

# Don't Throw Out Paper And Pens Yet: On The Reading Habits Of Students

Nitza Davidovitch, Ph.D., Ariel University, Israel

Roman Yavich, Ph.D., Ariel University, Israel

Eran Druckman, Ariel University, Israel

## ABSTRACT

*This paper focuses on students' reading habits — whether traditional reading habits (print books) or modern reading habits (using a computer screen). We review the changes in students' reading habits over time, as part of other global changes, and explore whether corresponding digital pedagogies have evolved to address these changes. We examine generation Y students' motivations and study habits, a generation that shows indications of changes in its academic values and priorities, and cracks in its research skills for a global world. We focus on a case study of the reading habits of students in one academic institution and discuss the implications of the findings for academic teaching and the academia's traditional role of training researchers.*

**Keywords:** Traditional Reading Habits; Modern Reading Habits; Global Changes

## ACADEMIC READING

### What Is The Reading List For?

A syllabus is the document that describes the contents of an academic course and is typically drafted by the course instructor. The syllabus is generally posted before the course begins or is distributed to students at the beginning of the course. A syllabus includes the course goals, the learning outcomes that the instructors seeks, the course requirements including required and additional reading for each course topic and lesson (CHE website).

The academic mission to train the future generation of researchers imposes a challenge on instructors to teach students research skills, which include research methods, statistics, computer applications, and academic reading and writing skills. The acquisition of students' reading habits has several aims:

1. To create a foundation for new research – Students must be familiar with previous research studies in their field to be able to conduct new research, map existing theories and analyze collected data. Students must be prepared to become involved in the goals of discovery and innovation.
2. Develop habits of learning, reasoning, and methodical work - Reading texts helps students improve the quality of their reasoning, promotes academic reasoning, and teaches students new principles and concepts that can be used to cope with the challenges of the global academic world (Parlette, 2010).
3. In some courses, reading texts is critical because instructors are unable to cover all the course material in the lessons, or in other cases, courses are designed such that students study the relatively simpler materials independently.

### What are the Features of Academic Reading?

1. Mandatory – Academic reading is an inseparable component of academic studies. Reading is mandatory and requires reading in English, which is a second language for most students in Israel.
2. Requires skills: vocabulary skills in various languages, familiarity with and understanding of existing theories.
3. Academic studies introduce students to a world of reasoning that differs from the world they were

- previously accustomed to – including issues such as citations, sources, intellectual property, innovation, and creativity.
4. Academic reading provides exposure to research skills: critical reasoning, organization, judgment, causal relations, objective analysis of research subjects, ethical principles.

### **What are Reading Habits?**

Reading habits have numerous definitions in the literature, with each study defining reading habits differently: (a) Reading habits are the manner in which an individual organizes his reading. Reading habits are acquired at an early age, between kindergarten and elementary school; (b) Acquisition of reading habits is a gradual process of learning letters, words, sentences, paragraphs, and complete texts (Parlette, 2010); (c) Researchers note that for reading to become a habit, reading must be encouraged. In practice, reading accompanies a child throughout her life, with the understanding that reading is a means for personal growth, it shapes the imagination, and plays a critical role that allows the individual to control language and play a role in society (Knoester, 2010); (d) A study of the reading habits of undergraduate freshmen found that participants were encouraged to read by their parents and their teachers (Parlette, 2010); (e) Chen (2006) identified indicators of reading habits including frequency of reading, volume of reading, and contents.

Reading habits accompany individuals as they progress in age, and also affect their academic life. Researchers found an association between students' reading habits and their demographic profiles, academic performance, and professional growth (Owusu-Acheaw, 2014). They also found several additional variables that affect reading habits:

1. Reading efficiency – Researchers found that students with higher reading efficiency do not read more than students with lower reading efficiency (Parlette, 2010). According to Parlette, reading for the sake of enjoyment is an important element in the development of a sense of self and students' ability to satisfy their strong need for enjoyment and relaxation in the transition from high school to university and adulthood.
2. It was found that high reading efficiency is consistent with more positive feelings about reading abilities (Owusu-Acheaw, 2014). Arguably, students who do not read willingly may be subject to negative effects on their academic performance.
3. Findings of a study in Bangladesh (Akanda, Hoq, & Hasan, 2013) indicate that reading is related to learning and learning leads to mental, professional, and human development in general. Annamalai & Maniandy (2013) described the reading habits and reading attitudes of a group of students at a Malaysian technical university and found that students who did not enjoy reading the course materials claimed that the texts were too difficult and caused reading anxiety, and that reading was boring and does not motivate them to study.

### **Obstacles to Academic Reading**

Almog & Almog (2016) have written extensively on students' study habits:

1. Time: For students to pass their courses with success, they must invest at least three hours a week in each course, but findings show that students invest less than expected of them; They consider reading "a luxury." Brief texts are popular ("It was too long - didn't read it"). Students feel that they don't have enough time to read, and reading is slow (Sheorey & Mokhtari, 1994).
2. Students lack text organization skills: Students' lack of text organization skills impedes significant learning, and might lead to a lack of self-realization and professionalism in the field of study (Pundak, Hershkovitz, & Shacham, 2010). There is a paucity of courses dedicated to writing skills. Students use ghost writers. Students have difficulties in comprehending and analyzing texts and find it difficult to articulate their thoughts, and writing requirements have become relaxed ("Circle the correct answer").
3. Lack of time management skills – When students enter the academia they are forced to cope with numerous requirements and must divide their time among their various academic assignments. Parlette (2010) found that students mainly read for reasons of usefulness. Students spend more time performing academic assignments than reading non-academic materials. In other words, when students read, they do so to pass their exams (Owusu-Acheaw, 2014).

4. Technological change – In the past, the textbook was the main study tool. Today, students have access to multiple study tools, and most courses are accompanied by course materials available on the institution's website, including articles, presentations, video clips, sample exams, etc. Computers have replaced books and students manage their entire lives on their computers.
5. Lack of reading experiences – Students are also assigned non-required reading, in addition to required reading (Deavers, 2000 in Owusu-Acheaw, 2014). Studies show that most students do not like to read for their own enjoyment, they prefer other pursuits such as watching television or surfing the Internet (Owusu-Acheaw, 2014; Sheorey & Mokhtari, 1994) or other things (Annamalai & Muniandy, 2013).
6. Lack of reading culture – A study in Pakistan (Dilshad, Adnan & Akram, 2013) found that female students have a more positive attitude to reading than do male students. Furthermore, female students read more because they enjoy reading and enjoy enhancing their knowledge. We can state that if a child's home has a culture of reading, there is a greater probability that the child will not abandon reading when he grows up. The home constitutes the child's role model for reading, and therefore if parents read and encourage their children to read from a young age, reading will become an integral part of their children's lives (Owusu-Acheaw, 2014).
7. A small percentage of students choose to read textbooks that teach other skills required for organizing and comprehending the ideas that emerge in the course of reading (organizing information, developing models, drawing conclusions, etc.).
8. There is an increase in the use of web-based sources for studies. There has been considerable development in electronic information sources but students still tend to rely on printed materials, and especially books and lesson summaries.

### **Technologies and the Tool Revolution**

The Internet affects many areas of life including reading habits. Akanda, Hoq, and Hasan (2013) found that students prefer to watch television; play games on computers, tablets, and X-box; and surf the web and social networks, rather than read. The change is significant and is affecting an entire generation that spends most of its time in front of a screen (Almog & Almog, 2016).

Web-based resources are the main sources used for study – and students generally do not apply any skills of discretion or judge the quality of the materials (Yaakov & Shor, 2010). In a study on reading habits by Pundak, Hershkovitz, and Shacham (2010), the authors note that students in basic science courses in colleges and universities rarely read their textbooks before the lectures. Students find it difficult to cope with their numerous academic assignments. This study showed that most students are not interested in using their textbooks to expand their knowledge of the theories that underlie their studies; Textbooks are used mainly to assist them in solving exercises and problems.

### **READING ON SCREEN VS. PAPER**

With the introduction of laptops and electronic information sources to the academic world, researchers have examined whether students prefer reading on screen or on paper, and found a clear preference for reading on paper. However, despite this preference, it is reasonable to assume that students will read academic literature on screen (Vandenhoeck, 2013). One study found that students reported that the main problem in reading was their lack of time (Leff & Harper, 2006). In view of these findings, students may prefer to read information that is readily available rather than to engage in a protracted search for academic texts in a library.

Attempts are being made to discover the underlying difference between studying on screen and studying from a printed text. The technological differences themselves are not the answer. Rather, readers activate different learning processes in both cases. Test performance was found to be poorer when students studied on screen compared to when they studied on paper. It seems that the effective management of the learning process and not the medium is what affects learning (Ackerman, 2012).

Palani's (2012) argument reflects a major concern that technology will take control of our lives and affect reading habits because people show little interest in any type of reading as a result of the influence of mass media. Students will not be able to expand their knowledge solely by reading books, science fiction, and magazines. A study conducted

at Ataturk University (Akarsu & Daryemez, 2014) found that students developed a certain level of reading habits, and that the Internet was the heart of students' reading activities. Since reading mainly included magazines, news, fashion, and sales, there is a need to maintain a balance between traditional reading and new technologies. In any case, students benefit from another advantage: According to a study by Owusu-Acheaw (2014), students who read non-academic materials including magazines and books, were able to relax.

As part of universities' technological developments and their desire to make digital study materials available to students, universities offer access to academic texts through their information systems. These systems are an efficient way for instructors to actively monitor their students' continuous learning process. It was found that low-SES students prefer to read on screen than to print out materials. Students who used ebooks were satisfied and noted that they would like more courses to offer materials on this new medium, and availability of such materials could even influence their choice of a field of study. Moreover, they were willing to pay \$200 to purchase the module that they tried (Simon, 2001).

In summary, technology has changed the nature of reading for the younger generation. Many students prefer to spend their leisure time watching television or surfing the Internet rather than reading books. The extensive information on the Internet also is a source of enjoyment for students, a source of global news, and a source of academic support. Digital resources help students by creating access to a complete domain that they wish to learn, and in a short time. In an attempt to examine whether the revolution of electronic tools has affected reading habits, we offer a picture of students' changing reading habits in one academic institution in Israel and their implications for higher education. In this study, we examine associations with students' gender, age, department, and previous education, and the implications of these findings.

Studies have found that a positive attitude toward reading evokes positive reading experiences. These positive attitudes are acquired through the support and encouragement of motivational factors that affect individuals throughout their lives, and potential encourage higher academic performance levels (Annamalai & Muniandy, 2013). However, even students who are not avid readers find the motivation required to study for exams and read all the required materials (Akanda, Hoq & Hasan, 2013). It was found that the reading abilities of high-performing students give them a better feeling about their own reading skills compared with other students (Sheorey & Mokhtari, 1994).

### **Digital Books in Higher Education – Does a Digital Pedagogy Exist?**

Ebooks (also known as electronic books, dynamic books, digital books, and talking books) have been part of the global publishing industry since the beginning of the twenty-first century. In contrast to print books, digital books contain both textual and visual information that can be read using a PC or laptop, tablet, smartphone or dedicated e-reader. Occasionally a digital book is the electronic equivalent of the print edition, but other times a digital version is independent. In the past decade, the gradual integration of digital books in Israel's publishing industry and in the reading habits of Israelis has accelerated. Although digital books still account for a marginal share of the country's book consumption, the trend is expanding. We review the media-culture-technological developments in this field in Israel in 2015. The data and assessments are based on the annual report *The Media in Israel 2015: Agendas, Uses, and Trends* (<http://goo.gl/KgSHT4>) and surveys of Israelis' reading habits conducted that year.

### **Main developments in 2015**

The main developments in the field of digital publishing in Israel in 2015 with implications for teaching include:

1. A considerable increase in ebook purchases, following a 250% increase in 2014. In 2014, 35% of all ebooks sold were new books, a much higher proportion than the percentage of new print books sold (<http://goo.gl/TWHl6X>).
2. Shift to ebook reading on smartphone devices, at the expense of reading on tablets or dedicated e-readers. Over the year, downloads of the Ivrit app (an ebook reader in Hebrew) increased by 441%. Smartphone screens became larger and more convenient for reading, and telephones are in users' hands during most hours of the day. Reading on smartphone devices is convenient and saves the need to carry a second electronic device (*Calcalist*, September 3, 2014). A division by age shows that smartphones are the

- platform of choice for reading ebooks for individuals between the ages of 18 and 54, while individuals over age 55 prefer to read on tablets (Goldenberg, 2015).
3. Expansion of the digital operations of major publishers that have been active in the digital book arena in recent years. Digital books accounted for approximately 3% of publishers' revenues in 2015.
  4. Increase in the number of traditional publishers that also sell digital editions. Even publishers that previously refrained from distributing digital books have gradually changed their approach. For example, in late 2015, Shoken Publishers was in the midst of preparations to distribute digital editions of its books. An initial 250 ebooks were offered for sale before all the publisher's books were made available in digital editions. Magnus Publishers (of the Hebrew University) focuses on reference books and since 2006 has made digital editions of 640 books available online or available for downloading as a PDF file. According to the publisher's figures, sales of digital books have increased significantly and in 2015 accounted for 25% of its sales (Sabar, 2015).
  5. Increased marketing efforts to increase public awareness. The Ivrit project and Bezeq jointly conducted an advertising campaign to promote their cloud services. The campaign focused on the opportunity to borrow ebooks on Ivrit's platform free for one year. The campaign included many billboards, advertisements on diverse media; tablets were distributed free by Gidi Gov to the passengers of an ELAL flight and the event was documented and broadcast on the Internet. The campaign was preceded by features posted on Ynet that were designed to increase awareness of ebooks, such as the feature entitled "It's time to dispel seven myths about reading ebooks" (Ynet, November 8, 2015). Small publishers in the ebook industry also took steps to raise awareness. For example, Segol Publishers announced an event that it called "Electronic Book Week" during which ebooks for adults and children were sold at a discount or distributed free. According to the publisher's CEO, the event was designed to encourage people who never experienced an ebook, to make the first step toward ebook use (Finkler, 2015).

### **The Transition to Digital Books: For and Against**

While many cultural fields including music, film, and television, have made considerable efforts to adopt digital technologies in recent decades, loyalty to the traditional print product remains strong in the publishing industry. In a survey conducted in Israel in 2015, respondents attributed their stated loyalty to print books to the following explanations: convenience (42%), likes the smell of books and the feel of a print book (23%), habit (20%), availability of books (9%), and the fact that books can also be read on the Sabbath [as opposed to electronic devices] (9%). Other arguments against a move to ebooks include the difficulty in coping with new technology, especially for older people; lack of uniformity in ebook formats prevents transferring an ebook to different devices; inability to transfer an ebook to another person when one has finished reading (Goldenberg, 2015). To address the latter argument, several ebook apps allow users to view a purchased book on 5-10 different electronic devices, for the reader's convenience and to allow access to other family members.

In contrast, ebook distributors and readers who prefer ebook editions offer a series of reasons that support the transition to digital technology (Bezeq, 2015): availability and convenience (34%), ability to read on tablets, smartphones, and dedicated ebook readers (11.5%), savings (10.7%). The ability to increase font size while reading is one of the important advantages of ebooks, especially for older adults or people who have a sight impairment.

### **EBook Security and Ethical Rules of EBook Use**

In view of the "freemium" culture that dominates many parts of the Internet, ebook publishers are concerned by information security issues surrounding their products. In this field, security is designed to prevent unauthorized sharing of digital books in the form of illegally copying and distributing "pirated" copies of books for free, which has been a familiar phenomenon in the music, film, and television industries for several decades.

For example, the following note appears on Indimedia's webstore: "Note that you have five downloads available. Other than those, distribution of a digital book without permission by the author or the published is a violation of the Copyright Law. This is a criminal offense. The books sold on Indibook are covertly imprinted with the buyer's name. Please protect these precious copy rights and avoid any personal unpleasantness." (<http://goo.gl/pFW7Yx>)

In Israel, as in other countries, there are two opposing camps on the issue of ebook security. One camp is populated by the majority of the traditional publishers and their managers, who wish to prevent any injury to copyrights and revenues. In the other camp are the majority of store owners who specialize in digital books and other activists that advocate citizens' digital rights, including the Israel Internet Association, which views security as an unfair and ineffective means.

A series of laws designed to protect copyrights in the digital age have been enacted all over the world, and internal treaties on this issue have been signed. In 2012, the Israeli Ministry of Justice drafted a bill that determines, among other things, that "No person shall circumvent technological means of defense that protect a locked work without the permission of the owner of the copyright of that work, if when committing the action, he knew or should have known that he is performing such circumvention and that such circumvention would lead to a violation of the copyright of the locked work" (<http://goo.gl/j9Borl>). Such bills are opposed by the Israel Internet Association (and others), which determined in 2005, during the preparation of an earlier version of this bill that "In the name of exalted principles of protection of the intellectual property of creators, technological schemes have come into this world, whose effectiveness is doubtful and which cause grave harm to users, creators, and universal values" ([http://www.isoc.org.il/docs/Israel\\_Internet\\_Association\\_\(ISOC-IL\)\\_Position\\_on\\_DRM.pdf](http://www.isoc.org.il/docs/Israel_Internet_Association_(ISOC-IL)_Position_on_DRM.pdf)).

A survey conducted in the UK indicates that the pirated use of digital books is much more limited than in other areas of culture and entertainment: 11% of respondents who use the Internet admit that they read a book illegally (without paying for it) at least once, compared to 25% who watched movies without paying for them and 26% who illegally listened to music without paying for it. In Israel there are no data on the pirated use of digital books, but the phenomenon appears to be very limited, according to estimates (<http://goo.gl/KgSHT4>).

### **Digital Books in Schools**

In recent years, digital textbooks and study materials have become an integral part of the content infrastructure of education systems worldwide. In Israel, the first classroom teaching experiment using tablets was conducted in 2011 and integration of digital books in the education system has expanded since then (Arad, 2012). Integration differs in scope by school. Some activities are based on the BYOD (bring your own device) format, which requires parents to purchase a laptop or tablet for their children's school activities, including digital books (Skope, 2015). The Ministry of Education defines the transition from the centuries-old print technology to information technology and the Internet as an opportunity to review existing paradigms and expand the diversity of features and abilities to make pedagogical materials available and study material available to students. Print books contained fixed content and allow readers to read texts and view images, but offer no interactivity or experience. In contrast, the eBook is dynamic and remains relevant over time, and makes available to students rich media that provide an interactive experience for learners. According to the Ministry of Education, eBook also have a health-related advantage, by reducing the load of books that children carry in their schoolbags, and an economic advantage, as the price of digital books is lower than the price of print books.

The Ministry operates the Educational Cloud website, that contains all the online services available to schools, including digital books (<http://sites.education.gov.il/cloud/home/Pages/default.aspx>). In 2015, the Ministry extended its activities in the field of ebooks, as part of its digital pedagogy approach, and in June that year published a comprehensive document entitled "Program for integrating digital pedagogy in meaningful learning" ([http://sites.education.gov.il/cloud/home/S\\_D/Documents/digital\\_books.pdf](http://sites.education.gov.il/cloud/home/S_D/Documents/digital_books.pdf)). According to the program, which was unveiled toward the 2015/6 school year, the goal is that all students in elementary and high school in grades 4 to 9 will study at least one subject using a digital book or online lessons, without purchasing a physical book. The Ministry of Education emphasizes the benefits of digital books, in contrast to print books, and the ability to constantly update digital books and adjust them to the ever-changing reality; they also offer the ability to adjust study procedures to the variability among students ([http://sites.education.gov.il/cloud/home/S\\_D/Documents/digital\\_books.pdf](http://sites.education.gov.il/cloud/home/S_D/Documents/digital_books.pdf)).

The Ministry defined three levels of technological standards for ebooks: level A — entry level, where ebooks include live text with basic functionality, retaining the familiar and original structure and content; level B - transition level, in which media resources and interactive exercises are added; and level C - also known as the "vision level," in which the book is a collection of content components operated by a learning management system (LMS). While levels A and

B retain the traditional structure of a print book — cover, chapters, paragraphs, etc. — the structure of the books in level C is different and can be completely customized by teachers for students using advanced learning management features ([http://sites.education.gov.il/cloud/home/S\\_D/Pages/maze\\_sfrim\\_digitaliim.aspx](http://sites.education.gov.il/cloud/home/S_D/Pages/maze_sfrim_digitaliim.aspx)). The Ministry of Education published a detailed standard for digital books to be adapted to each of these levels. In late 2015, the Ministry approved a catalogue of 436 digital textbooks of various levels and in the current school year, 430 schools elected to use level B textbooks, and 201 elected to use level C textbooks.

### **Digital Books in Tertiary Education**

Use of digital books and other online materials is more intense in tertiary education than in the general public, and digital books and materials are used extensively in teaching and research. A survey conducted in early 2015 at Tel Aviv University indicates that the virtual majority of students (over 90%) used at least one type of electronic resource in the previous year — electronic books, databases or journals). The more advanced the studies, the more extensive is the use of electronic books by students and faculty both. Most students tend to read electronic books directly on screen, using a computer, tablet or smartphone (58%), while others print the materials for reading. Most respondents (82% of students and 87% of faculty) noted the ability to download files to their personal devices as the most important advantage of digital resources, in addition to the text search tools and printing options. In this survey, 16% of students and 24% of faculty noted that the reading experience using electronic books is difficult, unpleasant, inconvenient, tiring, slow, and reduces concentration (Rozenblat-Porat & Cohen-Raz, 2015).

The most advanced academic institution in the use of digital books in curricula is the Open University. In the 2015/2016 academic year, students in 200 of the university's 700 courses also received digital editions of printed textbooks. The university has published three textbooks in a format that includes print and digital versions that also contain links to videos on the Internet (using QR codes). The university continues to publish print books, also in view of its findings that most students prefer print textbooks. Several years ago, the Open University reached an agreement with Google to add its textbooks to the Google Books project. According to the agreement, readers can access, at no cost, 30% of the contents of each of its textbooks. The project also refers readers to Lamda, which is the university's bookstore, where print books are available for purchase. In this manner, the Google Books project, which initially used books without permission in violation of copyrights, became an important marketing tool for the university's books.

Several major digital book projects have developed in Israel in recent years, including:

1. Ben Yehuda Project ([www.benyehuda.org/h\\_faq.html](http://www.benyehuda.org/h_faq.html)), which digitizes Hebrew literature masterpieces and concentrates them in a single website for the public, at no cost.
2. Kotar (<http://www.kotar.co.il/Misc/About.aspx>) is an online library for subscribers, which operates under the Center for Educational Technology, with books in many fields.
3. Peer (<http://openbooks.openu.ac.il/#!/about>) is the Open University's portal that offers free access to the public to the digital editions of dozens of academic textbooks and audio books, most of which are in Hebrew, including some in Russian, Arabic, and English.
4. Online Responsa Project ([www.responsa.co.il/home.he.aspx](http://www.responsa.co.il/home.he.aspx)) is an electronic collection of all types of religious Jewish sources.
5. Chabad Library – This is a project by the Chabad organization that contains over 50,000 scanned works of Torah literature and other Jewish books and historical essays ([www.chabadlibrarybooks.com](http://www.chabadlibrarybooks.com)).
6. The online book collection of the National Library — This project, designed to preserve the books over time, includes scanned copies of the Library's rare book collection, and offers free access to the public in and outside Israel (<http://web.nli.org.il/sites/NLI/Hebrew/library/services/Pages/digibook.aspx>).

In this study we examine whether and to what extent these digital book projects have influenced reading and study habits in Israel.

### **Findings of the 2014 Higher Education Survey (CBS, 2016)**

The 2013/2014 Higher Education Survey targeted students who had begun their undergraduate studies in universities, academic colleges, and teaching colleges (excluding the Open University, which has unique features such as unconditional admission to undergraduate programs). The survey examined improvements in reading skills as a result of academic studies. The sampling frame was 9,300 students who had begun undergraduate studies in universities and academic colleges in 2012/2013. The response rate for the complete questionnaire was 79.1%; 1/7% submitted incomplete questionnaires and 19.2% did not complete the questionnaire. The main findings of the survey were:

1. Less than half of the students improved their written and oral skills of expression. Most students (62.3%) did not improve their command of English. Most students (59%) did not improve their research skills.
2. The technological differences are unable to account the differences between onscreen study and study using a print text. Readers use a different study process in each case. Findings indicate that it is not the medium itself that affects learning, but rather the efficient management of the learning

### **AIM OF THE STUDY AND METHOD**

#### **Research Questions**

1. What study habits do students have (digital, print)? What are the sources of influence on students' study habits (parents, instructors, teachers)? What languages do students master? What are students' expectations of teaching methods and how much time to they spend using each study tool?
2. To what extent are study habits (digital. Print) related to demographic background (gender, age), previous schools record, and faculty (architecture and engineering, social sciences and humanities, natural sciences, and engineering)?
3. To what extent to parents, teachers, instructors, and friends affect students' study habits (digital, print)?
4. To what extent is the language students' used to search for information (English, Russian, or Hebrew) related to their study habits (digital, print)?
5. What are students' expectations about their future study habits (digital, print) and means of evaluation (exams; digital, print)?
6. What are students' attitudes on their ability to locate study materials in information searches (using digital or print resources)?
7. Is there a connection between ownership of a laptop, PC, tablet, telephone or other device and students' onscreen and print reading scores?
8. Can we identify onscreen and print learners based on their demographic profiles, attitudes, time, etc.?

#### **Participants**

In this study, 242 students participated, 130 females (53.72%) and 112 males (46.28%). Approximately one half of the participants were between age 18 and 24; 41% were between age 25 and 29, and the remainder were age 30 or over. One half of the students are enrolled in the Faculty of Social Sciences and Humanities, 20% in Natural Sciences, 12% in Engineering, 11% in Architecture, and the remainder in the Faculty of Health Sciences. Of the participants, 47% attended public high schools, 39% attended religious high schools, and the remainder attended other educational settings. Thirty-two percent of the students own a PC. 73% own a laptop, 20% own a tablet, 79% own a smartphone, and 1% own another device.

#### **Findings**

The first research question concerns students' onscreen and print study habits, the sources that influence their studies (parents, teachers, instructors, and friends), their primary search language, their expectations of teaching methods, and the time they devote to their studies (and to use of the study tools).

To examine whether the items in the study habit questionnaire can be divided into various domains, we performed factor analysis. Two factors emerged as explaining 46.5% of the variance: digital study style and print study style.



**Table 1.** Factor loadings for the two factors

Item	Factor 1	Factor 2
(4) I believe that the computer is a reliable source for academic assignments	.74	.02
(15) A combination of technologies and the Internet is essential in the learning process	.72	.02
(3) Customary do exercises/assignments directly on the computer	.72	.08
(14) An online lesson is better than studying in the classroom at the university/college.	.60	.37
(1) I usually work in the library alone.	.20	.69
(13) Agreement with the fact that social networks have an adverse impact on academic achievements	-.02	.68
(12) I can study successfully without the help of the Internet.	-.18	.66
(2) Usually I am in the library with friends	.32	.52
(9) I use books to help me solve exercises.	.26	.46

Table 1 indicates that the first factor comprises items associated with digital study style, internal reliability of  $\alpha = .68$ . The second factor comprises five items that represent print study style, with internal reliability of  $\alpha = .61$ . In view of these findings, two scores were calculated for each participant using a mean of the scores of the constituent items in each factor. Table presents the descriptive statistics for the study variables.

**Table 2.** Descriptive statistics

Variable	Measure	M	SD
Study style	Print	2.92	0.82
	Digital	3.54	0.81
Reading habits	Reads study material on screen	3.48	1.18
	Reads study materials after printing them	3.37	1.30
	Tends to read literature	2.93	1.37
	Reads newspapers daily	2.71	1.28
	Prefers watching television or video over reading	3.33	1.14
Factors influencing literary taste	Parents	3.28	1.26
	Teachers at school	2.84	1.33
	Instructors at university	3.21	1.37
	Friends and acquaintances	3.02	1.45
What devices would you like to use to read in the future	PC	2.05	1.36
	Laptop	2.36	1.38
	Smartphone	2.81	1.45
	Ordinary mobile phone	3.74	1.08
	Sony Reader, Kindle, PSP, Nintendo	2.65	1.27
	Tablet	3.53	1.24
Most of the study materials are available in electronic format	Yes and it's very rare not to find them.	1.62	1.31
	No, that is the reason to use paper	4.31	1.00
Language used in search queries	English	3.01	1.40
	Russian	2.81	1.34
	Hebrew	3.94	1.11
Preferred evaluation method	Digital exams	2.92	0.82
	Open-ended exams	3.54	0.81
	Closed exams (multiple choice questions)	3.48	1.18

The second study question concerns the association between study habits (onscreen v. paper) and demographic profile (gender, age), previous school (high school), and faculty (architecture and engineering, social sciences and humanities, natural sciences and engineering). To examine whether demographic profile (gender, age), previous school (high school), and faculty (architecture and engineering, social sciences and humanities, natural sciences and engineering) are related to the frequency of use of onscreen vs. paper materials, we performed four one-way MANOVAs (Table 4) and found a significant correlation between gender,  $F(2, 239) = 3.06, p < .05, \eta^2 = .02$ , and faculty,  $F(6, 476) = 7.72, p < .001, \eta^2 = .089$ , and between frequency of use of onscreen and print materials. No correlation was found between age,  $F(2, 239) = 1.38, p > .05, \eta^2 = .011$ , and school,  $F(4, 478) = 1.21, p > .05, \eta^2 = .010$ , and between frequency of use of onscreen and print materials. Table 3 presents the findings of a one-way ANOVA performed on each of the

dependent variables that were found to be significant (gender and faculty), and the descriptive statistics only for non-significant findings (gender and school).

**Table 3.** Findings of analysis of variance for differences in frequency of use of onscreen and print for study

Variable		N	Print score				Onscreen score			
			M	SD	F	$\eta^2$	M	SD	F	$\eta^2$
Gender	Female	130	2.91	0.86	0.01	.000	3.43	0.85	5.59*	.023
	Male	112	2.92	0.78			3.67	0.75		
Faculty	Architecture & engineering	56	2.51	0.66	8.99***	0.102	3.28	0.75	8.09***	.093
	Social sciences & humanities	121	3.14	0.92			3.58	0.81		
	Natural sciences	48	2.90	0.63			3.92	0.72		
	Health sciences	17	2.67	0.35			3.06	0.82		
Age	18-24	127	2.89	0.75			3.61	0.79		
	25+	115	2.95	0.82			3.47	0.84		
High school	Public	114	2.81	0.82			3.45	0.83		
	Religious public	94	3.03	0.80			3.61	0.78		
	Other	34	2.96	0.85			3.64	0.83		

\*  $p < .05$  \*\*\*  $p < .001$

Findings show that males use print materials more frequently than women. No differences in frequency of use were found by gender with respect to onscreen materials.

Furthermore, differences in onscreen and paper study were found by faculty. Using Scheffé's method to identify the source of the significant effects in the findings, we found that paper study scores of students in the faculties of social sciences and humanities were higher than those of students in architecture and engineering ( $p < .001$ ) or natural sciences ( $p < .10$ , borderline significance). We also found that onscreen study scores of students of natural sciences are higher than students in architecture and engineering ( $p < .001$ ), health sciences ( $p < .01$ ), and social sciences and humanities ( $p < .10$ , borderline significance). We also found that social sciences and humanities students use digital learning sources more frequently than students in health sciences ( $p < .10$ , borderline significance).

The third research question concerns the influence of parents, teachers, instructors, and friends on students' paper and onscreen study habits. To examine correlations between the influence of parents, teachers, instructors, and materials, we calculated Pearson correlations (Table 4).

**Table 4.** Pearson correlations between factors affecting literary taste and frequency of use of onscreen and paper study materials

	Paper score	Onscreen score
Parents	.21***	.06
School teachers	.49***	.16*
University instructors	.48***	.17**
Friends and acquaintances	.22***	.21**

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

We found that all the correlations examined were positive and significant, with the exception of the correlation between parents and frequency of use of onscreen materials. In other words, the stronger parents' influence on students' literary taste, the more frequently the students' use onscreen study materials. We also found that as the influence of school teachers and university instructors and friend's increases, the frequency of use of onscreen study materials also increases.

To examine the correlation between search language and the use of onscreen and paper study materials, we calculated Pearson correlations (Table 5).

**Table 5.** Pearson correlations between search language and frequency of use of on screen paper study materials.

	Paper score	Onscreen score
English	.19**	.25***
Russian	.62***	.24***
Hebrew	.05	-.12#

\*  $p < .10$  \*\*  $p < .05$  \*\*\*  $p < .001$

We found positive correlations between the use of English and Russian as search languages and students’ frequency of use of on screen study materials. In other words, as the use of English and Russian as the search language increases, the frequency of use of on screen study materials increases. Furthermore, we found a correlation between search language and on screen and print reading habits: Participants who use Hebrew and English as a search language also use on screen materials more frequently while participants who use Russian as a search language use print materials more frequently.

Research question 5 addressed the association between students’ desire to use an e-reading device in the future and students’ frequency of use of on screen and paper study materials. To examine this question, we calculated Pearson correlations (Table 6).

**Table 6.** Pearson correlations between students’ desire to use an electronic device to study in the future and students’ frequency of use of on screen and paper study materials.

	<b>Paper score</b>	<b>Onscreen score</b>
PC	.32 <sup>***</sup>	.36 <sup>***</sup>
Laptop	.29 <sup>***</sup>	.40 <sup>***</sup>
Smartphone	.30 <sup>***</sup>	.34 <sup>***</sup>
Ordinary mobile phone	.52 <sup>***</sup>	.22 <sup>**</sup>
Sony Reader, Kindle, PSP, Ninetendo	.46 <sup>***</sup>	.25 <sup>***</sup>
Tablet	.36 <sup>***</sup>	.40 <sup>***</sup>

\*\*  $p < .01$  \*\*\*  $p < .001$   
 \*  $p < .10$  \*\*  $p < .05$  \*\*\*  $p < .001$

We found that all correlations were positive and significant. In other words, the greater students’ desire to use an electronic device for studying in the future, the more frequently students use on screen study materials in the present. Pearson correlations were also calculated to examine the association between students’ preferred mode of evaluation and their frequency of use of on screen and paper study materials (Table 7).

**Table 7.** Pearson correlations of students’ preferred mode of evaluation and their frequency of use of on screen and paper study materials

	<b>Paper score</b>	<b>Onscreen score</b>
Digital exams	.35 <sup>***</sup>	.47 <sup>***</sup>
Open exams (open-ended questions)	.48 <sup>***</sup>	.24 <sup>***</sup>
Closed exams (multiple choice questions)	.03	.06

\*\*\*  $p < .001$

Positive correlations were found between students’ preferences for digital and open-ended exams and the frequency of use of on screen and paper study materials: The stronger students’ preferences for digital and open-ended modes of evaluations, the higher their frequency of use of paper and on screen study materials. No correlations were found between students’ preferences for multiple-choice questions and their frequency of use of on screen and paper study materials.

We may state that students who tend to use their computer more frequently for their studies have a higher digital orientation and therefore prefer to take digital exams, while students who use digital study sources more infrequently prefer to be evaluated using print materials rather than on screen materials

We calculated Pearson correlations to examine associations between students’ attitudes toward information searchers and their use of on screen and paper study materials (Table 8).

**Table 8.** Pearson correlations of students’ attitudes on the availability of information and their use of on screen and paper study materials

	<b>Paper score</b>	<b>Onscreen score</b>
Information is available	.09	.20 <sup>**</sup>
Information is not available	.41 <sup>***</sup>	.09

\*\*  $p < .01$  \*\*\*  $p < .001$

We found a positive correlation between student’s positive attitudes about the potential to locate most of the study materials in electronic format and their use of digital materials. The stronger students’ beliefs that study materials are available in electronic format, the more frequently they use on screen study materials. We also found a positive correlation between the opposite attitude (most study materials are not available in electronic form) and students’ use of print materials: Students who believe that study materials are not available in electronic format tend to use print sources more frequently.

To examine for associations between ownership of a PC, laptop, tablet, or mobile phone and use of paper and on screen study materials, we performed four multivariate analyses of variance (Table 10). We found a significant association between laptop ownership,  $F(2, 239) = 17.54, p < .001, \eta^2 = .128$ , and use of on screen and paper materials, although no associations were found between PC ownership,  $F(2, 239) = 0.02, p > .05, \eta^2 = .000$ , tablet ownership,  $F(2, 239) = 1.09, p > .05, \eta^2 = .009$ , or mobile phone ownership,  $F(2, 239) = 0.47, p > .05, \eta^2 = .004$ , and use of on screen and paper materials. Table 10 presents the findings of the one-way ANOVA performed on each of the dependent variables with significant associations (ownership of laptop), and descriptive statistics only for non-significant associations (ownership of PC, tablet, and mobile phone).

**Table 9.** Results of MANOVAs on differences in use of on screen and paper study materials by device ownership

Device	Ownership	N	Paper score				On screen score			
			M	SD	F	$\eta^2$	M	SD	F	$\eta^2$
Laptop	No	66	3.39	0.94	34.07***	0.124	3.77	0.85	7.50**	.030
	Yes	176	2.74	0.69			3.46	0.78		
PC	No	164	2.92	0.84			3.54	0.81		
	Yes	78	2.91	0.79			3.55	0.83		
Tablet	No	194	2.89	0.80			3.51	0.76		
	Yes	48	3.02	0.91			3.69	1.00		
Mobile phone	No	52	2.93	0.76			3.46	0.61		
	Yes	190	2.91	0.84			3.57	0.86		

\*\*  $p < .01$  \*\*\*  $p < .001$

Contrary to our expectations, we found that students who own a laptop use paper and on screen learning materials less frequently compared to students who own a laptop.

We examined whether we can predict students’ paper and on screen study habits from their demographic profiles, attitudes, time devoted, etc. To identify the variables that predict the different learning styles (on screen or paper), we performed two hierarchical regressions, one for each study style. In the first step we entered demographic variables (gender and age) and in the second step we entered the remaining study variables, including the interaction between gender and faculty, in a step-wise procedure. To add the categorical variables (gender, age, and faculty), we created the following dummy variables males (female = 0); age 25+ (18-24 = 0); architecture and engineering, natural sciences, and health sciences (social sciences and humanities = 0) (Table 10).

**Table 10.** Results of hierarchical regression to predict on screen or paper study based on demographic variables and study variables

Paper study style (N=242)			On screen study style (N=242)		
Predictor	$\beta$	R <sup>2</sup>	Predictor	$\beta$	R <sup>2</sup>
Fixed		.56***	Fixed		.39***
Male	0.14**		Male	.14**	
Age 25+	-.04		Age 25+	-.17**	
Search language Russian	.35***		Digital exams	.31***	
Open-ended exams	.20***		Laptop	.18**	
Architecture and engineering	-0.17***		Tablet	.19**	
Ordinary mobile phone	.14*		Health sciences	-.15**	
Hebrew language	.14**		Friends and acquaintances	.12*	
PC ownership	.12*				
English language	.10*				
School teachers	.12*				

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

**Note:** The final model for each regression analysis is reported. Dummy variables: male (female), age 25+ (age 18-24), architecture and engineering, natural sciences, and health sciences (social sciences and humanities).

We found that the model explained 56% of the variance in print study style,  $F(10, 231) = 29.07, p < .001$ . The most significant predictor is the use of Russian as the search language (reflecting country of birth), such that the more Russian is used as the search language, the use of digital study materials increases. Furthermore, positive associations were found between students' preferences for open-ended exams, use of English and Hebrew as search languages, school teachers' influence on students' literary taste, and students' desire to use devices such as PCs and ordinary mobile phones to read in the future, and students' use of print study materials. We also found that the variables female and students of architecture and engineering predict lower use of print study materials.

According to the second regression analysis, the model explained 39% of the variance in the use of on screen study materials,  $F(7, 234) = 21.54, p < .001$ . The most significant variable predicting study style is students' preference for digital exams, such that the stronger students' preferences for digital exams, the greater their use of on screen study materials. Additional positive associations were found between students' desire to use devices such as tablet and laptops to read in the future, the influence of friends and acquaintances on their literary taste, and students' use of on screen study materials. We also found that the variables female, students of health sciences and age 25 and over predict less use of on screen study materials.

In summary, the aim of this study is to examine whether it is possible to predict on screen and print study styles from students' demographic profiles (age, gender, religiosity) and academic profiles (field of studies, use of digital devices) and attitudes toward the learning process. In this study we examined whether it is possible to characterize on screen and print learners in view of their demographic and academic profiles.

In sum, fifty-six percent of the variance in the paper-based study style can be explained by the most significant predictor of this style, which was the use of Russian as a search language (a variable related to country of birth). In contrast, as the use of Hebrew as a search language increases, the use of on screen study also increases. Furthermore, the most important predictors of the paper-based study style was gender, and age (males between the ages of 18 and 24), and the influence of friends and acquaintances. Furthermore, the stronger the parental influence on participants' literary taste, the more frequently participants use a paper-based study style.

Differences were found in on screen and paper study styles by faculty: Students in the social sciences and humanities faculty use paper-based studying more frequently than students in architecture and engineering and the natural sciences. Students in the natural sciences use on screen study materials more frequently than students in architecture and engineering, health sciences, or students in the social sciences and humanities. Students in the social sciences and humanities use on screen study resources more frequently than students in health sciences.

## **DISCUSSION**

The literature review and the qualitative findings of this study indicate that it is not time to throw away paper-based study resources. This fact poses a challenge for the academia, specifically the challenge of teaching reading and research skills while addressing research literature and the innovations of previous researchers. Nonetheless, the findings of this study point to developments in digital reading and students' changing study habits: Most prefer to read on screen rather than print articles. The question is whether their instructors are aware of these preferences? Do students' current habits have an impact on course planning, including course goals, methods, and modes of evaluation?

Instructors, who are teaching students how to deal with an overwhelming world of information, should reinforce students' disciplinary reading skills. It is in such a world characterized by access to overwhelming quantities of information that critical academic reading and writing (skills of evaluation and judgment) must be strengthened. Instructors must raise students' awareness of ethical principles concerning intellectual property rights and rules of citation, Instructors should encourage students to maintain a balance between traditional modes of reading and new technologies, yet make academic materials available on institutions' information systems. These systems are effective means to maintain an active continuum of learning for instructors and students.

We remain to face the challenges of reading quality and excellence in the academia, which are an inseparable part of academic teaching and the academic experience. The challenge of academic discussions on academic texts is the challenge of creating an intellectual experience and developing pedagogy that uses innovation yet relies on tradition,

as one of the greatest Jewish thinkers the late Rabbi Kook said, “the old will become new, and the new will become sanctified” (cited in Letters of Rabbi Avraham Isaac Hacoen by Rabbi Kook).

### AUTHOR BIOGRAPHIES

**Nitza Davidovitch** heads the Ariel University Center’s Unit of Academic Assessment and Development, heads The Israeli Consortium of Faculty Development Centers, and has been intensely involved in Holocaust memorial projects for many years. Areas of interest include: academic curriculum development; development of academic instruction; Holocaust awareness and Jewish identity; director of student exchange programs with Germany and Poland; preservation of the heritage of Jewish sects; and moral education. E-mail: [d.nitza@ariel.ac.il](mailto:d.nitza@ariel.ac.il) (contact author)

**Roman Yavich** specializes in informatics. He deals with the use of the Internet technologies in educational process. Dr. Yavich is the author of technical support concept in the Internet MathOlympiad organization. Responsible for Computing Systems Support of the Faculty of Natural Sciences, Ariel University. Member of the Steering Committee of the Israel Mathematical Olympiad (on behalf of the Ministry of Education). Areas of interest include: Distance Education, ELearning, Networked, Education, Pedagogy.

**Eran Druckman**, Ariel University, Israel.

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