e-Books
for research &
knowledge creation !

Atul Chandra

Senior Lecturer

School of Accounting, Finance & Economics

Faculty of Business & Law

Abstract

New opportunities and challenges of the digital age are creating a paradigm shift in research, teaching and learning. As a result, the traditional education model based on the printed book, is radically being transformed. There is now an opportunity to convert the existing "educational factories" into future "educational laboratories", by exploiting constructivist methodologies. For maximum impact, it is imperative that the rapidly evolving digital technologies, such as e-Books enable academic research and education in a constructivist way.   `

In order to evaluate the digital needs of academia, the definition of digital natives and digital immigrants have been expanded to introduce the concepts of e-Citizen, digital appetite and multi-dimensional e-Citizen framework. It is expected that e-Citizens with higher digital appetite within the e-Citizen framework will embrace e-Books more readily. e-books are not just books as information repositories in electronic form, but are actually multi-functional learning objects. In the future, e-Books on the web will become a powerful electronic platform to conduct collaborative research and impart education.

The initiatives which were taken to embed e-Books in the teaching curriculum of two post graduate units arose, as a constructivist approach was taken, so that students could create their own knowledge during the learning process. For this purpose, e-Books were either included in the publisher's companion website containing interactive e-resources or they were downloadable on computers.

A survey was undertaken to investigate the acceptance and usability levels of the embedded e-Books in these post-graduate programs. As expected, the digital natives embraced it enthusiastically using its powerful features and have been keen to adapt the new advancements. In contrast, digital immigrants appreciated the e-Book capabilities, but still preferred the printed book. The result from this survey and the world-wide research which has been conducted, shows that although the uptake of e-Books has been initially slow, but they are rapidly gaining popularity. Academia is already harnessing the power of e-book for its random access, portability, replication, book-marking, highlighting and many other multi-faceted capabilities.

The future of e-Books is even more promising for researchers, teachers and students to create real-time knowledge with advanced collaborative and real-time technologies, such as wiki-books and mobiles. It is a constructivist educator's dream to have electronic tools where knowledge can effectively and efficiently be extracted, mixed and customised for an individual or collaborative team. As a result, integration in research, teaching and learning can be conducted anytime and anywhere. An on-going study will be implemented to investigate and monitor the usability of e-Books in some post-graduate and under-graduate programs, especially using mobile platforms, such as i-Pads.

Keywords: digital appetites, e-books, e-citizens, e-learning, digital natives, digital immigrants, e-residents, e-visitors, digital in-exile, multi-dimensional e-Citizen framework.

By Atul Chandra,   School of Accounting Finance and Economics, Faculty of Business & Law, ECU

It has been two years, since the initiative of embedding e-Books in the teaching curriculum for the two post-graduate units, Auditing and Accounting for Managerial Decision-making was commenced. During this period, contemporary literature, research and experiences around the world related to the following vital questions were studied:

- What has been the best practice in education?
- What are e-books?
- What has been the role of the printed book?
- What is the current state of education using digital technologies?
- Who are e-Citizens and what are their digital appetites for education using digital technologies?
- What are the changes taking place in digital technologies which will impact the future of education?
- How can digital technologies and digital appetites of participants be matched to maximize educational outcomes?
- What is their effect on e-Citizens, how can their utility be maximized and what future is envisioned for them?
- How will advanced mobile technologies be integrated with the education system?

The survey results from investigating the acceptance and usability levels of e-Books in the post graduate programs are discussed on page 7. The foresight gained into the future of e-Books as valuable tools for constructivist approach to knowledge creation is also discussed. Constructivism is about each student appropriating and constructing their own knowledge with their personal version of the instructional events. (Fetherston, 2006).

For thousands of years, the scroll was the written medium of instruction. The "gurus" being the learned educators had a "constructivist" approach to teaching, as students created their own scroll by documenting their experiences as they were learning. There was no "standard printed book" to be read, memorized and repeated. However, the scroll had several shortcomings:

- Sequential access to information was time consuming as it had to be physically scanned through till the information was found.
- Replication was difficult, as the whole scroll had to be re-written by hand, with no guarantee that it would be identical to the original.
- Readability and portability was cumbersome, as it was physically difficult to read, especially when the reader was in motion.

In the guru era, there was a close bond between the learned educator imparting wisdom to their students, who were creating knowledge from their individual experiences, and recording them on the scroll. Constructivist education was practical, contextual and required continual practice to master the subject. At that time, education was restricted to few people, the world existing in silos, with severe limitations on sharing and movement of knowledge.
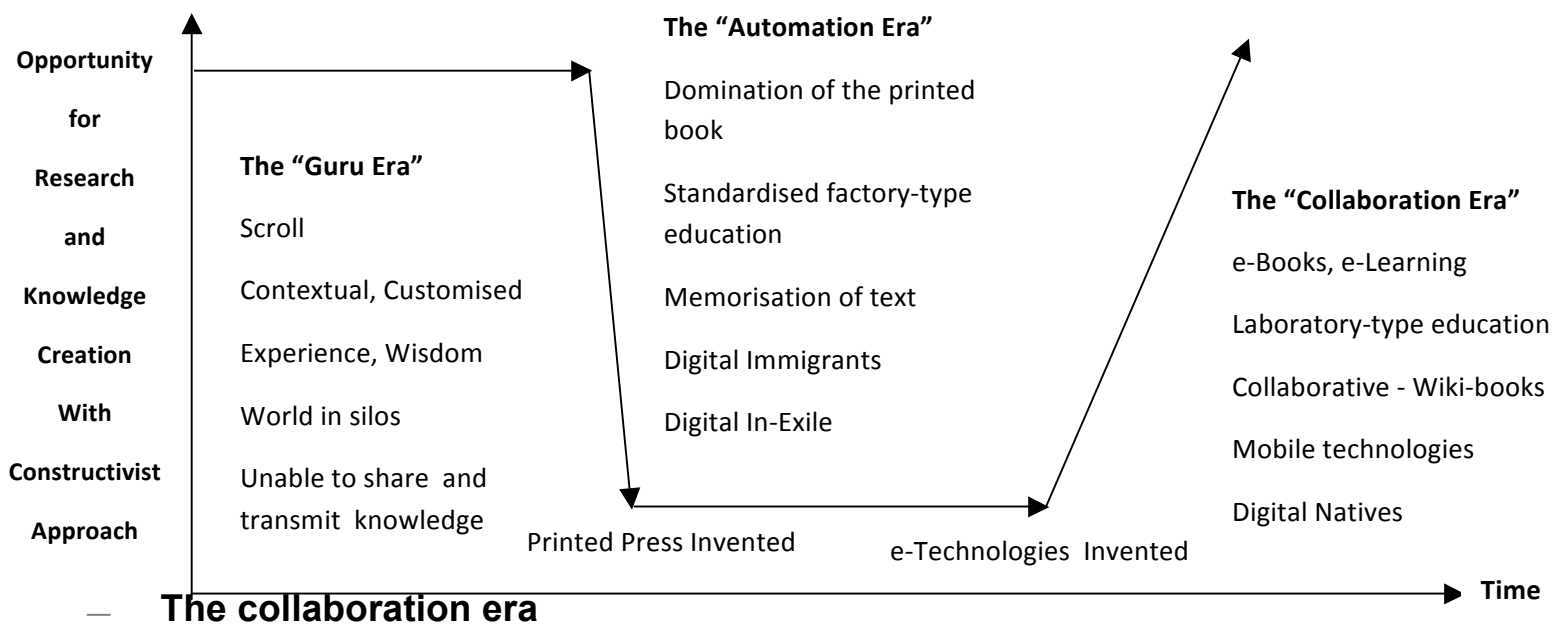
The automation era

e-Books for research and knowledge creation !

The invention of the printing press by Gutenberg in 1439, overcame the scroll's shortcomings of accessibility, replication, readability, portability and resulted in revolutionising the education process. For the first time in human history, information could be accessed randomly by flipping pages; endless replication and distribution of the original manuscript; and making reading portable by holding the printed book in one hand when in motion. It became an efficient medium to spread "standardised" knowledge across the globe with astronomical number of books filling up the library vaults. However, it created another challenge as to how the required information will be accessed from sifting through masses of books. It was then that catalogues, indexes and bibliographies were introduced.

With all the kudos for the printed book, it struck a major blow to the heart of the "gurus constructivist approach" to teaching and learning. As standardised knowledge was available from the printed book, the centuries old constructivist approach of individualised contextual education was forgotten. It became a wedge between the learned educator and the student, thereby separating the close bond between them. As a result, the learned educators just became map providers for students to navigate through these printed books. It overshadowed the learned educator, to the extent that students believed that the printed book was more accurate than their educator (Rankin 2010).

The impact of this standardised approach to education was that students had to memorise and carry maximum amount of information in their heads, so that they could sort through the printed books quicker and reproduce verbatim in examinations. Printed books became information sources to innumerable students, creating a standardised "education factory", where all students conformed and hoped to end up with identical skills. Knowledge was no longer reserved for the few and privileged.

In the end, the contextual research and knowledge creation using constructivist approach of customised teaching and learning from the "guru era", disappeared.

The "Automation Era"

Domination of the printed book

Standardised factory-type education

Memorisation of text

Digital Immigrants

Digital In-Exile

The "Guru Era"

Scroll

Contextual, Customised

Experience, Wisdom

World in silos

Unable to share and transmit knowledge

The "Collaboration Era"

e-Books, e-Learning

Laboratory-type education

Collaborative - Wiki-books

Mobile technologies

Digital Natives

Opportunity for Research and Knowledge Creation With Constructivist Approach

Printed Press Invented

e-Technologies Invented

Time

— **The collaboration era**

By Atul Chandra, School of Accounting Finance and Economics, Faculty of Business & Law, ECU

The dawn of the digital era since 1980's has resulted in providing electronic platform for collaborative research and education. Since the last couple of years, there has especially been a resurrection of the constructivist approach to contextual teaching and learning by the use of digital technologies, such as e-Books.

In order to evaluate the impact of the digital age on academia, the various participants, namely, digital natives, digital immigrants and digital in-exiles need to be identified.The term digital native is a person who was born in the eighties and consequently been raised and immersed in digital surroundings all their life. According to Dr Bruce D Perry of Baylor College of Medicine, it is very likely that as a result of being born and grown in the electronic world, the brains of the new generation have physically changed and are different from the earlier generations. As a result, the digital natives are fluent in using the digital language of computers, video games, internet and all other electronic media. Neuro-scientists are researching to find out how the brain actually changes and behaves like plastic, in response to external environment.

Thus, digital natives have different ways of finding out and processing information by consuming information in fast and random bursts. They intuitively know that all information is linked and extensively use google, blogs, tweets and wikis as their "go to" sources. They like to network and multi-task. These distinctions and consequences go much deeper than it was suspected or realised by educators (Prensky 2001a, 2001b).

It has been confirmed that digital natives want to learn in an interactive mode rather than in a broadcast mode (Tapscott 1998). For these reasons, guidance on many digital issues including the impact on teaching and learning is available (Palfrey 2008). It is therefore consequential that digital natives are keen to embrace the constructivist's approach to teaching and learning.

An e-Citizen who is not a digital native, but belongs to an earlier generation may be a digital immigrant. Although a digital immigrant was not born into this digital world, but is working with digital technology. Just like those who learn another language later in life, digital immigrants retain their accent because they still have one foot in the past. Typically, they instinctively immerse themselves in a topic and spend hours digging out the important bits. Thus, the accent of the older generation from the pre-digital world makes communication with digital natives difficult (Prensky 2001a).

A digital in-exile is disconnected from digital technology and therefore does not qualify to be a e-Citizen.

Thus, the definition of e-Citizen includes digital native, digital immigrant, digital resident, digital visitor but excludes digital in-exile.

Multi-dimensional e-Citizens model

The view that human brain does not change after the age of 3, which the educators have grown up with, is being challenged. There is a widely held theory of "neuro-plasticity" which suggests that as the brain is plastic, it changes itself throughout life in response to

changes in its environment (Doidge 2008). This means that evaluating the digital appetite of an e-Citizen just based on the birth date, is not sufficient. Identifying the profile of e-Citizen participants is crucial for designing the best suited technological tools for an engaging experience (Kennedy 2008). Thus, a multi-dimensional e-Citizen framework was developed containing at least four dimensions:

1. When was the e-Citizen born to identify whether a person is a digital native, digital immigrant or digital in-exile.

2. What is the level of digital media acceptance by the e-Citizen, ranging from nil to high?

3. What is the depth of technological immersion by e-Citizen, ranging from an occasional digital visitor to a permanent digital resident, as explained below:

  - Digital visitor is an e-Citizen who uses the web as a tool. The web is used only when required and not totally dependent upon it.

  - Digital resident is an e-Citizen who lives a virtual life on the web with their professional and social networks existing mostly online.

  4. What is e-Citizen's desirability to research and create knowledge ranging from low to high?

To expand the evaluation criteria, other dimensions can be added to this multi-dimensional e-Citizens model.

e-Book features

The basic e-Book is in file format containing the text of a book for easy reading on a PC screen, a laptop, a personal digital assistant (PDA) or a reader. The e-Book embedded in the post-graduate curriculum has advanced interactive features, such as:

  - Highlighting
  - Note Creation
  - Copy and paste
  - Portable
  - Bookmarking
  - Eco-friendly
  - Re-sizing text
  - High powered search

Depending upon the publisher's design, there are two types of e-Books which are being used, one which are downloadable on the computer and the other, which can be accessed on the publisher's companion e-Learning web-site. The latter approach of integrating the e-Book with a companion eLearning website as a single e-resource has been recommended.(Mazza 2008).

e-Books for research and knowledge creation !

The e-Book market can been categorised based on user-oriented features and librarian-oriented features. The user-oriented features cover bookmarking, highlighting, note-taking and annotating.(Vasileiou 2008).

However, there has been considerable confusion over the use of the term e-Book, especially the misleading impression of inseparability of content and hardware (Armstrong 2008).

Pros and Cons of e-Books
The salient features and advantages of e-Books over printed books are:

- Published usually in many different formats including PDF format.
- Available on websites.
- Require a software for reading.
- Security settings which can prevent or limit printing, copying, and specify how many devices they can be installed.
- Original quality printing of any page
- Lighter and take up no physical space compared to printed books.
- Less costly than paper books
- Instantly available worldwide by downloading from web instead of waiting delivery by snail mail.
- Full text search available on e-Books databases by specific phrase or key word
- Never go out of print.
- Authors can self publish and distribute their books inexpensively
- Virtual library can be created.
- Environmentally friendly by saving trees and pollution reduction
- Reference material can easily be updated.
- Libraries can loan by setting a time period in which it may be read

Based on worldwide research which has been conducted, summarised below are some of the results related to usability, advantages, disadvantages and future of e-Books:

- The level of e-Book use was higher in Business, Economics & Computer Science than in other subject areas. The benefits of e-Books clustered around convenience, such as ease of making copies, perceived up-to-datedness, space saving and around the clock availability. The unfavourable part was the difficulty in reading. (Rowlands 2007).

- People spend a lot of time in front of their computer screens, but they still do not want to read at length on their computer. Also, when faced with more than three to four pages, most people choose to read the printed text. (Buzzetto-More 2007).

- The motivation behind using e-Books was mainly for convenience and long term cost savings. The limitations were glare and lack of power source limited its use outdoors. Also, students were loyal to the printed book due to its tangible qualities. (Jorgenson 2010).

e-Books for research and knowledge creation !

- Students and researchers are convinced about the success of the e-Books because of accessibility and ease of use, but are finding reading on screen to be difficult. They also identified that e-Books are not cannibalising the printed book, but driving their demand upwards (Velde 2009).

- e-Book content has the potential to become more an integral part of research than the printed book. Integration of full text book content into research databases may facilitate the rediscovery of the book. (Losoff 2007)

- Mobile version of the Rich Book Player will make it possible to read, listen to a e-Book or have both modes working in a synchronised way.(Duate 2007)

- Although e-Book continues to have its generic heritage, it offers so many options – text, audio, still images, moving images and so many devices on which to read them – computers, iPods, PDA's. e-Book will never be static and there will be new technologies which will prompt further evolution into something yet to be envisioned, continually embracing new possibilities. Despite the slower than expected evolution, ebooks will prevail. (Soules 2008).

A survey was undertaken to investigate the acceptance and usability levels of e-Books which have been embedded in the post-graduate programs.

The results showed that the students who used e-Books, were very positive and benefitted from its advance functionalities, such as:
- Record your own observations and comments
- High level of search facility
- Downloadable on iPad to study
- Carry them anytime and anywhere

As examples, some of the feedback comments received are:

- "This is the first time I have used an e-Book for textbook. The e-Book was handy since it can be accessed wherever internet is available so you don't have to carry around a heavy textbook. It was easy to read since it showed only the relevant section on the screen".

- "Its faster and takes you to the relevant areas of the book that you need to review.....I am sure I am not alone in my personally owned academic books which are full of posted notes, highlighted areas and creased corners."

- "Yes, I would recommend e-Books to give another option to the student as a learning tool and a cost saving factor as well as convenience as the majority of students are now learning on-line. Each student learns in different ways and the more options available can only enhance their learning experience".

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- "I have colleagues who have i-Pads which takes this to a new level" and "Once we all have i-Pads it will save me filling my book-case with numerous textbooks".

- "Absolutely, I would recommend it. Actually as a full time member in management with a company, its essential. You may be surprised how many books you can access from the i-books site, even academic journals. Read your text, find something curious and open a new screen and google it.....seriously sensational".

It was observed that lower costs of e-Book compared to the printed book was taken favourably. However, there were instances, where it was felt that e-Book was inconvenient to read on the screen and that it was difficult to remain connected to the website which contained the e-Book. The respondents in these cases were digital immigrants. This supports the view that multi-dimensional e-Citizens framework as discussed above on page 5, can assist in identifying the profile of the student cohort to be digital natives, digital immigrants or digital in-exile.

By using the multi-dimensional e-Citizens framework, it was identified that the teaching approach for digital natives on electronic platform using e-Books was very positive, but the printed book was still the preferred option for the digital immigrants. These survey results were representative of the major proportion of students who were digital natives with a smaller cohort of digital immigrants. In order to meet the needs of both digital natives and digital immigrants, both e-Books and printed textbooks were made available to the post-graduate students.

These survey results are very much in line with the experiences of other universities and educational institutions as discussed above in pros and cons on page 6.

e-Books revolutionising the future

Online systems, as mass collaboration platforms, can be taken beyond storage, policing, and delivery, and used in the formation and maintenance of text materials in higher education. Students traditionally limited to the passive role of recipients might become active partners in the creation and continuance of the corpora of information that they learn from (Ravid 2008).

Abiline Christian University (ACU) has already taken this next step of using mobile technologies, such as i-Phone, i-Pad, i-Pod touch to use the true e-Books that are location-aware, media-rich, broadly-interlinked, and socially-connected, offering access never seen before. They are exploring ways e-Books are metamorphosing and showing the rich creative possibilities. ACU have given every student an i-Phone or i-Pod touch as a platform for exploring next wave mobile learning. ACU has become recipient of numerous accolades and awards. (Rankin 2010).

Apple computers in the recently introduced i-Pad have included a new e-reader called i-Books. Academia can connect to Apple's i-Bookstore, download the e-Books and use them on their i-Pad.

e-Books for research and knowledge creation !

Conclusions and future directions

Four important factors which need to be synthesised so that e-Books can provide an integrated and interactive research, teaching and learning platform:

- **Determine digital appetite of e-Citizens, especially keeping in view that digital natives who have the following features:**

  - Proficient uses of technology, expect their learning and working places to be technology-rich.
  - Information and opinion sharing culture, as their natural form of interaction is not one-to-one by many-to-many.
  - Extensively disclose personal data via blogging, face book and other internet media.
  - Creators of their own content and not passive users.
  - Learn through browsing, although identifying qualified and expert sources becomes questionable.
  - Peer-to-peer interaction, so that often decisions are not done by individuals but by a group.

- **Match the needs of e-Citizens to the e-Learning resources available**

  The popularity of e-Books is rapidly gaining momentum due to its multi-faceted advantages, such as random access, portability, replication, and bookmarking, highlighting and high powered search. They have become learning platforms where information can be extracted, mixed and customised for an individual or collaborative team. This should match with the needs of e-Citizens, who have high digital appetite.

- **Upgrading to collaborative and laboratory-type education system**

  It will not be surprising in a world where readers believe that all information can be obtained from the web and transmitted electronically that there will be a stage where the demand for e-Books becomes higher than the printed books. Already research journals are increasingly being distributed via the web. There is potential to integrate them with e-Books leading to the "laboratory-type" environment for knowledge creation.

  This is where constructivist educators can play the critical role of providing wisdom to students as to how valuable information needs to be identified and extracted by filtering masses of irrelevant information in the virtual digital world.

- **Using mobile e-technologies for real-time connectivity**

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The mobile technology platforms, such as i-Pad and i-Phone will give real-time access to research and education, so that a "laboratory-type" environment becomes conducive to knowledge creation rather than the traditional system of "factory-type" replication.

An on-going study will be implemented to investigate and monitor the usability of e-Books in post-graduate and under-graduate programs. Methods to effectively use e-Books and the lessons which can be learnt to pro-actively promote research and knowledge creation will be studied. The study will focus on the advanced use of e-Books on mobile platforms, such as i-Pads for real-time educational applications.

Thus, the future directions in using e-Books as a medium of research and knowledge creation is very valuable, promising and exciting, thereby making it the constructivist educator's dream come true !

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