Education and Learning

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Team: Education and Learning

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Chapter One: Introduction

The challenges facing the educational industry are complex and innumerable.Even in the year of 2018, hundreds of millions of students around the world will be enrolled in institutions with skyrocketing tuition costs, unequal distribution of resources, outdated teaching models, and an education system that will not adequately prepare them for their future careers. In many cases, students will be struggling to pay off student loan debts for their rest of their lives. This however, it is the bright side of the story for the students to be fortunate enough to stay in school. According to UNESCO's statistics, over 260 million children and youth were out of school in 2016 due to poverty, gender discrimination, political instability, and other factors.

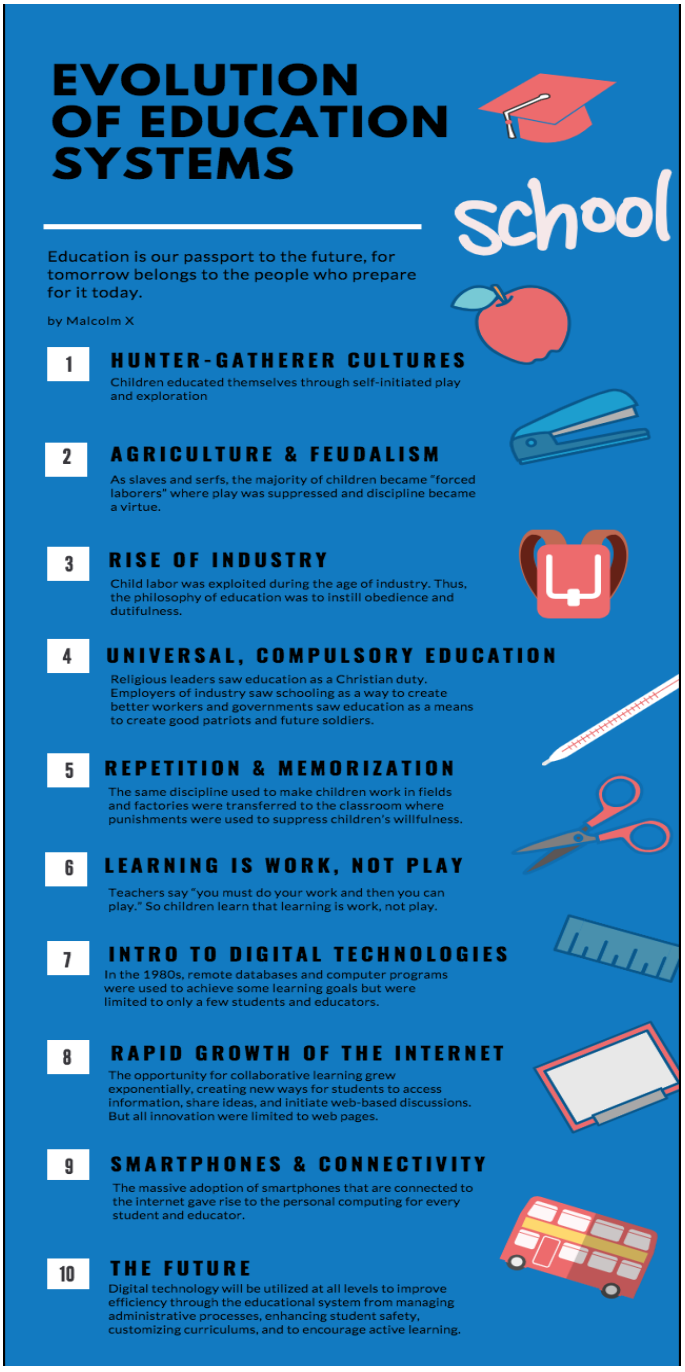
With education being predicted to be one of the biggest industries poised for digital disruption in the coming decade, it provides a glimmer of hope that digital transformation of the industry will provide long-awaited solutions to the woes of global education. To see if this is the case, this report will be dedicated to studying the challenges that traditional learning environments face and explorehow the role of technology and digitalization can play in transforming education and learning for students and educators around the world.

For the purpose of our report, digitalization will be defined as the "interconnectivity of billions of online connections among people, business, processes, devices, and data that can promote business and economic activity." Education on the other hand will be defined by the New Oxford American Dictionary's definition or the "process of receiving or giving systematic instruction, especially at a school or university." As such, this report will only focus on examining students and educators' educational experiences and will not explore other topics related to educational quality such as classroom safety and bully prevention.

The format of this report will be broken down into three main sections. The first section will zero in on the challenges that the traditional educational system faces and will also provide an overview of the evolution of education throughout history. The second section of this report will explore specific technological developments such as AI, machine-learning, and AR/VR that are currently transforming our education system and examine the opportunities and limitations of these technologies. The report will then end with a summary of our findings as well as a suggestions and a policy recommendation for how we can potential utilize digital technologies to transform educational systems throughout the world.

I. Evolution of Education Throughout History

Before we analyze the challenges in our traditional educational system, it is important to examine the evolution of education throughout human history. Many of the challenges in our current system were derived from a former educational model that was effective at its time and place in history but has now become antiquated, yet still deeply engrained in our educational system.



II. Key Challenges in Traditional Educational Environments

As seen from the evolution of educational systems that many of the instructional methods and philosophies surrounding education have remained largely unchanged for much of the last century. This is extremely problematic in today's society not only because of the mismatch between the education system and the career demands of our time but because much of the traditional educational methods are now outdated and not conducive for active and efficient learning. Here are some of the key challenges that traditional educational environments currently face:

a. Inadequate career preparation:

Since our current education system is still highly dependent on lecture-based classes, it nurtures a very limited range of skill sets. Critical skills that are required for success in the 21st century such as critical thinking, creativity, collaboration, cross-cultural communication, and problem solving skills are not effectively taught to students prior to starting their careers.

b. Facilitates rote learning:

Lecture-based classes place a greater emphasis on knowledge acquisition as opposed to skills application. Classes continue to emphasize rote learning and the regurgitation of class content to prepare for exams. While this may have been an acceptable style of teaching in the past, it is an extremely inefficient way to teach because knowledge is now more accessible than ever and the knowledge that students memorize will likely be outdated by the time they graduate.

c. Lack of customization:

Traditional teaching styles still operate on a "one shoe fits all" type of system. While there are a variety of learning styles ranging from visual, kinesthetic, to nonverbal traditional teaching methods expect educators to be able to reach all learning styles in the same way and also sets up an unfair grading system that marks all students on the same basis regardless of their unique learning styles and needs.

d. Outdated instructional methods:

With the rise of social media and digitalization, people's attention spans have drastically shortened. According to the New York Times' new article titled, "The Eight-Second Attention

Span," a survey of Canadian consumption of content concluded that the average person's attention span has fallen to 8 seconds –shorter than the attention span of a gold fish. Despite this, traditional teaching methods have not yet fully adapted to accommodate the shortening attention span of their students.

e. Unequal access:

Traditional educational structures tend to award students from privileged backgrounds and continue to place a high premium on innate "talent," often identifying "gifted" students at a young age and providing them with a disproportionate amount of attention, care, and resources throughout their lives. Whereas, students with equal potential that are masked because of their economic status, backgrounds, ethnicity, and even physical disabilities are often overlooked or denied the same resources and tools that can increase their chances of success as an adult.

f. Rising tuition costs:

Traditional educational systems have proven to be extremely costly in our day and age. Learning institutions have become increasingly commercialized where schools are forced to invest in more infrastructure and facilities to attract fee-paying student which amounts to skyrocketing operational costs. With high costs and rising tuition fees, access becomes even more restricted.

References:

1. Egan, Timothy. "The Eight-Second Attention Span." New York Times, 22 Jan. 2016, www.nytimes.com/2016/01/22/opinion/the-eight-second-attention-span.html.
2. Gray, Peter. "A Brief History of Education." Psychology Today, Sussex Publishers, 20 Aug. 2008, www.psychologytoday.com/us/blog/freedom-learn/200808/brief-history-education.
3. Kim, Anthony. "Why Traditional Schooling Can't Prepare Students for the Modern Workplace." Entrepreneur, 28 June 2016, www.entrepreneur.com/article/279365.
4. "Out-of-School Children and Youth." Data for the Sustainable Development Goals, UNESCO Institute for Statistics, http://uis.unesco.org/en/topic/out-school-children-and-youth#slideoutmenu.

5. Strauss, Valerie. “The Biggest Problem with Traditional Schooling.” The Washington Post, 13 June 2012, www.washingtonpost.com/blogs/answer-sheet/post/the-biggest-problem-with-traditional-schooling/2012/06/12/gJQAhMqlYV_blog.html?utm_term=.985b00b5bce2.

Chapter Two: E-learning

Team Members: Jay, Benjamin, and Afshan

E-learning is the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material (Derek Stockley 2003).

E-learning can involve a greater variety of equipment than online training or education, for as the name implies, "online" involves using the Internet or an Intranet. CD-ROM and DVD can be used to provide learning materials.

I. The History of e-Learning

The term "e-learning" has only been in existence since 1999, when the word was first utilized at a CBT systems seminar. Other words also began to spring up in search of an accurate description such as “online learning” and “virtual learning”. However, the principles behind e-learning have been well documented throughout history, and there is even evidence which suggests that early forms of e-learning existed as far back as the 19thcentury.

II. An e-Learning History Timeline

Before the launch of Internet, distance courses were being offered to provide students with education on particular subjects or skills. In the 1840′s Isaac Pitman taught his pupils shorthand via correspondence. In 1924, the first testing machine was invented. This device allowed students to tests themselves. Then, in 1954, BF Skinner, a Harvard Professor, invented the “teaching machine”, which enabled schools to administer programmed instruction to their students. It wasn’t until 1960 however that the first computer based training program was introduced to the world. This computer based training program (or CBT program) was known as PLATO-Programmed Logic for Automated Teaching Operations. It was originally designed for students attending the University of Illinois, but ended up being used in schools throughout the area.

The first online learning systems were really only set up to deliver information to students but as we entered the 70s online learning started to become more interactive. In Britain the Open University was keen to take advantage of e-learning. With the internet the Open

University began to offer a wider range of interactive educational experiences as well as faster correspondence with students via email etc.

III. Online Learning Today

With the introduction of the computer and internet in the late 20th century, e-learning tools and delivery methods expanded. The first MAC in the 1980′s enabled individuals to have computers in their homes, making it easier for them to learn about particular subjects and develop certain skill sets. Then, in the following decade, virtual learning environments began to truly thrive, with people gaining access to a wealth of online information and e-learning opportunities.

By the early 90s several schools had been set up that delivered courses online only, making the most of the internet and bringing education to people who wouldn't previously have been able to attend a college due to geographical or time constraints. Technological advancements also helped educational establishments reduce the costs of distance learning, a saving that would also be passed on to the students - helping bring education to a wider audience.

In the 2000′s, businesses began using e-learning to train their employees. New and experienced workers alike now had the opportunity to improve upon their industry knowledge base and expand their skill sets. At home individuals were granted access to programs that offered them the ability to earn online degrees and enrich their lives through expanded knowledge.

IV. Types of e-Learning

E-learning programs can take many different forms. Here are just a few examples:

1. Active learning
2. Bite-size learning
3. Blended learning
4. Distance learning
5. Online training
6. Rapid e-learning

V. What are the eLearning tools you need?

Coursera, Docebo, Udemy, Skillshare, WizIQ and Adobe Captivate Prime

Best productivity tools for eLearning:

Project Management Tools: Trello, Asana, Basecamp, and Dapulse.
Cloud Storage Tools: Google Drive, OneDrive and Dropbox etc.
Collaboration Tool: IFTTT (stands for "If This Then That")
To do list tools: Momentum, Todoist
Meeting/Scheduling Tool: Google Calendar, Microsoft Calendar etc.

Best eLearning content creation tools:

Camtasia, Elucidat, Articulate Storyline, YouTube, Microsoft Office Suite, Adobe Captivate, Google Docs, Wistia, Canva and Grammarly

Best eLearning research tools: Reddit, Quora, Scoop.it and Feedly
Best networking tools for eLearning: LinkedIn, Twitter
Best communication tools for eLearning: Slack, Tiny Letter, Paper.li and LearnUpon

VI. Education and the Future Of eLearning

ELearning is all about using electronic technologies for educational curriculum outside the boundaries of traditional classroom and, of course, it is gaining popularity especially among the younger generation over the past decade. Nowadays, obtaining a degree or a certificate for a course opted has become very easy. You don't need to actually sit and take a lecture at the MIT; instead, all you need is an internet connection to access any lecture of your favorite professor online. The broad-band of eLearning varies from distant education**,** learningonline**,** computerized electronic learning, and many others which makes it more appealing to the public.

But what about the future of eLearning?

VII. Current eLearning Trends

The eLearning industry is getting revolutionized by current up gradation of cyber and technological industry**.** 2016 and coming years can be considered as the renaissance period of the eLearning industry with constant evolution of its components. Listed below are the few trends being the hot topic of educational system of the future:

a. Gamification

Learning through gaming has been popularized in the recent years. The key objective behind gamification of education is that it is fun and more appealing to the general. Studies have shown video games boost hand-eye coordination and enhance general ***IQ*** and ***brainpower***.

Games increase a person's ability to switch between tasks and ***incept multiple ideas*** at the same time for problem solution. Serious games often contains points, badges, and leaderboards driving learners to attain best ASAP for accomplishing levels that are ***key lessons*** or ***topics***.

b. Cloud-based systems

Most of the learning management systems are switching over to cloud-based systems. Often managers of large industries use cloud-based ***corporate training***.

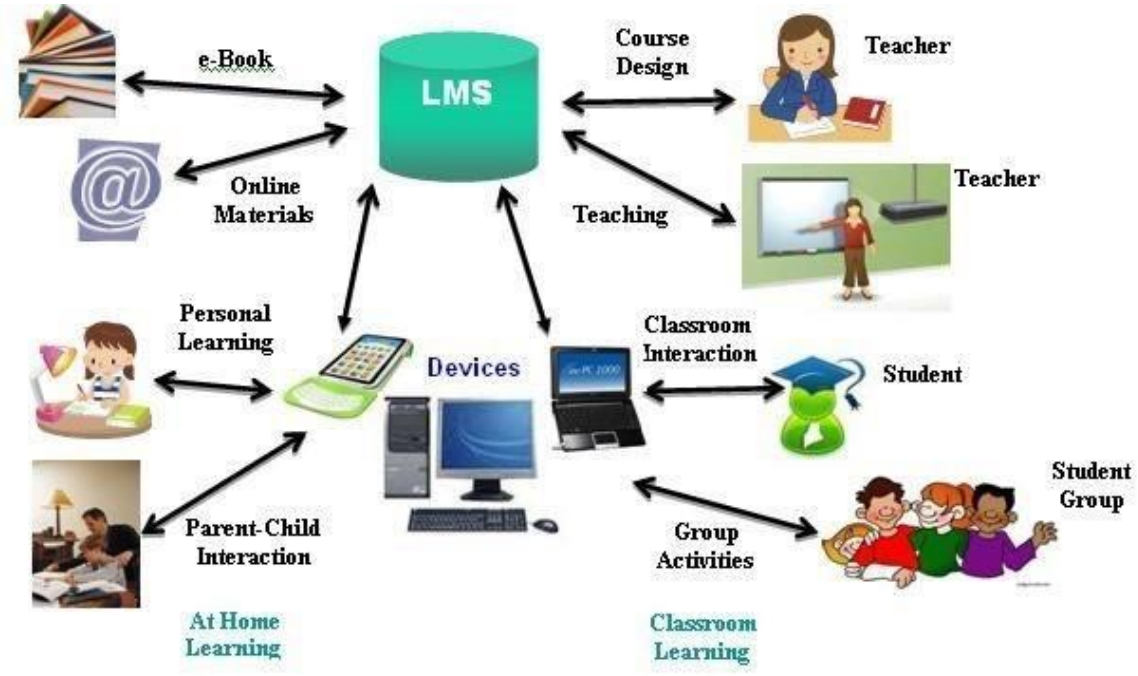
Cloud-based systems increase the trend of eLearning reducing appreciable training cost online.

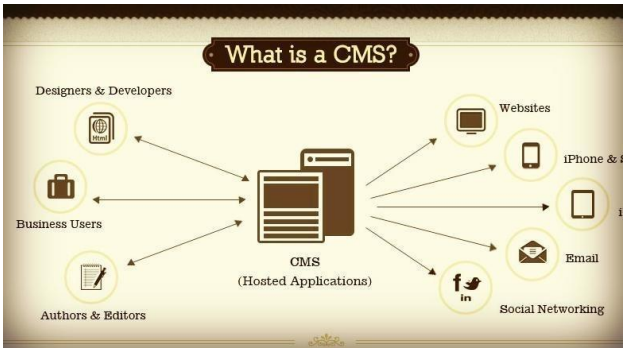
[How do cloud-based systems reduce appreciable training costs online?]

c. Big data

It is the Big Data produced during learning content interaction by learners. It gives advantages in realm of eLearning to both ***learners*** and ***developers***.

The data is collected via Content Management Systems (CMSs), Learning Management Systems (LMSs) and other media like ***social networking sites***, which enables learners to ***interact*** with learning programs.





d. Wearable technologies

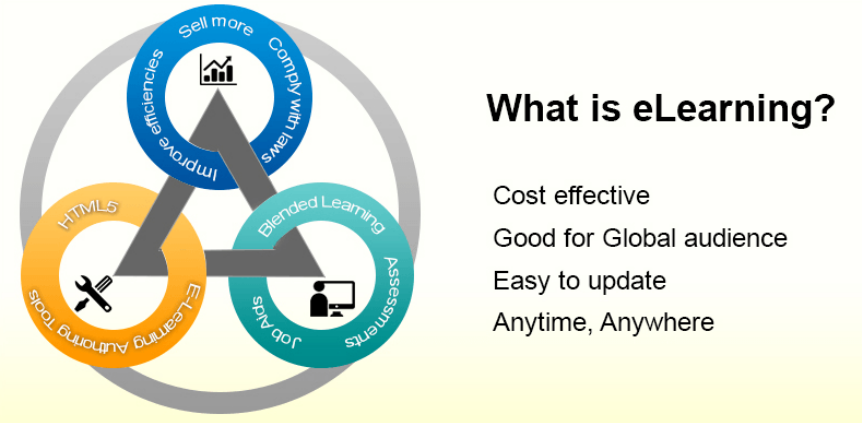
Oculus Rift, Apple Watch, Moto 360, and Google Glass are few of the ***brainstorming innovations*** which are flourishing in the eLearning industry.

The learner interacts with the subject in a ***multi dynamic*** way. The concept behind such technology is to make the learner ***immerse within learning subjects*** with ***3D*** and ***real-time simulation*** of eLearning games. Thus, virtual reality will create a deluge over conventional educational system.

VIII. Future Prospects of Learners

The conventional education system gives an idea of an environment where the Teacher is the supreme authority and students are their subjects. However, most of the adults who need to enhance their educational backgrounds find the campus experience difficult.

Often people look forward to ***educate themselves further***, but retrieve back ***giving up the idea***. ELearning provides great future aspects to those people, offering the following features:



a. Economic

Opting for educational courses might be expensive, while eLearning provides affordable and free online based certificate and degree courses, distant education, and learning contents.

b. Dream institution

ELearning provides an opportunity to avail classes from distant educational institutions of their dream online overseas. The most prominent example is the MITx courses.

c. Subjects and assistance

The learner gets the opportunity to choose from a wide variety of subjects and courses. They get to study as per their preferred time and flexibility, get academic assistance or assignment help online, they can give their exams online, etc.

d. Time management

The learner can practically take the courses at a convenient time with customized options of their choice. Time management is essential for candidates with existing jobs who find it quite difficult to take out time for studying.

IX. E-Learning and Distance Learning Change the Education Landscape

It's safe to say that the educational system is already heavily influenced by digital trends. With the Internet being part of people's everyday needs, most of them rely on it for completing all kinds of tasks. Learning is not an exception.

Online learning and distance learning programs are changing the entire concept of education. Before we go any further, let's explain the main difference between e-learning and distance learning: location. When a student is engaged in a distance learning program, **they are not in direct contact with the instructors and peers. As for e-learning, it can be practiced in a traditional classroom, too.**

1. Personalized Learning Is Now Possible
2. We're Getting Valuable Data
3. Educational Technology Transforms the Way We Learn
4. Part-Time Studies Are Getting More Common and More Effective

5. Learning Goes Mobile
6. Online Learning Leads to Improved Collaboration
7. It Brings Gamification in the Learning Process
8. Online Learning Is Becoming Normal Learning
9. Academic Projects Are Getting Easier
10. No Time Restrictions
11. Everyone Has Access to Education
12. Online Learning Imposes the Need for Self-Motivation
13. Educational Institutions Are Changing
14. Free Learning Opportunities!
15. It's Easier for Students to Decide What They Want to Study

We're witnessing an interesting phenomenon: the educational system is changing in front of our eyes. Technology made that possible. The changes are good and they are not over yet. The evolution continues.

X. Advantages and Disadvantages of e-Learning

a. Main advantages of eLearning for students:

1. Online learning accommodates everyone's needs
2. Lectures can be taken any number of times
3. Offers access to updated content
4. Quick delivery of lessons
5. Scalability
6. Consistency
7. Reduced costs
8. Effectiveness
9. Less impact on environment
10. Comfort, convenience and flexibility
11. Online courses show high levels of self-discipline

b. Main advantages of eLearning for teachers:

1. Extra source of income

2. Passion-oriented learning
3. Gives teachers extra experience

c. Disadvantages:

1. No self-discipline
2. No face-to-face interaction
3. Lack of flexibility
4. Lack of input from trainers
5. Slow evolution
6. Lack of transformational power

d. Significant barriers to eLearning:

1. Technical problems
2. Cost of and access to the Internet
3. Time and support for studies
4. Personal motivation
5. Technical skills
6. Academic skills
7. Social interactions
8. Administrative/instructor issues

XI. Conclusion

16. ELearning is a broader term that covers not just online education but all kinds of tools that are used either online or offline through the digital devices for the purpose of learning.
17. The landscape of eLearning is rapidly changing with the constant improvement in technology; everyone is one way or another reaping its benefits.
18. ELearning is used in educational institutes, corporate sector, healthcare, hospitality, services and government operations.

References:

1. The Economic Times: https://economictimes.indiatimes.com/definition/e-learning
2. http://www.derekstockley.com.au/elearning-definition.html
3. eLearning 101 concepts, trends, applications: https://www.talentlms.com/elearning/
4. Advantages of eLearning in Education: https://www.eztalks.com/elearning/advantages-of-elearning-in-education.html
5. How E-Learning and Distance Learning Change the Education Landscape: https://www.hastac.org/blogs/oliviaryan/2017/12/04/how-e-learning-and-distance-learning-change-education-landscape
6. Benefits of eLearning: https://elearningindustry.com/9-benefits-of-elearning-for-students
7. Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. The Chronicle of Higher Education, 23, page A39, http://chronicle.com/free/v46/i23/23a00101.html
8. Knowles, M. (1984) the Adult Learner: A Neglected Species (3rd Ed.). Houston, TX: Gulf Publishing
9. 25 eLearning Tools You Need Now: https://www.learnupon.com/blog/25-elearning-tools-need/
10. Education and the Future Of eLearning: https://elearningindustry.com/education-future-of-elearning
11. Morgan, C. K., & Tam, M., (1999) Unravelling the complexities of distance education and student attrition. Distance Education, 20 (1), 96-105.
12. Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). ELearning, Online Learning, And Distance Learning Environments: Are They The Same? The Internet and Higher Education, 14(2), 129-135
13. Noesgaard, S. S., & Ørngreen, R. (2015). The Effectiveness Of eLearning: An Explorative and Integrative Review of the Definitions, Methodologies, And Factors That Promote eLearning Effectiveness. Electronic Journal of eLearning, 13(4), 278-290
14. Farrell, G. et Shafika, I. (2007). Survey of ICT and education in Africa: A summary report, based on 53 country surveys. Enquête sur les TICs et l'Éducation en Afrique. Washington: DC : infoDev / World Bank.
15. Pelgrum, W.-J. et Anderson, R.-E. (dir.). (2001). ICT and the emerging paradigm for lifelong learning, An IEA educational assessment of infrastructure, goals, and practices in twenty-six countries (2e édition) http://www.iea.nl/fileadmin/user_upload/Publications/Electronic_versions/SITESM1_ICT_Emerging_Paradigm.pdf.

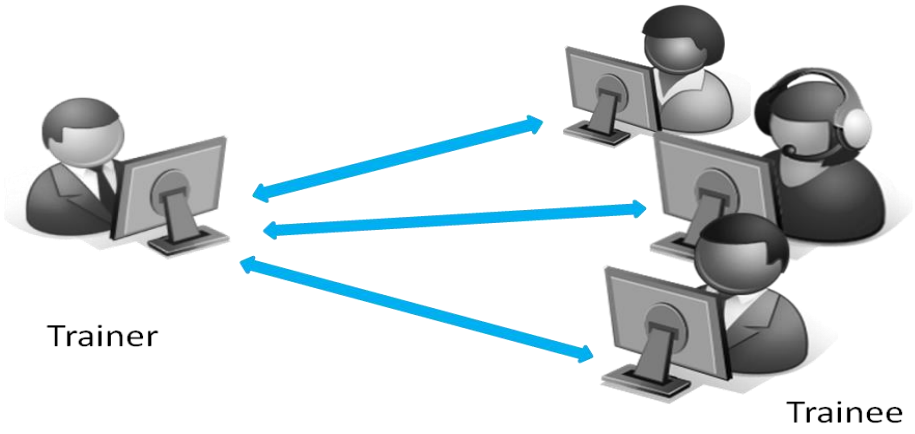
16. Pelgrum, W.-J. et Law, N. (2004). Les TIC et l'éducation dans le monde, tendances, enjeux et perspectives in http://unesdoc.unesco.org/images/0013/001362/136281f.pdf.
17. OCDE. (2001). Cyberformation, les enjeux du partenariat. Paris: OCDE.
18. Balanskat, A., Blamire, R. et Kefala, S. (2006). A review of studies of ICT impact on schools in Europe, (EUN). European Schoolnet in the framework of the European Commission's ICT cluster.
19. Alwani, A. E. S. et Soomro, S. (2010). Barriers to effective use of information technology in science education at Yanbu Kingdom of Saudi Arabia. Dans S. Soomro (dir.), E-learning experiences and future (35-47) in http://cdn.intechopen.com/pdfs-wm/10062.pdf.
20. Kulik, J. (1994). Meta-analytic studies of findings on computer-based instruction. Dans E. L. Baker and H. F. O'Neil (dir.), Technology Assessment in Education and Training (p. 9-33). Hillsdale, NJ: Lawrence Erlbaum.
21. Machin, S., McNally, S. et Silva, O. (2006). New technology in schools: Is there a payoff? (IZA Discussion Paper No. 2234) in http://ftp.iza.org/dp2234.pdf.
22. Karsenti, T. (dir.) (2009). Intégration pédagogique des TIC : Stratégies d'action et pistes de réflexion. Ottawa : CRDI (Centre de recherches pour le développement international), in http://crdi.crifpe.ca/karsenti/docs/livre.pdf.
23. OCDE (2011a) : The Nature of Learning: Using Research to Inspire Practice, OCDE, Paris.

Chapter Three: Virtual Classrooms

Team Members: Sohaib and Gabriel

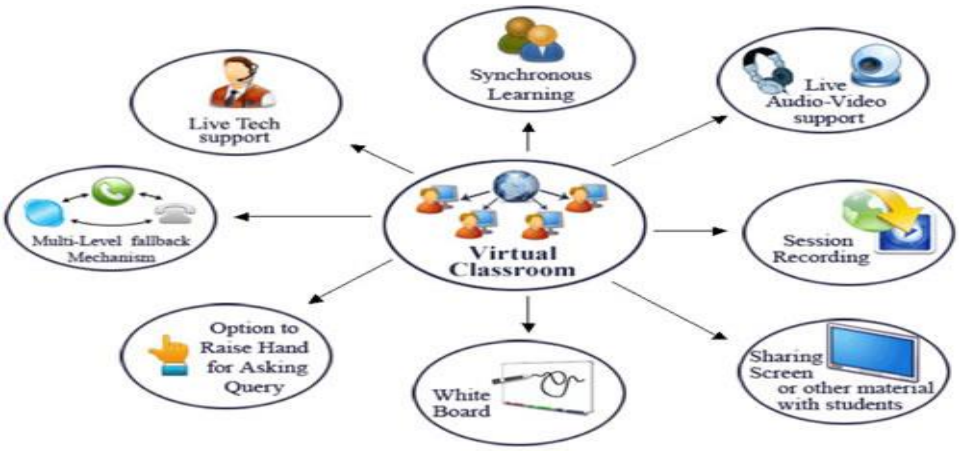
I. Definition and Differences with Traditional Classrooms

There is no concrete definition of what a virtual classroom is, but the most logical one is simply that it is an online classroom environment facilitated via specialized video conferencing applications. The participants, of course, include one or multiple instructors and students. However, a classroom or class does not always need an active instructor to supervise students; in this setting, they can proceed at their own pace, with the instructor only around to evaluate the students; sometimes there is no instructor at all. This type of virtual classroom is called an **unsupervised virtual classroom**, which is characterized by ready-made learning materials that students can follow without the aid of an instructor, essentially a self-paced tutorial course where the exams can be automated after every activity. This is the most common form of virtual classroom, where students just read a PowerPoint presentation or watch a video tutorial. This makes YouTube, by association, the most widely used virtual classroom thus far (even if it is not considered as one). The second type of virtual classroom is the **supervised or instructor-led classroom.** This conforms more to a traditional classroom definition. There is at least one active instructor present and the lesson is carried out in real time at a specific time and date, with the students being in attendance virtually through a video conferencing application. Here, students and teachers can truly interact and actively participate in class. [1]



A virtual classroom is also an online classroom that allows participants to communicate with one another, view presentations or videos, interact with other participants, and engage with

resources in work groups.As the term says, it is a class conducted virtually, wherein professors and students attend from their respective remote locations. Virtual Classroom is an online, web-based tool, which virtually creates a classroom environment similar to traditional classroom wherein professors and students login simultaneously. In this classroom professors can deliver lectures, elaborate on course topics, ask and answer questions, conduct group assignments, take quizzes, polls etc. It is an online teaching or training software that utilizes the aforesaid tools and provides enhanced learning/training experience. **Thus, virtual classroom gives the students as well as professors/trainers a similar experience like that of traditional classrooms without the need to be physically present, and at the same time offers flexible as well as cost-effective courses.**The virtual classroom is the heart of online degree programs a convenient, central place where your courses unfold. Although there are many fundamental similarities between a traditional campus-based education and the online University experience, learning through a virtual classroom offers many benefits that traditional degree programs don't provide. [2]



II. Current Developments, AI, VR, AR

a. Availability of online classes and programs

One of the first easy observations regarding digital technology and education is that online schools and classes are becoming widely available. Even free online classes called "MOOC's" otherwise known as Massive Open Online Courses are becoming widely popular. Online courses and full online programs are making it possible for learners young and old to

unite from all over the world at any given moment, and to have easy access to a course or program from home.

b. Learning texts are now digitalized

Check the backpack of many high school and college students, and you will find that physicals textbooks are slowly being replaced with iPads and various forms of devices connected to online media. With the fast paced development of online media, e-books, e-readers, and learning programs developed for iPads, iPhones, and smartphones, the textbook is becoming "extinct" in some areas. You can forget the time when your backpack was loaded down with a stack of textbooks, because learning is going online.

c. Mobile Learning

A combination of the result of the sharp and sudden increase in the availability of online courses and programs, and the wide availability of online resources and books, you can now study from your phone. MOOC's such as the well-known "Future Learn" MOOC allow you to access your course(s) from your smartphone. Just open the course, plug in your headphones, and follow the content and the classroom discussions! Whether you are riding the subway or taking a bus or a train you can instantly connect to the world full of learners and learning.

d. Personalized teaching and learning

Due to the increase in the presence of technology in the classroom, teachers now have more ability to personalize lessons, instructions, and projects for each group or child. By using devices and programs to distribute classwork and assignments, teachers can personalize lessons and focus on the work of each student. Individualized lessons can be provided to each student, and learning tools enable students to work, perform, and excel at their own pace. Teachers can also now provide feedback, grades, and reports directly to students through online platforms, and online school portals and log-ins. [3]

e. Guidance and instruction from diverse teachers

The increase of digital technology has also affected the availability and access to diverse teachers and instructors for students worldwide. One student can be present in a multi-cultural

online classroom with teachers with origins from South Africa, England, Brazil, Spain, Russia, and Poland all at the same time. Teachers from different backgrounds and countries all bring their own unique perspectives, cultures, and languages to the table of learning.

f. Collaboration and peer-to-peer learning in the classroom

With an increase in access to online learning, whether part or full instruction is provided online, increased opportunities for students to collaborate together from a variety of places becomes possible. Student bodies, in turn, can be made up of students from all over the globe, with every continent represented. Diverse student bodies also increase diversity in ways of thinking and contributions to class discussions and projects. Inside and outside the classroom students can work together through online platforms and portals to exchange ideas. Students can express ideas and communicate through programs provided by their schools, and also informally through social media programs such as Facebook, Twitter, and Pinterest. Peer-to-Peer learning has become increasingly popular as students share their ideas with each other through online discussions and share documents through programs such as Google Docs. Teachers are encouraging and setting up classrooms that inspire and sometimes require peer-to-peer discussions

g. Data driven instructions and results

Another change that is occurring due to the rise of digital technology is the increase in data-driven instruction and results. Although some teachers are being forced to use online grading tools and devices, analysis tools are also becoming more precise. These devices and grading tools can provide more accurate results regarding student performance, but can also result in a teacher's limited ability to judge a student's performance based on the content of their writing, classroom performance, and other contributions.

III. Technological Advancement Changing the Way of Learning by Virtual Classrooms

For many years, schools and universities have had to change the way they work and teach in order to fit in with technology.Software like PowerPoint, for example, which has long been

used as an education tool, wasn't designed for education. Nonetheless, it has been a staple tool in education settings, used as a way to present information in template, bite-size formats.

But this isn't always a good thing. [4, 5]

The use of digital technologies sees some teachers and students presenting information using templates, which means much of the individual character of teachers' practices can be lost. Research shows that software such as PowerPoint can homogenize and sanitize the way teachers present information to their students.Only more recently are we seeing technology being designed and utilized specifically for education contexts, and it's changing the way students learn and understand things.

IV. Virtual Reality (VR)&Augmented Reality (AR)

One of the limitations of eLearning has historically been the lack of immersion. Virtual Reality (VR) and Augmented Reality (AR) could change that. The most recent forms of technology to enter the educational landscape is Augmented Reality (AR).Unlike virtual environments, in which the real world is obscured and the user is immersed in a fully digital experience, AR overlays digital information on real world objects utilizing the camera on a mobile device such as a tablet or smart phone. In some educational uses of AR, three-dimensional images, video, audio or text are "triggered" to appear by a printed imageInstead of learning about history, geography, or biology out of a textbook, students can be transported to another part of the world, or get up close and personal with animals and plants by using VR and AR. Aside from making learning more exciting, VR and AR are beginning to see use in training medical personnel to perform surgeries and other procedures. With these tools, theoretical online study can be much more effective than using just photos and diagrams.

V. AI

Artificial Intelligence can be used in the virtual classroom or in the workplace in a number of ways. One possibility is developing an AI virtual assistant that can offer learning support. The AI would begin by gathering information: identifying learning issues, figuring out what the student or employee's individual learning needs are, and then scraping the internet or database for data and resources that would best help the student or employee to learn or develop skills. With the incredible reserves of data we now have access to; we can use AI to come up

with the best solutions for each student. These kinds of systems would help to ensure that students are working at the appropriate level for them, and that **no one slips through the cracks—something that can easily happen in eLearning.**Voicethread is an asynchronous multimedia platform that can be used in a variety of ways. One of its main features is that it allows users to create and share a **'thread'. The thread could contain, for example, a document to be discussed, a link to watch a** video or listen to an audio recording, or a PowerPoint Presentation. It allows you to selectively invite people to view the thread and discuss it using a voice recording, a dashboard (where they can type a message) or a video message: all using inbuilt features on the platform. Voicethread also has a doodling feature which allows you to highlight interesting areas on a document.Although existing platforms used by UCL, such as Moodle and Turnitin, allow you to leave feedback on students' work or upload documents, what makes Voicethread attractive is that you can find and use all of the above described features in one place that can be easily accessed in multiple ways, including via your phone.[6]

Advantages and limitations of Virtual classrooms[7]

ADVANTAGES	DISADVANTAGES
ACCESSIBLE – virtual learning is accessible to anyone who has a computer, tablet or smartphone.	SELF-DISCIPLINE – it's essential that you have the motivation necessary to sit and do the course. This type of learning is more difficult for those who are prone to procrastination
LOCATION – you can take part in an online course from any location where you can get a Wi-Fi signal.	IMPERSONAL – because there is no actual human communication involved, the virtual environment can feel a little lonely.
FLEXIBLE – virtual learning can usually take place at a time that is convenient for the student. There is no longer any need to be in a classroom at a specific time on a specific day.	ISOLATION – there are no other students with whom to discuss the course so the types of classroom discussions that can lead to understanding of the subject do not happen.
AFFORDABLE – because you can learn	SOLO LEARNING – if you need

from the comfort of your own home it means that there are no travel costs involved in virtual learning.	clarification on a topic, it's not instantly available as it would be if a teacher were present whom you could ask. You can still ask for clarification in a virtual learning situation, but the answer may be delayed due to online availability of the person who could answer your question.
CONVENIENT – you can study at your own convenience which makes this type of learning preferable for those with young families, those with full time jobs and those who have other responsibilities that require input at specific times or places.	TECHNOLOGY ISSUES – Technology problems are always frustrating, but if they take place when you're in the middle of attending a virtual class, they can be extremely disruptive. A virtual classroom is only as good as the technology behind it. If the learning software doesn't work well with your computer, or your Internet connection fails in the midst of a lesson, you may end up spending more time working with the software or repairing your connection than learning the material.[8]

VI. What Can be Done and by Whom? (NGOS, Government, International Organizations)

The most remarkable challenge faced by VC remains the internet availability. Therefore, at this scale, the government should invest more in the infrastructures involved in the internet connection and make it priority of their policies and development goals so do international organizations and NGOS. The implementation of virtual classrooms can be performed step by step steadily and continuously with clear time limit for geographic expansion above an area.

Internet users by region

	2005	2010	2016[a]
Africa	2%	10%	25%
Americas	36%	49%	65%
Arab States	8%	26%	42%
Asia and Pacific	9%	23%	42%
Commonwealth of Independent States	10%	34%	67%
Europe	46%	67%	79%

[a] Estimate.

Source: International Telecommunication Union.[10]

VII. Conclusion

As an interactive learning without boundaries, virtual classroom is being used nowadays in the areas where internet connection is more available at high level. It helps to connect the trainees to the trainer at any distance. In fact, space and time have been a huge challenge to humanity at any time. The invention of technology with the industrial revolution, help the World to move to another level of classroom concept which breaks the frontiers between countries and continent. But it remains many challenges to be addressed by simultaneously by governments,international organizations and NGOs: internet availability at high speed everywhere to make easier to perform virtual learning for anyone in World because no internet connection, no virtual classrooms.

References:

1. Virtual Classroomhttps://www.techopedia.com/definition/13914/virtual-classroom.
2. "ICT Facts and Figures 2005, 2010, 2014". https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspxTelecommunication Development Bureau, International Telecommunication Union (ITU).

Chapter Four: Digital Textbooks and Academic Software

Team Members: Kirk, Connie, and WY

I. What is Digital Textbooks/Academic Software?

Academic software is a set of programs used to facilitate knowledge adoption by pupils. These are normally in the form of **Software** packages, supporting specific goals in the education of target groups. Thus these include computer **software** or internet web-page, the primary purpose of which is teaching or learning, including self-learning. These set of software are specifically written for written **educational** purposes. Educational software could be further explained as the developmental and non-developmental **software** which are specifically used for education. It also reflects on the technical and also instructional design for developing the courseware or **educational** application.

II. Current Developments in Digital Textbooks/Academic Software?

a. Neural network technologies

The technology base of the laboratory works are both well-known programs and software package developed and currently been worked on to bridge the gap between the education software shortfalls. In addition to the practical experience in the use of software packages, students obtain experience in conducting comparative studies of traditional and neural network methods for solving control problems.

A neural network is a computer program that tries to simulate the way a human mind works–more specifically, by simulating neurons themselves.

In your brain, there are hundreds of billions of tiny cells called neurons, each of which is connected to maybe tens of thousands of its brethren in complicated, ever-changing webs. This charming interactive story is a great primer on how they work, but put (very) simply, neurons are how we learn. Each neuron represents a different idea, memory, or sensation. When two neurons fire at the same time, they link together, creating a mental association.

Neural networks are the key to making computers more like humans, and automating the human brain's problem-solving and creative capabilities. Combine them with conversational interfaces, and neural networks can make true artificial intelligence

finally possible—a revolution that would have a knock-on effect in the way we pretty much do *everything*. Designers in the future won't just use neural networks; neural networks may very well be designers themselves.

The development of digital learning skills in school curricula challenges designers of educational software. A useful starting point of research in this domain is the study of literacy, both in its traditional and new forms (Tyner, 1998). It is a powerful background for research on the interaction of learners with educational software platforms. A "platform" is a particular software package, designed for educational use.

b. Developments in digital textbooks/ academic software

Fundamental areas that attributed to the development of digital textbooks/academic softwares are: Classroom Technology, School Wireless Network, Technology in the Classroom, BYOD, learning tools, Mobile Devices in Education, iPads in the Classroom, K-12 Education, Strategy, Internet of Things, TOFU amongst others.

This has been supported by K–12, for kindergarten to 12th grade, indicates the sum of primary and secondary education in several nations, such as Afghanistan, Australia, Canada, Ecuador, Egypt, India, Iran, Philippines, South Korea, Turkey, and the United States, for publicly supported school grades prior to college research by Mourning. J (2015).

Digital learning is continuing to make headway in K-12 classrooms with different technology models being openly adopted by school district leaders. The list of trends covers a wide range of new strategies, from blended learning, flipped classrooms and gamification to remote learning, and digital textbooks.

However, the latest "NMC Horizon Report: 2015 K–12 Edition" is showing new variations to the future of K-12 classroom technology.

c. 3D printing takes the frontlines

3D printing is the biggest prediction that's already started to make a huge impact. It is projected to become a significant classroom technology tool in future K-12 schools, which may be largely due to the expected increase in 3D printers (more than 500% from 2013-2018).

"To be able to draft something with 3D CAD software and then physically output it is a tremendous complement to these programs," says Pete Basiliere, research vice president at

Gartner. “3D printers in the schools help students think creatively. It’s a whole new medium with a new range of possibilities.”

d. Makerspaces enter the game

Makerspaces are community centers that have been revamped with classroom technology tools. Also called digital fabrication labs or innovation labs, this new trend didn’t make Horizon’s 2014 list at all, but has popped up under the “one to two years” category in 2015.

The projected growth of markerspaces will be largely due to the impeding adoption of 3D printers in schools that will need dedicated workspaces for classes experimenting with hands-on technologies.

e. Gamification drops off the list

Gamification has declined in popularity recently and probably won't hit mainstream status anytime soon. This is mostly due to the concepts being too hard to integrate and the lack of tools to help make it any easier.

However, a possible substitute to gamified learning would be Digital Badges, which have made it onto this year's list and is pegged to hit mainstream adoption within four to five years.

These are digital images of a “badge” that a teacher may award a student upon completion of certain tasks. These digital badges can be collected and even shared on social media. Think beyond boyscouts and look at them as an accomplishment in a subject, activity, or workshop. These Digital Badges would follow a student through to college applications showing a history of their progress.

Programs like these help demonstrate the power wireless technology in the classroom and how through Wi-Fi we can help create a more interactive and more personalized experienced for every student.

f. Internet of Things doesn’t make the cut

The biggest surprise may be the elimination of**IoT** in this year’s list. However, it may not have entirely disappeared, but rather been absorbed by wearable technology, a trend that has been a constant in the list over the past two years.

According to the 2014 report, “the potential of the Internet of Things is still largely being explored through research efforts.”

g. Cloud computing taken off list

Cloud computing was in last year’s “near term” list but has dropped off this year. This could be a sign that the cloud has already reached mainstream status and that it is no longer considered a trending tech for the future.

The growth of Chromebooks, powered by Google’s cloud-based Google Apps for Education suite, is just one example of how cloud computing has become a vital technology for education. The report also mentions some cloud-based platforms like Qino that are now aiding K-12 students to keep track of their assignments.

NMC’s 2015 projections for future K-12 technology:

(The NMC is a regulatory body you've probably heard of. They set the standards for your education, to make sure you have the right skills and qualities to nurse. They also set out how you will need to work and behave as a practicing nurse or midwife.)

NEAR TERM **One year or less** **(2015–2016)**	**MID TERM** **Two to three years** **(2017–2018)**	**FAR TERM** **Four to five years** **(2019–2020)**
BYOD	3D Printing/Rapid Prototyping	Badges/Microcredit
Makerspaces	Adaptive Learning Technologies	Wearable Technology

As we follow these trends and watch others become accepted as mainstream standards we also begin to realize just how much the education market continues to become more dependent on wireless technology in the classroom to optimize learning in K-12 environments

As an educational setting, the traditional classroom fails to meet the learner’s need for suitable skills to learn with educational software.

III. How Has Digital Textbooks/Academic Software Changed The Way We Learn?

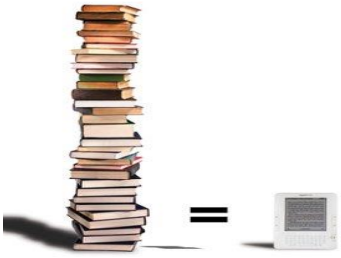
1. Access all books through a single, internet-enabled device be it a phone, tablet or laptop /PC.
2. Once downloaded the digital textbooks and resources can be accessed when there is no internet access.
3. There are no delivery costs or shipping delays with digital textbooks
4. Digital textbooks are portable. Published textbooks in physical form can be bulky and heavy. With students taking several classes in a day, carrying half a dozen textbooks around can become cumbersome.
5. Cheaper - Digital textbooks are cheaper compared to traditional textbooks.
6. De clutter classrooms; with digital textbooks no storage or shelves are required
7. No trees are required to manufacture paper for the pages of digital textbooks. Environmentally conscious students prefer leaving a smaller carbon footprint.
8. Digital textbooks can include links, for easy access to more information and related websites.
9. Digital textbooks can be annotated. The Classoos (digital learning textbook) reader allows notes and bookmarks to be tagged to specific words or paragraphs in a book. This helps students to take clear notes in their digital textbooks.
10. Digital textbooks can be highlighted. The highlighting function allows students to mark important parts of the e-textbook for easy study later.
11. Digital textbooks can include overlays. Using Classoos teachers can create overlays which include additional supplementary content includes external links and additional notes to aid understanding.
12. Digital textbooks are searchable. The Classoos search function makes finding any information in the digital textbook quick. No need to go through the index pages or searching for a specific paragraph.

13. Text in digital textbooks can be resized, and the colour inverted making it easier to read for people with disabilities. With the Classoos reader digital textbooks can be turned into audio books.
14. Always having a pristine copy. No graffiti, no missing pages.
15. Always having the most up-to-date book. Keep pace with curriculum change.
16. Should the phone, tablet or PC / laptop get damaged or lost login to a new device without losing notes and highlights?
17. Anytime, anyplace anywhere. With today's technology you can read digital textbooks everywhere, on the bus, train and even while queuing!
18. Create quizzes and tests. Use Classoos to create and allocate quizzes to teaching groups or share with teaching colleagues.
19. Digital textbooks can speed up work. The copy and paste function allows students to quote sections of textbooks in their references, without having to re-type them.
20. Digital textbooks can be interactive and contain audio, video and animations, which can enhance the message that the author is trying to convey.
21. Speed of Delivery – An e-textbook can be downloaded immediately as soon as the book is ordered. It is no longer necessary to wait for physical delivery of the books especially if they are needed in a hurry.
22. Easily Portable - published textbooks in physical form can be bulky and heavy. If the student takes several classes in a day, carrying half a dozen textbooks around the campus can become cumbersome. Digital textbooks on the other hand can be carried on a small laptop or e-reader, enabling students to carry virtually hundreds of e-textbooks.
23. Easy Search – The search functions make finding any information on the e-textbook quickly. No need to go through the index pages or searching for a specific paragraph. Most e-readers allow notes to be tagged to specific words or paragraphs of a book. This helps students to take clear notes in their digital textbooks.
24. Highlighting – The highlighting function allows students to mark important parts of the e-textbook for easy study later.

25. Copy and Paste - The copy and paste functions allows students to quote sections of textbooks in their references, without having to re-type them.
26. Audio - As e-textbooks can be easily converted to audio files, it helps students to listen to their lessons when driving or walking to college.
27. Cheaper - Digital textbooks are cheaper compared to traditional textbooks, sometimes as much as 50 to 70 percent less than first edition print texts.
28. Environmentally Friendly - Environmentally conscious students prefer leaving a smaller carbon footprint.
29. Quick Updates - Traditional textbooks become obsolete quickly while e-textbooks can be updated with current information.
30. Font Adjustments and Night Time Reading - E-readers make it convenient to adjust the size of the text and come with back lighting or built-in reading lights, making nighttime reading easy.

a. Benefits of e-books that make them valuable classroom technology as supported

Traditional textbooks are still being sold by the millions. Yet, with the rapidly growing tablet market can Ebooks be a new and more cost effective way of learning? Many would argue the pros of these interactive learning tools are as vast as their availability.



Never out of stock and no wait on shipping: e-Books are available instantly and can save on time running to stores and waiting in line.TTS (Text-To-Speech) have multiple functions that can enhance the learning experience. Some examples include helping students with dyslexia,

reading challenges, or visual impairments. It can also reduce eye strain, improve foreign language learning and promote listening skills.

Environmentally friendly: Schools will not have to constantly buy new physical copies of textbooks as curriculum changes and updates are needed, e-Books are a more cost effective way of obtaining your full reading curriculum, e-textbooks on tablets cost on average 50-60% less than print textbooks

Storage space is reduced: Tablets can hold hundreds of textbooks on one device, plus homework, quizzes, and other files, eliminating the need for physical storage of books

More benefits of e-books: They come with font flexibility making reading easier. You can check out library books on your e-reader, and e-Books help students better prepare for a world immersed in mobile technology.

New classroom technology is connecting with students by speaking the language they are used to, while also teaching them proper digital citizenship. It speaks the language of the future of our society as a whole. Secretary of Education Arne Duncan and Federal Communications Commission chair Julius Genachowski said on Feb. 1, 2012 that schools and publishers should "switch to digital textbooks within five years to foster interactive education, save money on books, and ensure classrooms in the US use up-to-date content."

- The percentage of K-12 classrooms with Internet access has increased from 51% in 1998 to 98% in 2012 and 40% of elementary school teachers use computers during in-class instruction. E-Booksare a trend following suit with so many advantages.

IV. What Limitations Or Challenges Stand In The Way As We Work Towards A Digital Transformation Of Global Education?

- Electronic gadgets investment and their compatibility to different educational software.
- Need for skilled human capital to pioneer/administer complicated software programmes in school.
- Major disruption to learning if the systems are down.

V. What Should The Role Of Governments, International Organizations, Ngos, And Private Sectors Be In Addressing These Challenges?

- The federal government should collaborate with several tech organizations in release of school guide supporting "Digital Textbook Playbook," a "roadmap for educators to accelerate the transition to digital textbooks."
- Project financing by all the stakeholders to allow for learning by all despite of the economic background.
- Human resource investment in the digital category and IT or software engineering.
- Backup for all systems to avoid disruption in learning.

VI. Conclusion

- Learning made easy yet complicated, with use of modern technology.
- Environmental friendly initiatives/developments in support of triple bottom line approach (Social, economic and environmental).

References:

1. https://www.classoos.com/what-are-the-benefits-of-using-the-classoos/
2. https://www.fastcompany.com/3058665/neural-networks-explained
3. https://www.universities-colleges-schools.com/the-advantages-of-e-textbooks
4. https://www.securedgenetworks.com/blog/whats-trending-in-k-12-classroom-technology-no.-4-might-surprise-you

5. https://www.securedgenetworks.com/blog/9-Benefits-of-e-Books-That-Make-Them-Valuable-Classroom-Technology
6. http://bruegel.org/wp-content/uploads/2018/07/Work-in-the-Digital-Age.pdf

Chapter Five: Collaboration Platforms

Team Members: Janeth, Mourice, and GG Kong Ming

I. Definition Of Collaboration Platforms

Collaboration platforms is one of the main characteristic of web 2.0 which can briefly be define as the adaption of digital technologies by students, teachers, entrepreneurs and innovators and practicing it to support learning and education as well engagement and self-direction. Education and learning collaboration platforms are successfully growing and gaining a huge momentum in the wide spreading use of education and learning resources.

II. The Current Development InCollaboration Platforms

The current development of collaboration platform is short and can be characterized by the rapid changes and development of digital technology which has changed everything starting from **how we acquire and store knowledge to how we transfer knowledge**. The use of Social media collaboration platforms such as Slacks and Trello in a higher education for education and learning purpose become a newer trend. A 2017 PEW research study showed that 90% of Canadian aged 18-34 use social media and integrating into teaching and learning. Social media can also use to create a sense of community and sending of information and strong sense of community and information can be created through the use of hashtags, which allow the facilitation in topic search, gather information in one conversation, bolster both learning and education, and connect with learners and professionals. It provides learners with a desire to connect other learners and established strong community.

III. Collaboration Platforms And The Role It Covers

Collaboration platform is currently taking place mainly in two forms, *face-to-face (F2F)* collaboration where students, teachers and learners collaborate by being in the same location while the lecture is going on and *online collaboration* where the participants take part in remote collaboration on the lecture contents via online platforms. Base to our brief definition, we offer a list of characteristic for the purpose of understanding what collaboration platform contains, summarized as the following:

- Education and learning collaboration platforms are the next-generation technology.
- Education and learning collaboration platforms tend to be software as service offerings, base in a public or private cloud on multi-tenant designs.
- It support and interoperate with multiple learning and social applications, and not just as extensions to the enterprise system, but as a core design consideration.
- Collaboration platforms are designed around the learner, giving a sense of identify that is maintained throughout the learning lifecycle. Learners are not just pre-defined roles with access levels within each course, but central actors in the system design.
- It is social in nature, supporting connection between learners and customization of content based on learners needs.
- Collaboration platforms allow for the discovery of instructional content, user-generated content, and of other learners.

Online collaboration can be further categorized into two groups – *synchronous* and a*synchronous* collaboration. Synchronous and F2F learning and education collaboration platforms activities are both have no different. In synchronous collaboration platforms the discussions and lectures on lecture content occur at the same time with the expectation of the participation of all the learners and the teacher while in asynchronous collaboration platforms, the learners participates in the discussion with their peers on the lecture content uploaded by the teacher, interact with their peers, deliver peer feedback, and reflect on the status on the status of their own learning plans and outcomes. Asynchronous online collaboration has grown to be more popular learning type because of the lower cost of the learning tools, requirement of minimal hardware, and it is used at student's pace.

F2F collaboration platforms has undeniable impact on learning experience, some studies have found that the students consider online collaboration more autonomous than F2F collaboration platform due to the equal opportunity it presents to all the students for expressing opinions or asking questions about certain contents. Beside this, online education and learning collaboration platforms provides the students with an opportunity to foster **certain diligence and**

deliberation about their peer's contribution (e.g. feedback or questions) about lectures while they are developing their own comments.

IV. Collaboration AndPlatforms Changes And Impact

Today's collaborations platforms are results of these digital technology developments, other primarily results are because of the globalization of the local and national markets, the resulting business requirement, and the evolution of information technology rapidly changing technologies, business requirements, and global economic results. **Furthermore, cloud computing and faster internet connections has given rise to these tools enabling students, teachers, entrepreneurs and innovators produced more learning and education materials online and acquire education, skills and engaged workforce.**

V. Collaboration Platforms Changes How We Learn

The uses of these collaboration platforms have offer learners and professional with a flexible time and location, with the ongoing development of the digital technology learning could take place in a variety of different places, both physical and virtual. Learning and education is going to be more flexible combine with an options, choosing when and where to study and learn and as for the education providers the challenges will be on the preparation and integration of materials and services because of the fundamental changes in learning environment and the development in information and digital technology.

VI. The Role Of Government, NGO And Private Sectors

Education and learning collaboration platforms promotes and encourage greater proficiency in information and digital technology skills, which helps in personal employability and competitiveness. The world is changing toward an information and digital technology and governments must recognize the important of information and digital technology which helps in developing efficient education and learning which in the other hand can support research, education through collaboration platform with the rest of the world. **Non-government organizations must funds collaborative platform that brings education and training professionals together. These platforms are spaces where education and training**

professionals can share ideas and experiences, learn new approaches or techniques from their peers and discuss big challenges faced by their colleagues around the world.

VII. Conclusion

Collaboration platforms and the current development in digital information helps Students, teachers, entrepreneurs and innovators to gain and learn how to find the right information, discover and learn how to use higher-level of thinking such as analysis, synthesis, and evaluation to disseminate information and impact others. Furthermore **it helps in gain knowledge and expertise not only in a content being studied, but also in the learning process itself which is how to learn through discovery, inquiry, and problem solving.**

References:

1. Marie-Noelle Bessangnet, Lee Schlender & Robert Aiken., (2005). Using e-collaboration to improve management education: three scenarios. JISTEM. Journal of information systems and Technology Management. (Online) Vol.2 no.1.
2. Paivi Hakkienen., (2002) History and development of collaborative learning and E-learning in Europe: Lessons Learned. Keynote address at the Asia-Europe Classroom. 2nd International Teachers' Conference Tampere, Finland 11-14.
3. European Commission. Education and Training. Collaborative platforms. http://ec.europa.eu/education/initiatives/collaborative-platforms_en
4. What is learning platform? https://mfeldstein.com/what-is-a-learning-platform/.
5. Islam, A.T., Flint, J., Jaecks, P. et al. Int. J. Educ. Technol. High Educ. (2017) 14: 29. https://doi.org/10.1186/s41239-017-0067-9.
6. Kanita Bose. 2003. An E-learning Experience: A written analysis based on my experience with primary school teachers in an e-learning pilot project. Vol 4,No 2.

Chapter Six: Tackling Learning Disabilities and Special Needs

Team Members: Rachel, Zeek, Egas, and Hassan

Learning disabilities are neurologically-based processing problems. These processing problems can interfere with learning basic skills such as reading, writing and/or math. They can also interfere with higher level skills such as organization, time planning, abstract reasoning, long or short term memory and attention.

A learning disability cannot be cured or fixed; it is a lifelong challenge. However, with appropriate support and intervention, people with learning disabilities can achieve success in school, at work, in relationships, and in the community.

I. Types Of Learning Disabilities:

Learning Disabilities is an "umbrella" term describing a number of other, more specific learning disabilities, such as dyslexia and dysgraphia.

II. Specific Learning Disabilities:

Auditory Processing Disorder (APD): Also known as Central Auditory Processing Disorder, this is a condition that adversely affects how sound that travels unimpeded through the ear is processed or interpreted by the brain.

Dyscalculia: A specific learning disability that affects a person's ability to understand numbers and learn math facts.

Dysgraphia: A specific learning disability that affects a person's handwriting ability and fine motor skills.

Dyslexia: A specific learning disability that affects reading and related language-based processing skills. The severity can differ in each individual but can affect reading fluency; decoding, reading comprehension, recall, writing, spelling, and sometimes speech and can exist along with other related disorders.

Language Processing Disorder: A specific type of Auditory Processing Disorder (APD) in which there is difficulty attaching meaning to sound groups that form words, sentences and stories.

Non-Verbal Learning Disabilities: A disorder which is usually characterized by a significant discrepancy between higher verbal skills and weaker motor, visual-spatial and social skills.

Visual Perceptual/Visual Motor Deficit: A disorder that affects the understanding of information that a person sees, or the ability to draw or copy.

Assistive Technology (AT) for individual with LD:

Assistive technologies refer to technology that helps individuals conduct a certain task efficiently. Assistive technologies help individuals with learning disabilities help perform tasks that other individual of their age is able to perform without the use of those technologies.

a. Types of at for individual with learning disabilities

- Audible
- Kurzweil 3000
- PXC 550 Wireless
- SuperTalker Progressive Communicator
- Snap&Read Universal
- Co:Writer Universal
- Mathtalk
- Spanish Talking Calculator
- Inspiration
- Ginger
- WatchMinder
- Conversor Personal FM Assistive Listening Device with TV Amplifier
- TrackerPro
- MobileConnect

b. Changes and impact of assistive technology:

Individuals with learning disabilities are unable to perform certain actions compared to their age group. However, learning disability affects in individuals could decrease by using assistive technologies.

c. Gamification of learning:

The gamification of learning is an educational approach to motivate students to learn by using video game design and game elements in learning environments.[1][2] The goal is to maximize enjoyment and engagement through capturing the interest of learners and inspiring them to continue learning. Distinguishable from game-based learning, gamification of learning does not involve students in designing and creating their own games, or in playing commercially produced video games. Some elements of games that may be used to motivate learners and facilitate learning include:

- Progress mechanics (points/badges/leaderboards, or PBL's)
- Narrative and characters
- Player control Immediate feedback
- Opportunities for collaborative problem solving
- Scaffold learning with increasing challenges
- Opportunities for mastery, and leveling up
- Social connection
- Fun
- Challenges
- Music

d. Benefits:

Some of the potential benefits of successful gamification initiatives in the classroom include:

- Giving students ownership of their learning[3]
- Opportunities for identity work through taking on alternate selves[4]
- Freedom to fail and try again without negative repercussions[3]
- Chances to increase fun and joy in the classroom[5]
- Opportunities for differentiated instruction[5]
- Making learning visible[5]

- Providing a manageable set of subtasks and tasks inspiring students to discover intrinsic motivators for learning[6]
- Motivating students with dyslexia with low levels of motivation[7]

e. Effectiveness:

The research of Domínguez and colleagues about gamifying learning experiences suggests that common beliefs about the benefits obtained when using games in education can be challenged. Students who completed the gamified experience got better scores in practical assignments and in overall score, but their findings also suggest that these students performed poorly on written assignments and participated less on class activities, although their initial motivation was higher. **The researchers concluded that gamification in e-learning platforms seems to have the potential to increase student motivation, but that it is not trivial to achieve that effect, as a big effort is required in the design and implementation of the experience for it to be fully motivating for participants. On the one hand, qualitative analysis of the study suggests that gamification can have a great emotional and social impact on students, as reward systems and competitive social mechanisms seem to be motivating for them.** But quantitative analysis suggests that the cognitive impact of gamification on students is not very significant. Students who followed traditional exercises performed similarly in overall score than those who followed gamified exercises.

f. Significant challenges for technology in global education:

- Improving digital literacy: **Solvable challenge, those that we understand and know how to solve;**
- Integrating formal and informal learning: **Solvable challenge, those that we understand and know how to solve;**
- Achievement gap: Difficult challenge: those that we understand but for which solutions are elusive;
- Advancing digital equity: Difficult challenge: those that we understand but for which solutions are elusive;
- Managing knowledge obsolescence: Wicked challenge: those that are complex to even define, much less address;

- Rethinking the roles of educators: Wicked challenge: those that are complex to even define, much less address;

g. The role of the government and others organizations:

- Create a comprehensive, educational federal website of Disability-related government resources;
- Create clearinghouse on postsecondary education for individuals with disabilities;
- Coordinates national resources, offers technical assistance, and disseminates information related to secondary education and transition for youth with disabilities in order to create opportunities for youth to achieve successful futures;
- Create a central source of information on disabilities in infants, toddlers, children, and youth. Something that's also an easy-to-read information on IDEA, the law authorizing early intervention services and special education. This State Resource Sheets must help people connect with the disability agencies and organizations in the state.
- Create and grant programs that help individuals with physical or mental disabilities to obtain employment

References:

1. Kapp, Karl (2012). The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education. Pfeiffer. ISBN 978-1118096345.
2. Shatz, Itamar (2015). Using Gamification and Gaming in Order to Promote Risk Taking in the Language Learning Process (PDF). MEITAL National Conference. Haifa, Israel: Technion. pp. 227–232. Retrieved 4 August 2016.
3. Pavlus, John (2010). "The Game of Life". Scientific American. 303: 43–44.
4. Klopfer, E.; Osterweil, S.; Salen, K. (2009). Moving learning games forward (PDF) (Report). The Education Arcade / Massachusetts Institute of Technology.
5. Lee, J.; Hammer, J. (2011). "Gamification in education: What, how, why bother?" (PDF). Academic Exchange Quarterly. 15 (2).

6. Li, Cen; Dong, Zhijang; Untch, Roland H.; Chasteen, Michael (2013). "Engaging computer science students through gamification in an online social network based collaborative learning environment". International Journal of Information and Education Technology.
7. Gooch, Daniel; Vasalou, Asimina; Benton, Laura; Khaled, Rilla (2016-01-01). Using Gamification to Motivate Students with Dyslexia. CHI Conference on Human Factors in Computing Systems. CHI '16. New York: ACM. pp. 969–980.

Appendix: Special need tools- smart toy, gamification

III. Gamification

Gamification is the craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities. It is a design process that optimizes for the human in the system, as opposed to pure efficiency of the system.

A misconception is that gamification does not involve games. It is simply absorbing the fun elements in a game (Game Mechanics or Game Design Techniques) into real-world applications.

a. Why gamification?

Games have the amazing ability to keep people engaged for a long time and develop their creative potentials. However, classic games these days are simply focused on entertaining. With integrating gamification with education, the more time you spend, the more productive you would be.

b. Game elements

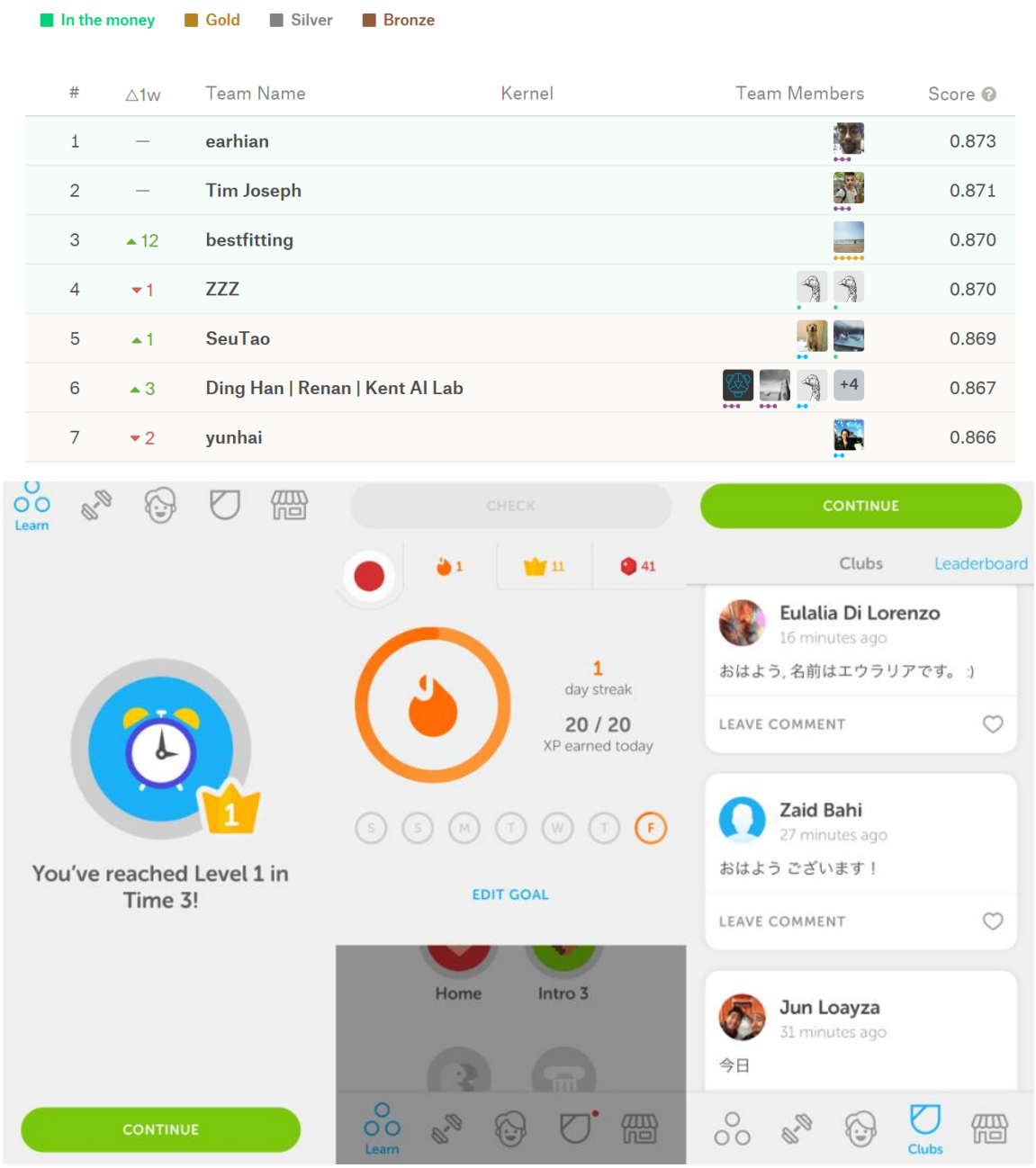
These elements comprise of points, leader boards, direct competitions and badges, which could basically found in educational application.

Progress bar: Learner feel accomplished and get them to come back for daily usage

Leader board: Learner can compete head-to-head in a challenge. It incentivizes students to learn material and practice as everyone wish to see his or her name on leader board

Experience point: Learner progress towards level of mastery

Badge: tracking progress and encourage perseverance



Gamification in language learning software

c. Smart toy

A toy could be a companion of anyone in childhood. Children of ages between 1 and 7 spend entire days with toys. With the emerging of artificial intelligence and high computing capabilities, machine with intelligence could be used as a tool for adult like Siri and smartphone.

Benefit from these technology, dedicated machine intelligence for kids has been introduced. A smart toy implanted with intelligence could be a great mean for early childhood education.

A smart toy has its own intelligence by virtue of on-board electronics. These enable it to learn, behave according to pattern, and alter its actions depending upon environmental stimuli. Typically, it can adjust to the abilities of the player. A modern smart toy has electronics consisting of one or more microprocessors or microcontrollers, volatile and/or non-volatile memory, storage devices, and various forms of input–output devices. It may be networked together with other smart toys or a personal computer in order to enhance its play value or educational features. Smart toys frequently have extensive multimedia capabilities, and these can be utilized to produce a realistic, animated, simulated personality for the toy.

IV. Characteristic of modern toy

SMART: a knowledgeable embedded conversational agent like Siri or Alexa, who can listen to, answer questions about the things children are curious about, engage in conversations, and even tell jokes.

INTERACTIVE: can read and understand sentimental state of children and response by displaying facial expressions or even moving

EDUCATIONAL: tells stories and embodies educational games that teach children about people, places, and concepts

HELPFUL: a parent helper who help kids maintain daily routines.

V. How kids learn from interactive toys

The rate of brain development in children is the fastest in the first five years of their lives. By third grade, children who are struggling to read proficiently are 4 to 6 times are more likely to not graduate from high school on time, making early reading experiences extremely crucial for their development.

While traditional “parents read, children listen” is commonly used, the dialogic reading method has been proven to be more successful in preparing children for school. Research shows the dialogic reading, which is one sort of consistent and supportive relationship between caregivers and their children, contribute to more balanced social, emotional, cognitive, and

linguistic development. This popular method focuses on encouraging conversation between the caregiver and the child, allowing the child to assume the role of a storyteller.

While parents and caregivers often don't have sufficient time to practice dialogic reading, smart toys with AI technology are able to play parents or companion roles to use the dialogic reading technique to make reading a more enriching experience for the child.

Besides, an average 4 years old child asks in a day most of which being "why". Adult are able to have their question answered with Google search engine, but child has no other mean than parents to answer their curiosity. By the build-in intelligence, smart toys with conversational capabilities are able to answer questions and deliver quality contents that could inspire creativity.

References:

1. https://tophat.com/blog/gamification-education-class/
2. https://en.wikipedia.org/wiki/Smart_toy
3. https://yukaichou.com/gamification-examples/top-10-education-gamification-examples/
4. https://www.kickstarter.com/projects/702843172/woobo-a-smart-companion-for-curious-kids
5. https://blog.woobo.io/effective-reading-tips-for-a-more-meaningful-story-time/

Chapter Seven: Entrepreneurial education

I. What Is Entrepreneurial Education?

The word 'entrepreneur' and 'entrepreneurship' is attributed to Richard Cantillon for coining the word in his essay entitled "Essay Sur la Nature du Commerce en General" ("Essay on the Nature of Trade in General"), written in 1732 and published posthumously in 1755. The terms are derived from the French *entreprendre* ("to undertake") (Mason, 2011). Entrepreneurs are considered to be the undertaking and driving force of the change in a society (Gautam, M.K. et al. 2015). Using their skills, knowledge and courage to think outside the box, they bring forth innovation on the civilizational level, but they also open up ventures for the masses and enable employability and constant social development and adaptability and technological advancement, across the globe. **An entrepreneur is an individual who has the ability to turn ideas into action with creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives.**

Entrepreneurship education, consequently, can be seen as the process of professional application of knowledge, attitude, skills and competencies. Apart from teaching students how to become independent business owners, it includes creating and nurturing a learning environment that promotes entrepreneurial traits and behaviours, such as becoming creative and independent thinker, risk taker, assuming responsibility, and valuing diversity (Gautam, M.K. et al. 2015). According to the European Union (2006), entrepreneurial education is vital for developing eco-system that promotes innovation.

Entrepreneurial education can also be seen as education closely related to small business, its launch and development (Peterka, S.O. et al., 2015). The definition varies in the degree of width and scope, which leads to different understandings about the actual goals, measures and methodologies to be used in this type of education. As Gautam, M.K. et al. (2015) review, the scope of entrepreneurial education is quite broad:

- It is a function of innovation;
- It is a function of fostering leadership;
- It is an organizational building function;
- It is a function of high achievement;

- It involves creation and operation of an enterprise;
- It is process of creating value for customers by exploiting untapped opportunities;
- It is strong and positive orientation towards growth in wealth, knowledge and employment;
- It is concerned with attitudinal change, risk taking abilities and turning idea in to actions.

They conclude that, as a discipline, entrepreneurship education always tries to inculcate some skill, so that the students can play a role of catalyst for socio-economical change. Finally, Peterka, S.O. et al. (2015) notice that entrepreneurial education programs are emerging at the institutions of higher education all over the world and that, ultimately, these programs can influence positively the students' roles in the society and economy.

II. What Are The Current Developments In Entrepreneurial Education?

As a quite new global direction in the education, entrepreneurial education meets all the challenges of a young discipline: defining of terms, educational scopes, educational objectives and targets, targeted audience, and educational methodologies and teaching staff. One set of the opposing opinions regarding entrepreneurial education refers to the the idea of nature or nurture: is entrepreneurship something that can be taught or is it a personality/character trait that one must be born with in order to be successful? Can entrepreneurial goals be achieved and enhanced through education and training, or certain people are 'born' to be entrepreneur or to act entrepreneurially (Fayolle et al, 2008).

Based on answers to questions regarding whether entrepreneurship is teachable, who should teach it, how to measure the success of a program and the relationship between entrepreneurship education, Seelig (2005) concludes for the USA, Europe, Asia and Latin America:

1. entrepreneurship education differs around the world from cultural, political, economic and historical perspectives;
2. in most regions university entrepreneurship education is viewed as a tool to stimulate economic development;

3. universities in regions with shorter history of entrepreneurship face greater challenge of building support or legitimacy and finding experienced educators and gathering needed resources;
4. in many regions entrepreneurship education is new and requires much experimentation including incubation;
5. and a global network of entrepreneurship educators is pertinent to share best practices and improve the quality of entrepreneurship education.

The study conducted by Corduras Martinez et. al. (2010) looks at various aspects of entrepreneurship education and training. The study was conducted in 38 countries which the researchers categorized into three categories according to their level of economic development:

1. Factor-Driven (Bolivia, Bosnia, Herzegovina, Colombia, Ecuador and Egypt),
2. Efficiency-Driven (Argentina, Brazil. Chile, Croatia, Dominican Republic, Hungary, Iran, Jamaica, Latvia, Macedonia, Mexico, Peru, Romania, Serbia, South Africa, Turkey and Uruguay),
3. Innovation-Driven (Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Republic of Korea, Slovenia, Spain and the United Kingdom).

While studies show that training is likely to heighten awareness of entrepreneurship, increase self-efficacy and intentions, it also influences opportunity identification and fear of failure. These imply that providing training is only effective if there are adequate infrastructure, economic stability or market and technological readiness, and thus economic and social contexts must be considered when developing entrepreneurship education and training policy.

Li, Zhang and Matlay (2003) researched the development of entrepreneurship education in China. Entrepreneurship education is a somewhat new concept with rapid expansion of management programmes. There were 106 rural enterprise training centres and colleges nationwide with about 1.7 million participants trained between the year 1996-2000. Most of the programmes are short-term training programmes and tailor-made vocational education and training. In the early 1990s there had been efforts to coordinate management education and training for rural enterprises by the Ministry of Agriculture. After 1990s, entrepreneurship

programmes at the undergraduate and post-graduate levels began to emerge. This period witnessed the launching of

1. the student business plan competition,
2. the setting up of the National Entrepreneurship Research Centre in November 2000, a Graduate Venture Park and four venture capital funds by Tsinghua University which was soon emulated by other universities,
3. the introduction of new regulations allowing university students to suspend their degree of study for up to three years for the pursuit of business venturing activities.

Additionally, the Ministry of Education launched a pilot scheme in nine universities to encourage entrepreneurship education at the undergraduate level.

Three models of entrepreneurship education have emerged:

1. A Personal Quality Development Approach,
2. A Business Venture Skills Development Approach,
3. An awareness Raising and Skills Development Approach.

The key drivers for the development of entrepreneurship education are sensitivity to changes in the broader socio-economic and political environment, rapid development in rural areas and rural enterprises after, demand for management programs to ensure better management of millions of firms, either state owned or newly created collective firms, growing hype of the Internet economy especially the dot.com start-ups, growing perception of entrepreneurship education being an integral part of competence and capability in students, and of course the impressive economic growth which had released the entrepreneurial spirit and endeavour in China (Li, Zhang and Matlay, 2003).

Finally, Li, Zhang and Matlay (2003) in a survey of 26 top business schools in China identified that in terms of modules, the emphasis was on functional management skill with strategic management, human resource management, organizational behaviour, financial management, marketing, and accounting being the main priority, and six universities offered venture programmes and five concentrated on entrepreneurship modules.

III. How Has Entrepreneurial Education Changed The Way We Learn?

By developing the sense of initiative, entrepreneurial competencies and providing the learners relevant experiences, everyone will have more opportunities in shaping their career, irrespective of what they want to be in future – a responsible employee, an entrepreneur or an active citizen. Cooperation between the education system and business helps to raise awareness about the importance of entrepreneurship in our wellbeing (www1).

Entrepreneurial education has been focusing on the changing role of learning and teaching in some countries. The emphasis is on the importance of transferal and soft skills, including entrepreneurship; practical learning – following the "learning-by-doing" concept. Moving from "learning for better knowledge" to "learning for better and more experience". This is about a change of the culture of learning and teaching. The culture change is always a time-consuming process and needs a lot of clarification not only to teachers but also to school leaders, parents and other educators. In addition to dissemination, the teacher training is also very important (www1).

Through entrepreneurial education, schools, universities and business get connected and the gap between the education and the market needs is narrowed. Business people go to schools for mentoring student companies. Students learn theory from their teachers and get business advice from their mentors who are also good role models (www1).

IV. What Should The Role Of Governments, International Organizations, Ngos, And Private Sectors Be In Addressing These Challenges?

After experiments in the EU, several conclusions have been made regarding the role of governmental bodies in the entrepreneurial education (www1)

1. Collaboration between all relevant stakeholders (researchers, teachers, schools, entrepreneurs, government institutions, politicians) is important to assure success in implementation but difficult and time-consuming to manage.
2. Implementation of entrepreneurial education systematically at all education levels is essential to achieve success in implementation (competence framework, progression models). This is important to build a common understanding about entrepreneurial education in society (amongst parents,

teachers, school leaders foremost). The ultimate goal of an education systems is an improved wellbeing and the latter can come only from economic development, which cannot be based on anything other than strong, competitive enterprises (being competitive at international level is especially important in the case of small county as the internal market is very limited).

3. Integration of entrepreneurial education in all subjects is a challenge, it should not be left to teachers to solve, but methodological tools and instructions should be provided. School leaders and authorities at local level should support teachers in the transitioning period.
4. Evaluation of impact is a challenge, but very important, to see the progress, identify success factors. This is also important for communication, for convincing and gaining trust from parents, educators, students, politicians etc.

Supranational institutions can also provide support to develop a shared understanding of key competences and to further foster their introduction in education and training curricula and support better developing and assessing these skills.

V. Conclusion

The scope of the scope of entrepreneurial education is broad. It includes:

- Innovation, fostering leadership, creation and operation of an enterprise;
- It is an organizational building function and a function of high achievement;
- It is process of creating value for customers by exploiting untapped opportunities;
- It is strong and positive orientation towards growth in wealth, knowledge and employment;
- It is concerned with attitudinal change, risk taking abilities and turning idea in to actions.

Research in the current developments in entrepreneurial education shows that:

1. entrepreneurship education differs around the world from cultural, political, economic and historical perspectives;

2. in most regions university entrepreneurship education is viewed as a tool to stimulate economic development;
3. universities in regions with shorter history of entrepreneurship face greater challenge of building support or legitimacy and finding experienced educators and gathering needed resources;
4. in many regions entrepreneurship education is new and requires much experimentation including incubation;
5. and a global network of entrepreneurship educators is pertinent to share best practices and improve the quality of entrepreneurship education.

They show that the entrepreneurial training is only effective if there are adequate infrastructure, economic stability or market and technological readiness, and thus economic and social contexts must be considered when developing entrepreneurship education and training policy.

In order to further develop entrepreneurial education, the governmental bodies should:

1. facilitate collaboration between all relevant stakeholders (researchers, teachers, schools, entrepreneurs, government institutions, politicians);
2. ensure implementation of entrepreneurial education systematically at all education levels;
3. build common understanding about entrepreneurial education in society (amongst parents, teachers, school leaders foremost);
4. methodological framework and instructions of instructors should be provided and evaluated.

References:

1. Corduras Martinez, A. Levie, J. Kelley, D.J. Saemundsson, R.J. and Schott, T. (2010). A Global Perpective on Entrepreneurship Education and Training, GERA.
2. European Commission. (2006). Entrepreneurship Education in Europe: Fostering Entrepreneurial Mindsets through Education and Learning. Brussels. Retrieved on September 24, 2018 from http://ec.europa.eu/enterprise/policies/sme/files/support_measures/training_education/doc/oslo_report_final_2006_en.pdf.

3. Fayolle, A. and Gailly, B. (2008). From craft to science: Teaching models and learning processes in entrepreneurship education. Journal of European Industrial Training, vol. 32, no.7, pp. 569 - 593. Retrieved on September 24, 2108 from http://www.emeraldinsight.com/doi/pdfplus/10.1108/03090590810899838.
4. Gautam, M.K. et al. (2015) ENTREPRENEURSHIP EDUCATION: CONCEPT, CHARACTERISTICS AND IMPLICATIONS FOR TEACHER EDUCATION. Shaikshik Parisamvad (An International Journal of Education). 5:1 (21-35).
5. Kuratko, D.F. & Hodgetts, R.M. (2004). Entrepreneurship: theory, Process, Practice. (Mason,OH: South-Western).
6. Li, Jun, Yuli Zhang, and Harry Matlay.(2003). Entrepreneurship Education in China. Education + Training 45 (8/9) : 495-505.
7. Mason, Cordelia. (2011). Entrepreneurship Education And Research: Emerging Trends And Concerns.
8. Peterka, S.O. et al. (2015) Challenges of evaluation of the influence of entrepreneurship education. Economic Review – Journal of Economics and Business. 12:2 (74-86)
9. Seelig, T.L. (2005). "Entrepreneurship Education Around the World". Paper presented at REE USA 2005, Standford University, Oct. 26. 2005.
10. www1: Reflecting on the Impact of Entrepreneurship Education.
11. www2: https://guests.blogactiv.eu/2017/11/27/reflecting-on-the-impact-of-entrepreneurship-education/

Chapter Eight: Moving Forward/Plan for the Future – Leslie and Team

What are the greatest obstacles that stand in the way of change? What is the role of governments, policy, international organizations, and the private sector in addressing these obstacles?

Forward-thinking educational institutions are now seeing the power of technology to transform the learning environment, merging the physical with the virtual, and realizing better student outcomes. These institutions understand the current change dynamics and are moving rapidly to innovate and transform their business models, acknowledging the evolving role of faculty, understanding the requirements of the students of the future, and examining their educational delivery methodologies.

Education institutions, like all service organizations in the digital information era, must seek every means to enhance quality of service delivery and drive efficiency and cost-savings. In other words, the journey for the digital transformation in education should lead to a broader vision that enables constant innovation and enhancement of teaching and learning; it must also improve the operational efficiencies of administrative and management services for students, educators, and the community.

Those leaders who are still of the mind that only modest incremental shifts are necessary could miss the next generation of teaching and learning.