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Explore the Effects of E-Books on Students Academic Achievement: An Experiment on BS English Students at Superior University

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Abstract

The world is moving very fast in economic, technological and education ground and all those changes bringing the big impact on the roads of an achievement we are dream. The origins of writing date all the way back to information written on leather, tree bark and stone which eventually evolved into paper. Using paper however has become a major challenge. The production process of paper is expensive and the resulting product heavy to carry for children, which also contributes negatively in environmental pollution that makes it unsustainable. To overcome these problems an E-Books came into place instead of traditional paper books. The data was collected from two groups of 30 BS English first-semester students by using mixed-method experimental study in Superior University Golden Campus Lahore. The other was a standard group in which students studied paper books; and the experimental one, using digital resources like PDF books or video classes available through an AI tool developed for this study with WhatsApp. For data analysis, thematic interviews were conducted with the doctors from Children's Hospital Lahore (total of five) I also used a posttest a summative achievement test, that indicated the students who followed through with reading from digital books scored substantially overall higher. These students also scored higher on time-based (eg, multiple-choice tests) but lower in power-based assessments (ie, essay questions). The power test in which students learned

digital was finished on time by the paper book learner, but it is likely to be improved sense there are other study that can practice mechanical keyboard typing. When it comes to their vision and hearing, reading on a screen proved no less conducive than traditional materials for students of any age group — though those who used e-book readers were more prone to color blindness. The study suggests the government to push E-Books, set up tablet libraries in schools and special training for teachers.
Keywords: E-Books, PDF, AV-Aids, Academic achievements.

Introduction

The advent of digital technology has brought a whole new world to share knowledge and data much more efficiently. As those traditional books have for so long remained at the center of education, their 21st-century digital forebears have kept them there. Over the past few years, digital tools have been increasingly harnessed in educational settings and methods for improving learning experiences within them are now a major focus of research efforts These textbooks, being the backbone of classroom learning and beyond make E-Books a crucial element for digital transformation in education. Through the transition to digital publications, various ways of disseminating and using these contents have emerged as well in educational practices that it is necessary to reevaluate how E-Books could be best implemented for better learning outcomes (Lee et al., 2023; Im, 2024).

E-Books have turned the paradigm of learning providing a way out to students who are tired of monotonic traditional reading and want something more immersive. Benefits and struggles for schools using E-Books. One of the main benefit would be better access to educational resources and thus students could interact with it better which will also helps in getting the education customized based on their learning needs. For schools, the transition to digital curriculum — particularly in switching from paper books to resources online can provide cost savings by eliminating some of the costs associated with printing. Beyond that, they also spare students from having to lug around a mountain of heavy textbooks when using an e-reader or another digital device for class readings (which are generally all part of the same platform), everything you need is in one lightweight place. Although these benefits are substantial, it is vital to identify the liability and potential for undermining work-around headaches that need be addressed like student well-being as well lack of reliable tech infrastructure. Nevertheless, these initiatives have been huge in modernizing education and making learning more accessible to the masses.
(McHaney, 2023; Tafani, 2023).

Digital textbooks are a continually shifting concept and practice just as is educational technology. In the beginning, digital textbooks were straightforward conversions of paper-based books into e-books or static PDFs that offered a basic replication of print material. However, as the educational world evolved so did digital textbooks. These have now evolved into more

advanced E-Books that are about way beyond just the text. These new age digital textbooks are laced with multimedia components such as videos, animations and interactive elements which makes the process of learning more vibrant and live. Designed to meet the different and changing requirements of learners and educators, this evolution provides a more versatile mode of education for students. By integrating these features in their applications, they are able to cater a variety of learning styles and enables education more accessible and effective. Considering that the need for creative learning techniques is gradually increasing, digital textbooks are poised to further evolve serving as a notable component of the prospective education (Jang & Shin 2016; Kim & Kim 2022).

E-Books are commended for its portability that means: it can be read from anywhere even if you are at home, in travelling or the classroom. For this reason, they are also a perfect learning tool to have when reading anywhere in the open (Al Mulhim & Zaky, 2023). E-Books can also be flexible and could change depending on the wants of users (customizable simply things like adjustable fonts, interactive elements) in addition to multimedia integration. This adaptability improves the overall reading experience and make it more tailored, depending on one's preference and learning style (ElAdl & Musawi, 2020)

Significant research has been done to analyze the effects of E-Books in students' brain power and academic performance since they entered our education system. Researches has been done by a lot of articles looking after the effective use of E-Books in terms to cognitive study, because improving student's cognition always have being one main target around formal educational. The results consistently point to the cognitive enhancement of students in varied subjects because of E-Books. Students get to experience develop cognitive skills when E-Books are used in learning, which underscores the Importantly of E-Book toward academic performance (Lim et al., 2022; Wijaya et al., 2022).

Despite increasing relevance in contemporary education (Johnston et al., 2015), debates concerning the wider implications of E-Books extend into realms other than cognitive dimensions. E-Books are an established form of reading technology and finding benefits in e-books is not surprising, however, there do seem to be some qualms that still linger behind them. However, a central question in this area is that of whether E-Books are better than printed books or not; and while the perception its usage for education differs ranging (YIiot et al., 2022).

It is important to consider the actual cost-effectiveness of E-Books, especially when you are thinking on larger or national scale. Decisions should be supported by extensive longitudinal research data and gradual policies put in place to ensure full assimilation. While several studies have investigated the effectiveness of E-Books, long-term longitudinal research is lacking in the

literature. Consequently, informed decision-making necessitates a balanced appraisal of both short-term gains and long term ramifications (Lim et al., 2022; Ryu & Byun,2012).

Statement of Problem

The world is witnessing big changes as far different spheres e.g. economic, technological and in education realms are concerned. In past paper, we had leather and tree bark were on which they used to write the method before this there have been writing into stones. Nevertheless, there are complications in using paper both as it is expensive to produce and cumbersomely carried by students but also on the environmental side due its pollution resulting from becoming garbage most of time. To overcome these challenges, there is growing awareness of the need for sustainable solutions. E-Books appeared as a response to this trend away traditional paper books. E-books are not as resource-intensive to produce, print and store like paper. These are highly portable since they can be downloaded to digital devices like tablets or smartphones. E-Books: E-book has the advantage of being read anywhere and at any time, even in darkness or when reading along with a different work (at breaks like during travel etc.) They may also conduct online tests which in turn reduces the requisite school infrastructure and consequent problems like transportation, environment affecting harms or health related issues. Therefore this research is carried out to investigate the pros and cons of E-Books as a potential solution for many unmet needs in education, with testing their performance through experiment.

Objectives of the Study

The following were the objectives of the study;

1. To analyze the effects of E-Books on BS English students' academic achievement.
2. To check the effects of E-Books on BS English students' health
3. To explore the demerits of E-Books on BS English students

Hypothesis of the Study

The following were the hypotheses of the study;

Ho.1 E-Books have no effect on BS English students' academic

achievement

Ho.2 E-Books have negative effects on BS English students' health.

Significance of the Study

The impact of e-books could likely be extremely useful for college students and this will bring about a revolution in the education sector. In Pakistan, the introduction of digital books is believed to change drastically Pakistan's economy with cost reduction in various ways like paper printing

and editorial costs etc. Let us loop in the efficiencies enabled by cutting costs from paper production to printing, ink and securing stock into warehouses moving physical books around. They will also help us save the environment by reducing waste, volume and time as well! In addition to parents, the study should help enlighten policy makers about how e-books can be useful or may hinder children's learning. The identification of these aspects will be a stepping stone for future investigation in this domain, employing further research and advancements in education.

Literature Review

The idea of E-Books is in a sorry state (Turel & Sanal, 2018) At first E-Books were electronic versions of printed texts, like a PDF. They have evolved substantially over time though. When E-Books started to be used in education, they were integrated with a number of features which can help the students more effectively. Today, E-Books have all these features combined with bookmarks, notes, highlights and hyperlinks also linked to more learning resources for enhanced user engagement. This evolution has graduated to developing more interactive online textbooks that students can use collaboratively, so they are not just learning by themselves. It has long beyond the standard beginnings of e-books into a robust array assisting an extensive variety academic activities (Lim et al., 2022; Im, 2024).

E-books can be divided into two classes, based on the aspects of Jang and Shin (2016). The original version, which are just pure PDF based eBooks or basic electronic textbooks. These early e-books provide little interactivity and essentially serve as digital facsimiles of their print originals. Conversely, a lower second generation of e-books which turned out interactive or as advanced digital textbooks that are better in actual the first-printed-textbooks-only regressive characteristics. Modern e-books(queue share books, sometimes eBooks grave errors on the page), also introduced as children's but new to babies and baby music cyber headway, are actually refreshing digital agency agog face value over against set of conditions learning. They include videos, interactive exercises and lunch discussions to make learning more engaging when compared with their first-generation counterparts.

Digital books come with all manner of advanced features to add on or improve upon what traditional reading has been. Not only do they provide the full digital content of printed textbooks, as typical etexts would. These also are designed with a number useful tools for students built-in and multimedia capabilities not possible in paper or standard e-books. This personal experience does not exist with the static content of traditional publications. E.g., you can annotate in ebooks or highlight portions what helps for learning); In reality, according to Rodríguez-Regueira & Rodríguez-Rodríguez (2022), the great added value of these e-books is that they allow you a greater interaction with them: looking up word meanings, investigating further information and accessing more in-depth studies through hyperlinks. E-books also come with multimedia elements not available in print, such as photos and videos to go along 360-degree or even 3D images, in addition to accompanying audio components. These enhancements are there to make e-books more flexible and interactive learning tools that deliver a richer, far more engaging experience compared with the one-way traffic of traditional textbooks.

This interpretation can be found in the Dictionaries and books that they are prepared specifically for students with visual impairments have an Audio recordings included, thus when he puts his finger on a word here someone will say its meaning so musawi & ElAdl, (2020) These textbooks are differentiated because they include audio glossaries as well as some Text-to-Speech(iii)] features.. Lim et al. highlighted recent advancements in some online textbooks, including augmented and virtual reality features. Communication Functions are the various forms of communication you have with other participants to interact, collaborate in digital space. Publish, Discuss and Message in Real Time In the same way that tasks could be sent and feedback returned, giving immediate opportunity gives better value for money of executing assignments just as a coordinated student academic work management (UNESCO 2017).

Prior to 2007, Korea used "electronic textbook" as a standard term. Nevertheless, in 2005 the Korea Education and Research Information Service defined "digital textbooks" as referring to a textbook teachable with ICT. This was a change in the educational policy of Vietnam towards novel digitalization textbooks. Byun et al.,describe digital textbooks "as digital learning materials maximized to convert traditional printed textbooks into a digitized form." With the emergence of these digital textbooks, students not only receive advantages, content-wise that they could from a printed book but also more with additional features like search capabilities, navigation, and multimedia components such as animations and 3D graphics. All said and done, these are to simply make the platform more convenient and effective when learning. This seems to have emerged as a widely accepted definition when it comes to talking about digital textbooks.

Together with the advanced AI technologies, E-books have started establishing their role in contemporary education. For students, AI enables prompt responses to questions, tailors challenges for the skills level of individuals and provides children with an opportunity to explore subjects independently at their own pace — while tracking progress. In other words, it leads to a much less interactive and personalized educational experience. South Korea will initiate introduction of AI-powered e-books starting 2027 at all educational stages From 2023, AI e-books will be produced from the third to fourth grade in secondary school, and first to second grades of middle school (all subjects), up until high school's 7th-8th grades. The titles will center on the common key subjects such as Maths, English and IT in significant progress towards embedding AI into learning materials. It is an initiative that aims to improve learning results and support targeted education among students in all grades (Im, 2024).

Our education systems need to be sustainable environmentally, economically and socially if we want current and future generations of humans (as well as all other forms of life on the planet) to benefit from quality education. Instructional materials like textbooks are critical to a child's education, and long-term sustainability of the same should be top priority during development / selection. E-books are a particularly striking example of this trend; they really do almost give it

away.

Al Mulhim and Zaky [10] stressed the environmental benefits of e- books compared to traditional paper textbooks during their 2023 evaluation. The shared conversation spoke to how E-books foster a more sustainable education by saving money, preserving resources and shrinking classroom energy consumption.

In terms of social benefits, E-books have a lot to offer as well. This way, they may increase the knowledge of the students about sustainability (Valverde-Berrocoso et al. In E-books, this is due to the process in which a recorded voice that can create an alternative way of learning (Kim & Kim 2022) which provides equitable opportunities for those students with visual impairments. Hence, E-books come as a very good and sustainably competing choice with the best of educational goals adding facility to it. Studies have shown that electronic books (E-Books) improve students' analytical ability and reasoning skill as well. A recent study found that e-books have a net positive effect on cognitive skills (measured in various ways) and performance outcomes [in basic areas like physical science, English language arts< math] with overall weighted mean effect sizes ranging between %.24 to 1.05 (Cha et al.,2017).

E-Books provide some obvious advantages over your average printed textbooks from the past. These include self-testing, highlighting, and generative techniques to name a few (Brown et al., 2023), all of which can help students enjoy interactive learning more. The type of functionalities E-Books offers goes a long way to ensuring that more important notes are embedded within the mind of the student and it supports personalized learning which only makes adequate education all worth while. One thing that has been hotly debated, however, is the effectiveness of online textbooks. Gronlund et al. The review found that the direct impact on usage is mixed with some finding a significant positive effect while others are not as supportive of E-Books (such as Bond et al., 2009) but that there may very well be little correlation between most students preferences and their own reactions to specifically utilizing these resources, meaning even if asked for them they might in practice use another source when writing.

Johnston et al. Weeden-Sanzman et al (2015) additionally claim that their assessment of E-Books against written analogues does not support the claim that these alternatives represent a viable option to meet student needs. The mixed nature of the evidence on student preferences for E-Books implies that more research is needed, to tell us whether these preferences really matter in terms of long-term usage or effectiveness as learning resources. Gronlund et al. The authors (2018) point out that the ignorance and skills with IT tools of educators, difficulty in using E-Books efficiently. On the other hand, A study by Al-Qatawneh et al. College students demonstrate high usage of E-Books, though insufficient evidence exists to universally justify their integration (2019). Due to the disparate nature of research methods, population segments and exposure times it is necessary that a large-scale trial be conducted which offer generalizable conclusions for schools in Pakistan.

In contrast to cognitive skills which are about how well you think, affective competencies of learning is the emotional specifics that happen during a sharing activity such as character (patience with each other), belief in divine truth at least by one person– or personal motivation. These skills stand at the core of how students believe and maintain their own drive to learn.

As per the TIMSS comparative research, (Mullis & Martin, 2015) in assessment of student achievements particularly when standardized evaluation is tough at least four chief-attributes connected with students attitudes towards learning: self-concept, motivation and willingness to learn along with general attitude. These are the emotional competencies that support self-belief, intrinsic motivation to learn and success in learning. One of the books that I read 2 weeks ago by Sritharan (2018) also pointed out how a student's belief in their ability to learn, and being genuinely interested about learning are critical factors affecting students' achievements. Therefore, developing these affective dimensions can improve the academic results of students altogether.

It is defined as an individual's conviction in his or her potential to execute the particular skills required for specifying jobs within a situation by utilizing appropriate planning and output. This is an important concept for educators to remember, because students with high self-efficacy tend more likely to use higher-level cognitive and meta-cognitive strategies, persevere in the face of difficulties and emerge with greater academic success. Self-efficacy is becoming more important in the world of modern, digitalized education. Findings from Chen and Su (2019) indicate that e-books integrated with learning management systems support student confidence as well as independent studying. Moreover, ElAdl and Musawi (2020) added that the implementation of e-books directly promotes students' learning motivations to their self-efficacies. These results demonstrate the importance of self-efficacy to boost academic performance and therefore recommend digital tools such as e-books which could significantly facilitate students' perception of their own abilities.

We are discuss two important emotional components to the students academic achievement; intrinsic motivation for learning and their inclination towards overall attitudes about leaning. Motivation has a significant contribution to academic achievement (Sritharan, 2018), as empirical evidence repeatedly indicates that highest motivated students are most successful and acquire rich learning content around them. As a result, formal studies have been dedicated to finding directions which can increase the student motivation and desire for learning (O'Bannon et al., 2017). According to the research of Sun and Pan (2021), e-books implemented with ITE has increased the motivation for studying while facilitating self-directed learning skills among students. For example, interactive e-books (e.g., iBooks) have led to improved engagement and motivation among students. E-books including several interactive features are also reported to have a stronger positive effect on boosting learners motivation, compared to traditional PDF textbooks (Turel and Sanal 2018).

The impact of E-books on student emotional competence Although the literature around regarding has been vast, almost pellucid regarding one area, and that being: The extent to which reading text digitally can shape student motivation levels of junior high ambrosial sybaritic students (ElAdl & Musawi,, 2020). Electronic BOOKs (E-books), not like paper Publications are

expected to boost the social abilities of pupils via interactive features offered by them. Saini & Kaur (2019), claims that e-books offer the possibility of two-way communication among teachers and students, as well as between content itself and students which can enhance learning. The interactive nature of e-books also encourages students to work on their social components, through communication and collaboration (Van Oudeweetering & Voogt 2018). Metcalf et al. Students interact more when e-books are used (2023). In the same way, UNESCO (2017) reported that digital technologies improve communication and collaboration in class; confirming with Sun & Pan, 2021 who found an effect on e-book features to support student-teacher interactions leading to better learning methods which affect academic performance. Some detractors suggest that the geographically and media bound nature of digital tools can slow in skills-building social competencies. Kreijns et al. Contextilcke(2023) has indicated that environmental restrictions might hinder the smooth communication at interpersonal level in online educational environment. Education institutions and students create social skills development, but problems are still there (Muuro et al., 2014) Emphasising the importance of more research into how e-books affect social competences in these settings.

The global level also shows several initiatives related to digital pedagogy on the rise. The LendED platform, developed in the UK (in partnership with BESA) and launched in 2018 provides schools access to digital tools they can select from an online library, which are then purchased using Department for Education funding streams public money will enter contractors' bank account eventually. While Singapore has been experimenting with e-books for secondary students since 2000, Malaysia only followed in 2002.

The German Digital Schule initiative, launched in 2019 has the aim of nationwide digital infrastructure up to and including 2024 (Greifenberg, 2020). The U.S. National Educational Technology Plan offers an approach to eliminate technology inequity by guiding classroom instruction on when and how use of the digital tools (Escueta et al., 2017). In Japan, The" GIGA school project," will be launched in 2020 nationwide and is based on the promotion of digital infrastructure such as e-learning platforms (Lander, 2022). The EU has adopted educational technology, and Estonia is a trendsetter in this field with its recent 2018 "e-schoolbag" project offering free digital textbooks to students (Estonia, 2022). It shows the increasing trend of digital education around the world and it also maybe requires more exploration on (digital) e-textbook taking flavanol to students' emotional &societal development.

Research Method

This study was an experiment mixed method research; it aimed to investigate the effect of E-Books on academic performance and health problem for students. This study was conducted at Superior University Golden Campus it has researched on first-semester BS English students. The 42 students of the class were administered a pre-test achievement test at first. From the pre-test scores, high and low achievers were removed and 30 students with middle level of both genders were used for the study. 10 This method was used to randomly assign 30 of the students into two groups. The second group of fifteen participants also were students, who together became the

experimental condition and a first controls cohorte was divided that composed by other 15 students. The e-Book research that was conducted did examine academic results from the use of E-books but also included consideration of potential health effects primarily auditory due to listening methods and secondly, visual because of eye strain. This holistic approach intended to provide synergistic perspectives of students e-readers (the learning media), education, and physiology.

Experiment Procedure

This study is applied two modes of teaching to the students. The experiment group of students got study support via cell phones with learningg materials that consisted PDF books and some multimedia concents as audio files, video lectures etc. Their course material was all in software form, where every book had been changed into a PDF and every class recorded so one can observe anytime. They were also made familiar with specific AI-driven instruments that could aid and equip them to become better learners. They opened a WhatsApp group for instant support as well.

The other group, on the flip side was taught making use of common imprinted textbooks. Though they persisted with old-school avatars, sticking to print instead of digital books. With moving the experimental cohort to a fully digital platform, they no longer needed textbooks as all materials were now available on cell phones or tablets. This change was meant to decrease the load of books students have to carry and provide a modern flexible learning environment.

Treatment

The concept of using digital as a new medium to learn was first brought into the minds of students, and traditional textbooks were electronic-ised in PDF format for easy access. They made PDFs of additional notes and stitched them with video lectures, which they could send to the students via mobile phones. These resources were always improved over time to deliver them in a form with the higher quality. There was a specific WhatsApp group for audio messages and interactive discussion sessions, in order to support learning. Different training modules were established that will teach students how to carry out the process of reading in which they are guided about appropriate distance from screens, managing sound levels and others. Students were also given demonstrations on how they might respond to questions using AI tools. Initial hurdles were well-leaped by students, as they accustomed to the new directions quite quickly. There were also safety precautions to ensure that cell phones are used only for educational purposes in the case, and not misused.

Medical Test

This experimental research was initiated after seeking help from doctors of Lahore Students Hospital. A special occasion was created at the school to have them over for a meal so they can

volunteer. At this visit, each child in both the experimental and control groups underwent a full medical assessment. It also involved full investigation of their hearing and sight. Medical files were prepared for each student recording issues of hearing deficiency, vision defects and color blindness. Our goal in collecting this information was to create a reference list of the students' health status, such that effects observed later on from the research could be considered likely only due to experimental variables and not prior conditions.

Experiment Duration and Formative Assessments

This research was carried out over one semester on first-semester BS English students in Superior University Lahore. The educational sessions were presented in a digital manner, combining numerous online learning technologies. In semester, the assessments were frequent formative and followed a similar routine to how they tested other students. Other software applications were also installed in the cell phones used by students to help them write quicker and seize writing style. Google Forms was used to collect data for midterm examinations and other evaluations while MS Excel spreadsheets were prepared for data arrangement, refinement, and analysis. This strategy targeted to utilize the learning up-to-date and make the assessment process validated.

Development of Tools

Two main evaluations were created for this project. They were first given a pre-test to screen for average ability. Then we got to a full-blown achievement test, the kind of mundane old summative assessment from first semester BS English. This test was administered in two ways: a paperless PDF format sent by cell for the experimental group and printed out hard copy versions delivered to those in the control arm. Furthermore, the researcher prepared an interview guide to produce interviews with physicians for qualitative data analysis. Themes were identified from these data and summarized to assess the benefits and drawbacks of e-books.

Validity and Reliability of the Tools

The assessment of validity was only performed for the pre-test as, the post-test applied to all students at school and therefore no separate analyses were necessary. As a result, testing also was limited to the pre-test for this study focusing on test–retest reliability. The pre-test showed high internal consistency (0.923). This score also represents the strength of face validity as demonstrated by this test being able to measure what it purportedly measures and can thus make dependable reproducible results. This high reliability score highlights the initial success of the pre-test in collecting accurate data and serves as a strong starting base to examining outcomes related from this study

Data Analysis Procedure

Three different types of data analysis were used: Both groups were first administered standardized achievement tests to assess their general academic proficiency. For the

experimental group, specific category tests of power and speed were administered following this. These tests for the experimental group were done on mobile (cell phones) using Google Forms, Speed test and a spreadsheet; At the same time, those in a comparison group completed assessments on paper. The control group is the one that received printouts of multiple-choice speed test-like questions (Google forms) deprivation session. Power test questions were printed and used in a hard-copy format for the control group likewise. They were given a prescribed amount of time in which to complete the test. Five key themes were identified through interviews taken from the Lahore Children's Hospital, which impacted on wider analysis of study.

Quantitative Results of the Study

A post-test was given that encompassed an achievement test of 500-marks to be answered by the students. This review lasted five days, 100 marks each day across a paper. There were two parts to the test; one portion was a top speed section, while the other was an acceleration trial.

For the speed test, there were multiple-choice questions where students needed to recall and understand content. The former type assessed knowledge in a more basic way, whereas the latter was characterized by the use of short and long questions where deeper understanding and analytical skills were tested. It was designed to capture both quick, on-the-spot knowledge and slower depthful reflective thinking ability of students. This segmented method of evaluation ensured that the child's performance was measured in terms of all dimensions covered at school, leading to holistic assessment.

Table 1

Ho1. E-Books have no effect on students' academic achievement.

Independent Sample t-test					
Groups	*f*	μ	σ	t	α
Experimental	15	322.87	2.200	-159.111	.000
Controlled	15	441.87	1.885		

The results of the experimental and control groups are presented in Table 1, as already mentioned in detail. We found evidence that the experimental group performed better (with a significantly higher mean score) in comparison to control. In terms of mean and standard deviation, the control group scored M = 322.87 (SD =.2720). The experimental group on the other hand, has a mean score of 441.87 and standard deviation of 1.885. The t-test for statistical analysis resulted in -159.111 and p-value that was less than 0,05 which showed the null hypothesis would be rejected. Thereby, the experimental group performs significantly better than that of the control.

Ho2. E-Books have negative effects on students' health

The experimental research was done after obtaining medical help from Lahore College and

Hospital. Doctors were invited to a special event at the university, where every student who was in the experimental group participated and underwent an all-round check-up that included testing hearing visibility, coloration discrimination. All participating students had detailed medical files that included hearing thresholds, visual impairments and information about their color vision deficits. One year after we finished the experiment, so 22 months in all: follow-up consultation with the doctors. Results showed that there was no harm to the students' hearing at all, and in fact their vision improved. Nonetheless, tests after the experiment detected a marginal uptick in colorblindness from before. Its implication is that even reading black and colored text in physical books could worsen colour blindness problems. On the other hand, digital books with audio aspects need to be displayed less frequently for a limited amount of time which may alleviate some stress on students who are colorblind.

Qualitative Results of the Study

Below are few of those themes along with the statement about e-books from one doctor (doctor is/was a student) Relevance to Academic Performance and Health

> *"Online resources such as e-books make a large variety of tools available, which can greatly improve student academic performance by allowing them to delve into new viewpoints and materials that they might miss otherwise from within the textbook" Participant-1*

The e-book helps students to expand their horizons and venture beyond traditional confines of a physical textbook by giving them ready access to vast pools of educational resources. With wider access comes more opportunity for students to interact with various types of material that can better inform the information they are learning in school. The start to peruse different perspectives and sources encourages the development of a more comprehensive research as well as analytical thinking. In conclusion, e-books are important for the purposes of improving student learning experiences as well as enhancing academic success.

"Ebooks(electronic books) are easy to carry and inexpensive so students can afford in it at the student life, A user friendly e book instead of lugging around all those physical text-books is available. This ease means that the students will read more frequently and learn more often, which of course leads to better academic results" Participant-2

E-books have many advantages that is the most important being easier to carry round and far more cost-effective. Teachers observed that students can have multiple books in one laptops without the actual weight of textbooks. Based on the participant, this convenience leads to you can read more and study very often since students will get many information in your morphs. The increased availability and affordability of E text books may therefore result in improved academic results as they encourage a much more interactive, structured strategy for learning.

"The interactive features of e-books like embedded videos and hyperlinks can create more engagement with students, and in turn meet different learning styles therefore help improve academic success'' Participant-3

Participant-3 noted the interactive features that came with e-books like embedded videos, and hyperlinks being an excellent way to keep students engaged as this could cater for different types of learning styles. These features make for engaging learning experience and enable a form of content interaction unavailable in traditional textbooks. E-books are designed to cater for visual auditory and kinesthetic learners which ultimately promotes diverse learning preferences of the reader resulting in improved understanding and syncing with material.

"Due to rapid shifts in disciplines, schools can ensure that students see the latest information available - which is what make or breaks fields of study today." Participant-4

The advantage of easy updates has been pointed out by Participant-4 Such feature further ensures that students always have information at their fingertips. This becomes even more important in dynamic fields where timeliness is crucial. Textbooks as commonly formatted can go out of date rather quickly which makes e-books convenient because they are constantly updated in real-time. This flexibility makes e-books a great resource for students to keep up with the latest in their fields. E-books keep the pupil updated with changing content and hence, they always stay a step forward on learning curve.

"Among the benefits that can be very helpful for students with visual impairments and ultimately support inclusive education, also increasing academic achievement in this group […] include ability to change font size," he said. Participant-5

Another use case described in user story 5 is as follows: proposal-2 the custom colors and adjustable font size, this can benefit to students with certain visual handicaps. These features improve readability and promote diverse learning environments by allowing for a variety of forms in the type, size, colour/contrast toggles. E-books provide a major benefit to student learning outcomes by greater access to educational content for all students regardless of their visual ability. The flexibility of online learning resources also illustrates the promise they hold in ensuring that all students have an opportunity to learn.

Demerits:

"Over time, e-books can cause eye strain and headaches from too much exposure to the blue light that emanates form screens. If students are not able to attend classes and other campus activities due to health issues, this can significantly impact their wellbeing as well as academic

performance" Participant-1

Participant-1 suggested caution using e-books for extended time, as screen emit blue light that which leads to eye strain and cause headache or lack of sleep. According to the participant these health issues may affect overall well-being and hence can result in underperformance of students. E-books provide some degree of convenience and accessibility for the users but using e-book in long run may bring health problems that educators should consider it when educators or students plan to keep working with academic productivity & personal health.

"Digitizing their education can make them use the same devices too much and solicit less physical activity amongst student population thereby actions like incorrect postures, obesity rise again" Participant-2

Participant-2: It might enable students to fully depend on digital devises and hinder their physical health. Such reliance on tech could ultimately lead people to be less active physically, leading to issues such as poorer posture (from sitting for prolonged periods) and higher rates of obesity linked with a sedentary life. Digital tools are useful, the participant acknowledges, but not at the expense of student well-being because too much screen time swaps education for health.

"Add the ever-present screen and it likely means this technology is also contributing to students developing digital eye strain, which causes discomfort and can create a foundation for long-term vision problems – impacting their ability to focus on learning." Participant-3

Participant-3 suggested prolonged exposure to screens can cause digital eye strain, which eventually causes discomfort and permanent vision problems. Students ability to focus and concentrate can suffer due this strain, as well their academic performances. Too much screen time can lead to eye strain, headaches and blurred vision -- factors that only add up to reduce the attention with which you will grasp on your studies. The need to correct digital eye strain is also important as it helps students overcome a challenge that can undermine their well-being and academic success, bringing attention back on the importance of maintaining an optimal balance between screen time along with effective strategies for eye care.

"Using screens to read too frequently can disturb sleep Patterns of students because blue light from these Screens interferes with the natural circadian Cycle, resulting in fatigue which is lead cognitive function Depressed" Participant-4

She observed that continuous reading with digital devices related to loss of sleep along the way. Specifically, it creates a bright blue light that messes with your circadian rhythm. This disruption can make it difficult to fall asleep (causing fatigue and a decrease in cognitive performance).

Those sleep disruptions can lead to an unhealthy overall academic performance and well-being, so it is essential that we use screen time adequately for students before bedtime. This result contributes to the importance examine of academic setting associated sleep health and cognitive functions with digital devices use.

One drawback is that "this diminished tactile interaction with physical books might cause the students' sensory experience of reading to suffer, which can help them retain and comprehend what they're ready for better academic performance" Participant-5

Does not even the absence of tactile interaction with physical books reduce sensory experience, which many students find favorable for retention and comprehension? The catching of fingers holding pages help often, and holding a book demands more concentration upon the brain — exercising memory. In the absence of this sensory input, students might struggle to stay on pace academically difficult because without physical interaction it may be more overwhelming for them to retain and process information. This decrease in sensory input could be limiting one's potential for academic results.

Conclusions

Advantages and disadvantages of the use of the e-books in education Based on existing studies about it, using e-book has been show some benefits. Previous research has underscored positive e-book effects on learning student. Much more than that, they are a contemporary pedagogical tool offering an alternative to our traditional textbook and serving as audio-visual aid. The integration of AI simply gives a wide benefit to the learning experience by acting as a virtual teacher. This technological approach could save hundreds of billions a year for worldwide education, reducing economic burden up to 90% in some areas. There would be savings in paper, printing and storage and handling costs. And because there's no longer a physical cost to carrying textbooks, it makes sense that students who are already used their cell phones won't really care if they're being encouraged to bring them today.

Similarly, e-books offer practical advantages particularly flexibility and speed. For example, the touch interface of e-books may shorten completion times for multiple-choice questions compared to traditional pen and paper. Its digital format greatly enhances the speed at which you can take a test and your productivity in general. Yet, overexposure to e-book usage can lead to a few health hazards. The bank also confirmed members of the study suffered from symptoms including eye strain, headaches and disrupted sleeping patterns linked to the blue light emitting by screens. These issues may even impede on students' academic success and therefore,

whilst e-books are very practical their long term health effects also require to be carefully considered.

One worry was expressed that the dependence on digital gadgets is a lot. The worst part of it is that this dependency could lower the amount we walk on a daily basis, leading to bad postures and in turn obesity. Inability to touch an e-book, unlike the familiar experience of holding a book in hand while reading it could also result as factors affecting retention and comprehension. Students experiencing reading through texture where they fell the books in their hands are needed for that type of sensory input to take place; this can hold academic success back.

Moreover, the never-ending screens might result in digital eye strain which is uncomfortable and may lead to vision problems over time. This stress can reduce concentration of students and their academic performance. In addition, too much screen time interrupts your body's sleep cycles by affecting blue light that eventually suppresses melatonin secretion causing restlessness and poor cognitive capacity. These concerns can be addressed by finding the right screen time balance and taking measures to reduce eye strain & encourage a good night's sleep. In conclusion, although e-books provide many benefits in terms of accessibility and purchasing savings inclusive academic, also come with difficulties related to health and sensory involvement. These are areas for careful management to ensure that e-books fulfil their potential benefits while not impacting negatively upon student health or academic success.

Recommendations

Following the results of this study, it can be suggested that;

1. E-books Should Be Encouraged / Promoted at government level, in order to integrate e-books into the educational system successfully. The use of tablets must be provided to students in order to support them for this transition and also reduce the cost on paper printing. In addition, the schools must build a tablets library to ensure every student has access to digital learning resources. Well, this would not only improve the learning for our children but also be a heck of a cost saver in that part of our educational system.

2. Train educators in the use of digital textbooks and e-books. This training needs to include the mechanics of e-book use, how these digital resources can be embedded in curriculum and pedagogy as well as best practices for getting learners learning from books. Proper professional development will ensure educators are trained to make the most effective use of digital tools and have a solid understanding on how they can support their students in transitioning into new learning technologies.

3. A government organization should be established on the top level (state) to manage, assist and publish e-books. Such an organization would also help in coordinating the development of high quality and current digital educational contents, mapped against standards. Centralization of e-book publishing through the government would provide greater uniformity in digital learning materials by ensuring everyone has access to a public source.

4. The study further suggests that the slow writing speeds observed among Indian preschoolers could be addressed by promoting typing skills with age-appropriate computer keyboards. Studies should teach students how to type at an advanced level and quicker in digital environments. Through building strong typing skills, students will be able to complete digital exams as efficiently and effectively leading to an improved academic performance in the end.

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