. T. Cotter, S. L. Szanton, J. L. Taylor, Home/community-based interventions to improve function in persons with mild cognitive impairment/early dementia, Geriatric Nursing 42 (5) (2021) 1109–1124.

[8] P. Chandler, J. Sweller, Cognitive load theory and the format of instruction, Cognition and instruction 8 (4) (1991) 293–332.

[9] S. Feinberg, M. Murphy, Applying cognitive load theory to the design of web-based instruction, in: 18th Annual Conference on Computer Documentation. ipcc sigdoc 2000. Technology and Teamwork. Proceedings. IEEE Professional Communication Society International Professional Communication Conference an, IEEE, 2000, pp. 353–360.

[10] M. K. Seery, R. Donnelly, The implementation of pre-lecture resources to reduce in-class cognitive load: A case study for higher education chemistry, British Journal of Educational Technology 43 (4) (2012) 667–677.

[11] F. Paas, J. E. Tuovinen, H. Tabbers, P. W. Van Gerven, Cognitive load measurement as a means to advance cognitive load theory, in: Educational psychologist, Routledge, 2016, pp. 63–71.

[12] L. Abeysekera, P. Dawson, Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research, Higher education research & development 34 (1) (2015) 1–14.

[13] I. W. Cheung, Plain language to minimize cognitive load: A social justice perspective, IEEE Transactions on Professional Communication 60 (4) (2017) 448–457. doi:10.1109/TPC.2017.2759639.

[14] F. Paas, A. Renkl, J. Sweller, Cognitive load theory and instructional design: Recent developments, Educational psychologist 38 (1) (2003) 1–4.

[15] M. Mazher, A. Abd Aziz, A. S. Malik, H. U. Amin, An eeg-based cognitive load assessment in multimedia learning using feature extraction and partial directed coherence, IEEE Access 5 (2017) 14819–14829.

[16] A. Gevins, M. E. Smith, H. Leong, L. McEvoy, S. Whitfield, R. Du, G. Rush, Monitoring working memory load during computer-based tasks with eeg pattern recognition methods, Human factors 40 (1) (1998) 79–91.

[17] D. C. Moos, D. Pitton, Student teacher challenges: Using the cognitive load theory as an explanatory lens, Teaching Education 25 (2) (2014) 127–141.

[18] A. Hindriana, The development of biology practicum learning based on vee diagram for reducing student cognitive load, Journal of Education, Teaching and Learning 1 (2) (2016) 61–65.

[19] J. Sweller, P. Ayres, S. Kalyuga, Measuring cognitive load, in: Cognitive load theory, Springer, 2011, pp. 71–85.

[20] A. Renkl, R. K. Atkinson, Structuring the transition from example study to problem solving in cognitive skill acquisition: A cognitive load perspective, in: Educational psychologist, Routledge, 2016, pp. 15–22.

[21] J. M. van Bruggen, P. A. Kirschner, W. Jochems, External representation of argumentation in cscl and the management of cognitive load, Learning and instruction 12 (1) (2002) 121–138.

[22] G. Cooper, Research into cognitive load theory and instructional design at unsw (1998).