



education in  
the digital age

THROUGH  
NON-FORMAL  
TO DIGITAL



GEORGIAN  
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BUDAPEST



## THROUGH NON-FORMAL TO DIGITAL – EDUCATION IN THE DIGITAL AGE

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# CONTENT

## NON-FORMAL EDUCATION IN A DIGITAL WORLD

04 WHAT IS NON-FORMAL EDUCATION?

05 DIFFERENCES

08 INFORMAL EDUCATION

08 NON-FORMAL EDUCATION

10 BENEFITS

## DIGITAL LEARNING

12 WHAT DO WE MEAN BY DIGITAL LEARNING?

13 DIGITAL AGE SKILLS FOR EDUCATORS

## NOW AND TO COME

18 NON-FORMAL AND DIGITAL EDUCATION

19 EDUCATIONAL METHODS WITH DIGITAL TOOLS AND INSTRUMENTS

## THE BENEFITS OF DIGITAL LEARNING

24 DIGITAL LEARNING MAKES STUDENTS SMARTER

25 DIGITAL LEARNING MAKES STUDENTS SELF-MOTIVATED AND MORE ACCOUNTABLE

26 DIGITAL LEARNING TOOLS INVOLVE EDUCATORS AND PARENTS

27 DIGITAL LEARNING TOOLS RAPIDLY INCREASES INFORMATION SHARING

28 INCREASING STUDENTS' EMPLOYABILITY WITH DIGITAL LEARNING TOOLS

29 TRADITIONAL EDUCATION METHODS HAVE TO BE REPLACED

30 ADVANTAGES OF DIGITAL TECHNOLOGY



## THE FUTURE

- 41 How digital tools for non-formal education can help in the future?
- 42 Collaborative, deep learning
- 43 Understanding learning science's impact on education
- 46 Integrated and innovative

## GAMIFICATION IN DIGITAL EDUCATION

- 49 The relevance of gamification in digital education
- 49 Why does gamification work in education?
- 50 Why gamification in digital education?
- 51 Gamifying training also profits you as a producer
- 52 Three more reasons to use gamification techniques

# NON-FORMAL EDUCATION IN A DIGITAL WORLD



### WHAT IS NON-FORMAL EDUCATION?

Non-formal Education is any organised educational activity that takes place outside the formal educational system. Usually it is flexible, learner-centred, contextualised, and uses a participatory approach. There is no specific target group for Non-formal Education; it could be kids, youth, or adults.

The Non-formal Education activities preceded the term coining in the late 1960s; the term just gave a label for already existing activities. If you think about how people used to learn before the formal school system appeared, you will be thinking about a form of Non-formal Education whether it's literacy program in a village, wise elderly men transferring their knowledge to younger generations or a farmer teaching his aides how to plant crops.



## DIFFERENCES BETWEEN NON-FORMAL EDUCATION, INFORMAL EDUCATION AND FORMAL EDUCATION

Non-formal Education is clearly defined against Formal Education. However sometimes the terms NFE and Informal Education are used interchangeably but this is not accurate. Both the Educational and Development discourse differentiate between the three even though they don't agree on Non-formal Education definition.

Non-formal education expresses the core principles that should be at the heart of all good education. Non-formal education is all of the following.

**1. Relevant** to the learner's life and the needs of society, and will be so in the future. Mechanisms for involving children, parents and local communities as well as educators in deciding the content of what is taught will ensure that non-formal education is relevant to the needs of communities and draws on local resources and personnel.

**2. Appropriate** to the level of the learner's development, with new content and experiences being introduced when the learner is ready. Teaching is learner-centred and student-directed.



**3. Flexible** in what is taught and how it is taught, and to the needs of the different learners, e.g. adults and children who work, who live on the street, who are sick, who are in prison, who have a disability or who are victims of conflict or emergency, and flexible to traditional/indigenous learning styles.

**4. Participatory** in those learners are active participants in their learning, and that they and their families and communities are involved in running the non-formal education programme.

**5. Protective** of children from harm, and protective of their rights to survival and development. Places of non-formal education should be healthy and safe, and provide proper nutrition, sanitation, and protection from harm.



**6. Inclusive** of all children regardless of background or ability, respecting and utilising the differences between them as a resource for teaching and learning. Non-formal education often targets marginalised groups, e.g. nomadic communities, girls, people with disabilities, school dropouts, and working children. For students with disabilities and other marginalised groups, non-formal education is very helpful, responding to and fitting their needs.

**7. Quality:** non-formal education programmes have the potential to be of exceptionally high quality, because they can respond more easily to the needs of individuals and specific groups in the community.

You have learnt in the foregoing pages of this unit about the 'in-formal' and 'formal' modes of education, but the changing scenario, dynamic and revolutionary need based education through traditional approaches can hardly be achieved. Eventually, non-formal education emerged as one of the alternatives of the formal system of education. Non-formal learning is one of the recent international educational movements, which emerged from the idea of general improvement of the people to meet their social and economic needs.

## INFORMAL EDUCATION

This is the lifelong process where people acquire attitudes, values, skills and knowledge from daily experience and the educative influences and resources in the environment. Infants and young children learn to speak. They learn by listening and imitating. Parents, siblings, and friends who encourage correct sounds and spontaneously correct errors augment their trial and error efforts.



## NON-FORMAL EDUCATION

This is any organised educational activity outside the established formal system – whether operating separately or as an important feature of some broader activity – that is intended to serve identifiable learning clienteles and learning objectives. Example is a course offering soft skills for youth or an empowerment program for women

The glossary of the European Knowledge Centre for Youth Policy describes non-formal learning as follows:

"Non-formal learning is purposive but voluntary learning that takes place in a diverse range of environments and situations for which teaching/training and learning is not necessarily their sole or main activity. These environments and situations may be intermittent or transitory, and the activities or courses that take place may be staffed by professional learning facilitators such as youth trainers or by volunteers such as youth leaders. The activities and courses are planned, but are seldom structured by conventional rhythms or curriculum subjects. They usually address specific target groups, but rarely document or assess learning outcomes or achievements in conventionally visible ways."

## BENEFITS

Unlike structured, formal learning, informal learning harnesses a person's intrinsic desire to learn and gives them the freedom to find knowledge from their preferred sources. Formal learning channels have largely been seen as the most effective way to train employees in the past. However, businesses have recently started to realise that employees can gain a great deal of information from less structured learning.



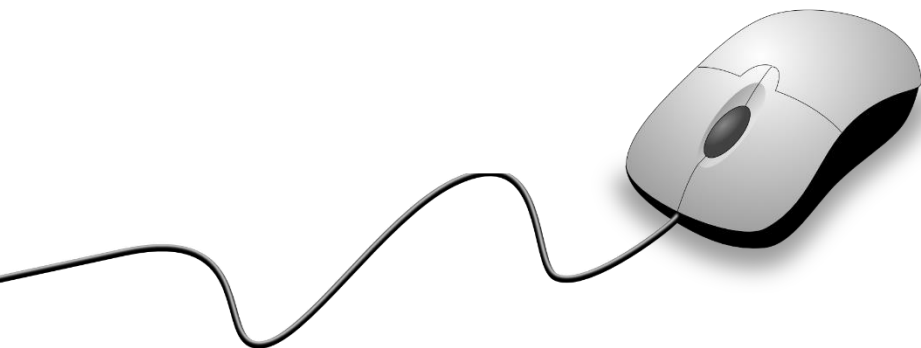
# DIGITAL LEARNING



### WHAT DO WE MEAN BY DIGITAL LEARNING?

Digital learning is any instructional practice that effectively uses technology to strengthen a student's learning experience. It emphasises high-quality instruction and provides access to challenging content, feedback through formative assessment, opportunities for learning anytime and anywhere, and individualised instruction to ensure all students reach their full potential to succeed in college and a career.

Digital learning encompasses many different facets, tools, and applications to support and empower teachers and students, including online courses, blended or hybrid learning, or digital content and resources. Additionally, digital learning can be used for professional learning opportunities for teachers and to provide personalised learning experiences for students.



Digital learning advances school reform by increasing equity and access to educational opportunities, improving effectiveness and productivity of teachers and administrators, providing student-centred learning to ensure college and career readiness for all students, and recognising teachers as education designers.

### DIGITAL AGE SKILLS FOR EDUCATORS

Within years to come, there will be five billion citizens of the web. Learning to read, write, and participate in the digital world has become the 4th basic foundational skill next to the three Rs – reading, writing, and arithmetic in a rapidly evolving, networked world. In the 21st century, learning can take place anytime, anywhere, at any pace, and with the learner at the centre.

The shift from print to digital is a profound transition in how human beings learn, it is more significant than the development of the printing press and its benefits are spreading much more quickly.

Like the printing press six centuries ago, this transition is transforming and spreading learning opportunities. Digital brain training system learning is powering many benefits that are changing the opportunity landscape for golf teachers.

## **1. Personalised learning**

The opportunity to help every student learn at the best pace and path for them, is the most important benefit of digital learning. One on one tutoring is a good example of personalised learning, but it is time consuming and expensive. The shift to digital learning can approximate the benefits of one on one tutoring while freeing up teachers to address other individual needs. The opportunity to customise learning sequences for each student will make golf tuition more productive.

## **2. Expanded learning opportunities**

Digital learning is extending learning opportunities so golfers can leverage the fact that learning happens many times and in many places and digital learning will enable this diverse learning opportunity. Learning is in the palm of their hand.

## **3. High engagement learning**

The shift to digital can boost student motivation. The new age “digital golf coach” will encourage new golfers to be active participants in their own learning and engage them in the design of their experiences and the



realisation of their learning outcomes in ways appropriate for their developmental level.

#### **4. Competency-based learning**

Students displays what they know and their progress is based on demonstrated learning. Competency-based learning is possible with paper and pencil but it is hard to monitor and manage an individual's progress model at scale. Cloud predictive and prescriptive reporting replaces the pen and paper so golf coaches can scale their tuition business.



## 5. Assessment for learning

Digital learning powers continuous feedback from content-embedded assessment, neuro-games, simulations, and adaptive learning. When students can track their own progress, it can improve motivation and ownership.

## 6. Collaborative learning

Digital learning powers collaboration. Cloud platforms make it easy for teachers to liaise and manage their students regardless of their location. Collaborative learning powers transparent, prompt, and accurate communications.

## 7. Quality learning products

Digital learning tools allow students to experiment with their metrics, digitally document the change and to share this data with their coach or coaches. Quality learning products power guided audio sessions so there is no room for ambiguity.

NOW AND TO COME



**NON-FORMAL AND DIGITAL EDUCATION**

In modern European societies, where there is an ever-increasing need for digital competence among citizens, 44% of Europeans still lack basic digital skills. The Digital Competences Development System (DCDS) project aims to provide a solution to this challenging reality.

To achieve this aim, the project will develop an open, innovative multilingual Digital Competences Development System (DCDS) and use it to provide non-formal training to low-skilled adults. The Digital Competences Development System (DCDS) aligned to the European Digital Competence Framework will contribute to promote the use of this Framework by non-formal training providers and its adoption by policy makers around Europe. That is expected to be a significant step towards a digital competent European society.

## EDUCATIONAL METHODS WITH DIGITAL TOOLS AND INSTRUMENTS

In the new era of learning, technology plays a fundamental role in the processes of teaching children, adolescents, teenagers, and youths. Therefore, there are tools that facilitate communication between teachers and students, among other things.

Hundreds of digital education tools have been created with the purpose of giving autonomy to the student, improving the administration of academic processes, encouraging collaboration, and facilitating communication between teachers and learners. There is certainly no shortage of tech-based tools to use in the classroom.

So what are the examples of tools that focus specifically in encouraging, enhancing, and managing learning? Let's examine a few

### 1. Edmodo



Edmodo is an educational tool that connects teachers and students, and is assimilated into a social network. In this one, teachers can create online collaborative groups, administer and provide educational materials, measure student performance, and communicate with parents, among

other functions. Edmodo has more than 34 million users who connect to create a learning process that is more enriching, personalised, and aligned with the opportunities brought by technology and the digital environment.

## 2. Socrative



Socrative professes “your classroom app for fun, effective classroom engagement.” Briefly, it is a cloud-based student response system, allowing teachers to test student understanding by way of mini-quizzes, assigned to them on class laptops or tablets immediately. Quizzes can be multiple choice, graded short answer, true or false, or open-ended short response. Socrative’s strength lies in it is “on the fly” assessment method, providing teachers with valuable and timely feedback.

## 3. Project

project\

Project is a tool that allows you to create multimedia presentations, with dynamic slides in which you can embed interactive maps, links, online quizzes, Twitter timelines, and videos, among other options. During a class

session, teachers can share with students academic presentations, which are visually adapted to different devices.

#### 4. Scratch



Scratch is a simple, fun, and engaging introduction to programming, designed specifically for 8 to 16-year-olds. Users can combine music, graphics, and photos to create interactive games, animations, and slideshows. All of their creations are shareable with others in a student's online community. It's important to note that Scratch will really only teach programming concepts, not so much real, authentic programming.

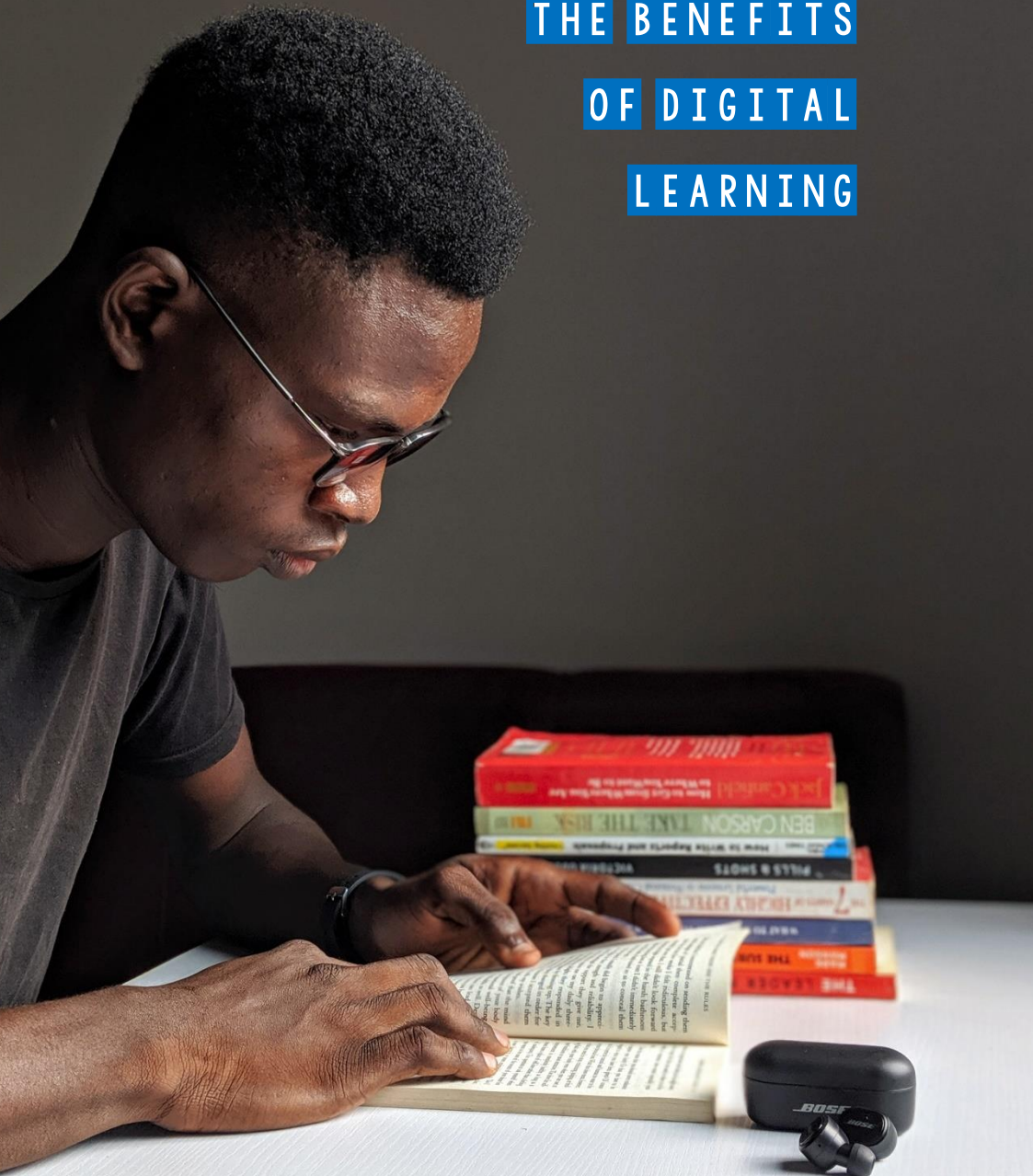
#### 5. Prezi



According to Prezi, "creating, giving, and tracking beautiful interactive presentations is as easy as 1, 2, 3" with their cloud-based presentation software. Prezi presentations are nothing like your traditional presentations; zooming in and out and moving side to side across one single, very attractive, and modern canvas, focusing in on images and videos inputted by the user. Prezi is very popular and consistently receives excellent reviews.



# THE BENEFITS OF DIGITAL LEARNING





## THE BENEFITS OF DIGITAL LEARNING

Digital learning is replacing traditional educational methods more and more each day. With how rapidly classrooms are changing, it is best to forget methods you may remember from when you were in school and start thinking about newer teaching and learning techniques based on digital learning tools and technologies. The inclusion of digital learning in the classrooms can vary from simply using tablets instead of paper to using elaborate software programs and equipment as opposed to the simple pen.

This could entail using sites, services, programs, teaching tools, and technologies like study aids built for at-home use. Even social networks and communications platforms can be used to create and manage digital assignments and agendas. Irrespective of how much technology is integrated into the classroom, digital learning has come to play a crucial role in education. It empowers students by getting them to be more interested in learning and expanding their horizons. Here is how digital learning is a step up from traditional education methods.

## DIGITAL LEARNING MAKES STUDENTS SMARTER

Learning tools and technology enable students to develop effective self-directed learning skills. They are able to identify what they need to learn, find and use online resources, apply the information on the problem at hand, and even evaluate resultant feedback. This increases their efficiency and productivity. In addition to engaging students, digital learning tools and technology sharpen critical thinking skills, which are the basis for the development of analytic reasoning. Children who explore open-ended questions with imagination and logic learn how to make decisions, as opposed to just memorising temporarily the textbook.

Educational tools by Young Digital Planet such as Bingiel teach children how to collaborate and work successfully in groups. This is typically done through gamification. Gamification is a great feature of interactive learning because it teaches children playing in a group to depend on and trust each other in order to win a game or achieve their goals. They also promote cooperation and teamwork, which are very important skills, in every aspect of life.

Interactive social skill games are excellent learning tools that teach children discipline because playing games requires children to follow

rules and guidelines in order to participate. Even children who might grow frustrated with other learning methods may stick with games longer because playing itself is rewarding. This ends up helping them develop patience, another useful life skill.

Children also develop positive feelings of accomplishment from mastering new knowledge and skills using digitised learning tools giving them the confidence they need to want to learn things that are even more new. It is commendable that millions of courses by the best educators are available freely to anyone with an internet connection. The possibilities are endless.

### **DIGITAL LEARNING MAKES STUDENTS SELF-MOTIVATED AND MORE ACCOUNTABLE**

Students using digital learning tools and technology become more engaged in the process and more interested in growing their knowledge base, they may not even realise that they're actively learning since they're learning through engaging methods such as peer education, teamwork, problem-solving, reverse teaching, concept maps, gamification, staging, role playing, and storytelling.

Since digital learning is far more interactive and memorable than voluminous textbooks or one-sided lectures, they provide better context, a greater sense of perspective, and more engaging activities than traditional education methods. This allows students to better connect with the learning material. Further, they often offer a more interesting and involving way to digest information. This is reflected in their retention rates and test scores. In addition, when students can track their own progress it can improve motivation and accountability.

### **DIGITAL LEARNING TOOLS INVOLVE EDUCATORS AND PARENTS TO A DEEPER EXTENT**

Learning tools and technologies like social learning platforms make it easy for teachers to create and manage groups. The shift to digital learning can approximate the benefits of tutoring while freeing up time for teachers to address individual and small group needs. The opportunity to customise learning sequences for each student will make education more productive by closing learning gaps sooner and accelerating progress. Dynamic grouping, workshops, and project-based learning can add lots of collaborative learning to the already present education model.

Apart from educators, parents can use interactive activities to encourage their child's interest in learning since gamification makes the process much more enjoyable and interesting. Parents can also explore online learning activities with their child, which can serve as an extension to what they are learning in their classrooms. Digital learning tools and technology provide enjoyment for kids as well as numerous benefits in terms of developing a child's well-being. Everyone benefits with the digitisation of learning.

### **DIGITAL LEARNING TOOLS AND TECHNOLOGY RAPIDLY INCREASE INFORMATION SHARING**

In recent years, the shift from print to digital has influenced how we learn. Just as printing press did six centuries ago, this transition is transforming formal education and increasing learning opportunities. Digital learning is not only allowing students to access more and more information but also ensuring that the information in question is customisable and suited to their personal needs. The opportunity to help every student learn at the best pace and path for them is the most important benefit of digital learning.

Digital learning tools and technology enable educators to rapidly share information with other educators in real-time. The explosion of free and open content and tools has created an environment of sharing economy. By embracing digital devices and connected learning, classrooms around the country and around the globe cannot only coordinate with one another to share insights but also boost learning, experience, and communications skills. The practice also allows educators to enjoy a level playing field. Schools can save money while ensuring equitable access to educational material as expensive private schools.

### **INCREASING STUDENTS' EMPLOYABILITY WITH DIGITAL LEARNING TOOLS AND TECHNOLOGY**

Equipping students with the requirements of higher education and holding a career at a young age has become one of the most crucial responsibilities of school education. Digital learning solutions based on problem-based learning emphasise on learning methods that are constructive, collaborative and calls the students' attention to a real-world approach to learning.

With the ongoing employment crisis in the MENA region, it is crucial that if young people are unable to find jobs, they should have the ability to create their own and ideally even generate jobs for others. For this purpose, newer methods of learning and education need to be incorporated into the school curriculums, starting right from elementary school. Digital learning tools and technology in elementary, secondary, and high schools prepares students for higher education and modern careers by helping them acquire skills including problem solving, familiarity with emerging technologies, and self-motivation.

### **TRADITIONAL EDUCATION METHODS HAVE TO BE REPLACED**

Traditional lectures may still exist along with the new-age learning tools and technology, but the lecture materials should be provided as a supplement to classroom activities and moved online for students to reference outside of the classroom. Classroom time is better used for discussing the curriculum, engaging in activities with teams, and completing class projects. Students often have the option to pace their learning and even study ahead with a digital learning tool if they wish to do so. By helping children think outside their typical learning modes, digital

learning inspires creativity and lets children feel a sense of accomplishment that encourages further learning.

Digital learning tools and technology fill the gaps where traditional classroom teaching falls behind. In fact, some of the efficiencies such tools bring are simply unmatched by traditional learning techniques. From the environmental impact recognised by the need for less paper for handouts and books to saving time with quick access to information and the ease of research, digital learning provides an effective way to cut costs, maximise resources and heighten both reach and impact for students and educators alike.

### ADVANTAGES OF DIGITAL TECHNOLOGY

Digital technology has transformed nearly every aspect of modern life. Travel, work, shopping, entertainment, and communications are just some of the areas that have been revolutionised in recent decades. It's now rare to find an electronic device or piece of machinery that doesn't incorporate digital technology in some way.



Digital technology means that devices can be more compact, faster, lighter, and more versatile. Huge amounts of information can be stored locally or remotely and moved around virtually instantaneously. Even the term "information" has expanded to include media such as photos, audio, and video, and no longer refers to just words and numbers. Digital technology has transformed modern life, bringing with it many advantages.

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Each of the advantages are explained below.

## 1. Social connectivity

Digital technology makes it easy to stay in touch with friends, family, and work remotely, even if you are in another part of the world. You can communicate by words, video, audio, and exchange other media. Websites, apps, and software have all been created to help users to socialise. With social media, messaging, texting, laptops, tablets, and mobile phones, nobody need feel isolated in the digital world. News and local events update users regularly.

## 2. Communication speeds

Internet speeds have increased exponentially since the early days of dial-up. Ever faster broadband enables the transfer of large amounts of information across the web almost instantaneously, making it possible to stream video and audio in real time, send large data files, and access data from virtually anywhere in the world. Traditional media generally takes much longer.

### 3. Versatile working

The nature of work has been transformed by digital technology. Increased connectivity options mean that many people now have far more opportunities for working from home, as remote working becomes increasingly common. Many jobs can now be done from hundreds, or even thousands of miles away without difficulty. Without the need for all workers to be present in the same building, many other flexible working practices are now possible.

### 4. Learning opportunities

Anybody with access to the internet now has access to a huge proportion of the world's knowledge over the web. Lessons and courses can now be delivered virtually online. Communication advances mean that you can now easily communicate with most of the world's population and learn directly from sources, for example if you are trying to understand foreign events, or learning a new language. Digital technology can also be easier to use for people with disabilities and often give them equal access.

## 5. Automation

Digital technology is increasingly making machines smarter. In some cases, the machines no longer need humans to operate them, freeing up workers from often boring tasks for more interesting pursuits. In other cases, smarter machines mean better standards of safety or a better experience for the user. Products and services drop in price as the technology develops and becomes more common. Many tasks can now be done directly by customers, rather than having to be done through another person acting as an intermediary, for instance, booking a holiday.

## 6. Information storage

Digital technology enables the storage of massive amounts of information in relatively small spaces. Large amounts of media, such as photos, music, videos, contact information, and other documents can be carried around on small devices like mobile phones. As well as physical locations, data can also be stored online, enabling it to be accessed from any device that has internet access.

## 7. Editing

One of the great advantages of digital technology over traditional media is that the information can be easier to edit or manipulate. Word processing has brought about a revolution in the editing of text. Video editing, which used to require expensive studios and equipment, can now be done on a laptop in a bedroom. All sorts of photographic effects are now available, as well as the ability creatively alter images.

## 8. Accurate duplication

One of the great things about digital technology is that it enables the exact duplication of media. For instance, you can write a work report and email it to multiple recipients, or you can distribute multiple copies of photos to family and friends. Breakthroughs in technology are now happening in the field of 3D printing, which looks set to transform our world radically.

## 9. GPS and mapping

Finding your way around used to involve referring to a paper map, but digital combined with satellite technology has transformed travel. GPS

services can now pinpoint your position accurately, update you on traffic jams and road closures in real time, and give you lots of up-to-date information such as time of arrival at your destination, as well as alternative routes. If you want to find a gas station or drugstore that's open, that's easy too.

## **10. Transportation**

Many trains and airplanes already rely to an extent on digital technology. Road vehicles, such as cars and trucks, will become fully automated in the not too distant future. Accessing timetables, as well as booking planes and trains now often take place online. Passports contain digital chips that hold information, enabling self-service machines to speed up the process of checking in and passing through customs.

## **11. Low cost**

Aside from paying for an internet service and the basics like a modem, much of what the digital world offers can be accessed free. Sending an email, communicating via a video link-up with family, and surfing the

internet generally cost nothing. It can provide opportunities for low cost self-education, setting up a business, buying and selling items, or earning money online.

## **12. Entertainment**

The entire entertainment industry and the way that people amuse themselves has been radically transformed. Many people get their fun from online social media, or playing computer games. Traditional media has evolved too, as televisions and broadcasting have become digitalised, along with radio.



### 13. News

Increasing numbers of people get their news online, either via a website or social media. Even traditional news media, such as TV and radio, have been digitalised. People have more options for news sources than ever, and most of it is available 24 hours per day. Independent and do-it-yourself journalism is now very common, as well as ordinary people taking photos and videos on their phones at locations where a news event is taking place.

### 14. Warfare

Advances in technology mean that wars can increasingly be fought remotely, avoiding the risks associated with having soldiers physically present on or above the battlefield, where they are prone to injury or death. Drones and missile technology are particularly reliant on digital technology to work effectively, but most machinery is being gradually becoming increasingly automated.



## 15. Banking and finance

There's no doubt that digitalisation has led to a revolution in financial matters. Online banking done either through a laptop, tablet, or phone app is now the norm. Bank users can now check their incoming and outgoing payments remotely, as well as arrange money transfers and bill payments. Outside of banking, other financial matters, such as buying and selling currency and shares can be dealt with online. Transferring money between accounts both nationally and internationally has also seen a great deal of innovation in recent years.

## 16. Smaller sized devices

One general effect of digital technology that is almost taken for granted is that devices can be made much smaller. The phones that we carry around are mini-computers, for example, capable of surfing the net, working as calculators, planning journeys, capturing and playing photos, audio, and videos, providing games for our amusement, as well as operating as phones and having other functions. Smaller devices generally mean more portability and less space used up in living spaces.

A full-page photograph featuring a man standing on a dark escalator on the left side of the frame. He is wearing a dark jacket over a white shirt and jeans. To his right is a wide, light-colored wooden staircase that extends from the bottom to the top of the image. The text 'THE FUTURE' is overlaid in white capital letters on a blue rectangular background in the upper right quadrant.

THE FUTURE

### HOW DIGITAL TOOLS FOR NON-FORMAL EDUCATION CAN HELP IN THE FUTURE?

As we embark on the Fourth Industrial Revolution, it's clear that technology will play a central role in nearly all aspects of our lives. Research by the World Economic Forum estimates that 65% of children entering primary school will find themselves in occupations that today do not exist.

By 2020, it's estimated there will be 1.5 million new digitised jobs across the globe. At the same time, 90% of organisations currently have an IT skills shortage, while 75% of educators and students feel there is a gap in their ability to meet the skills needs of the IT workforce. To prepare the talent needed for the digital economy, education must adapt as fast as the demand for IT skills is growing and evolving.

Insights into the influence of psychological, social, cultural, and environmental factors on how we learn are emerging from “the new science of learning.” This approach to understanding education argues that in our complex and rapidly evolving world today, academic models

based on interdisciplinary research are necessary to create effective teaching and learning environments.

## COLLABORATIVE, DEEP LEARNING

Learning science's expanded viewpoint is uncovering new approaches to education. The power of technology influences and enhances academia by providing experiences that lead to deep learning. These include allowing students to learn collaboratively, test out and redesign models, and articulate their knowledge both visually and verbally.

Imagine a classroom infrastructure that includes wireless technologies, remotely accessible switches and routers, and collaboration tools to create an "intelligent" environment for the invention of real-world Internet of Things (IoT) products, services, and experiences by students. Creation takes place in different venues, for example, in the classroom during project-based learning or alongside passionate technology peers via hackathons. Students model the networks they create in a simulator and prototype with cloud-based technology at home. Instructors are empowered with a customisable learning management platform while collaborating with peer instructors across the world.

Learning science's interdisciplinary insights are uncovering new approaches to education. Example is the power of technology to influence and enhance academia.

This is the most exciting piece of all achievable now. By applying learning science insights to IT education, we can create a dynamic, digital, and hands-on learning experience that is tailored, flexible, and relevant, developing the talent needed to power the digital economy.

## UNDERSTANDING LEARNING SCIENCE'S IMPACT ON EDUCATION

These are three learning science concepts:

**1) Distributed Cognition (dCoG):** this is how people, their environment and artefacts (or tools) can be regarded as one cognitive system. Educators can view human learning through the lens of dCoG to design digitally enhanced learning experiences that facilitate the interaction of people (e.g. students, teachers, mentors), their environment (e.g. classrooms, workplace learning, informal settings) and tools (e.g. hands-on activities, simulators, games).

For example, Cisco Networking Academy, a world-leading IT skills and career-building program, applies dCog and learning via activity to develop deeper, transferrable problem-solving skills. Leveraging collaboration technology, students, and teachers can interact face-to-face or virtually to strategize, create and test digital solutions.

The learning environment is flexible and diverse, offering face-to-face instructor-led courses, online classes rich with video and interactivity, in-person labs, and blended classroom experiences. The program uses various tools to support learning by doing such as Cisco's Packet Tracer (PT), an innovative network simulation and visualisation tool for the IoT era that offers a multitude of opportunities and applications for the teacher and learner.

Packet Tracer is free to anyone in the world who registers and allows for student-directed, open-ended networking building and guided practice in designing, configuring, and troubleshooting networks. Additionally, through hackathons, boot camps and hands-on lab challenges, Networking Academy students can collaborate, create, and problem solve in real time.

**2) The Zone of Proximal Development (ZPD):** Another concept central to learning science is Vygotsky's Zone of Proximal Development (ZPD), and the related idea of scaffolding. ZPD represents the skill level just outside

a learner's comfort and mastery, while scaffolding refers to any type of instructional support, such as quizzes, games, instructions, tutoring, that facilitate learning within the student's ZPD. By building learning experiences that use scaffolding to adjust to a student's ZPD, we can hone in on the activity that will optimise a student's capability to learn new material, as well as the balance between their current ability and the challenge presented.

Adding digital tools expands the options and reach of personalised teaching and scaffolding. For example, complementing the power of in-person and online teachers, learning and assessment enhanced with networked digital tools can be very effective.

**3) Formative assessment** - emphasises how humans learn through activity. Applying frequent formative assessments, the U.S. Navy's Digital Tutor system demonstrates how digital solutions result in a scalable educational environment that has created IT experts in months rather than years.

Through its Education Dominance pilot, the U.S. Navy developed an artificial intelligence based tutoring system to replicate the behaviours of exceptional tutors. Simulation technology and hands-on labs drive this system with student outcomes equivalent to, or surpassing, those using

the human tutor. The platform is also scalable in a way not afforded by in-person tutors.

Additionally, digital-based assessments enable Cisco Networking Academy, and its global community of educators, to pursue an agile continuous improvement process that target a learner's optimal pace and material. A spectrum of online quizzes, chapter and final exams, practice Certification experiences, and online skills exams, coupled with options for instructor customisation, create a "digital ocean" of data on learning patterns and progress, for students, instructors, and the program. Cisco Packet Tracer also has a formative assessment mode with scaffolding enabled via instructions, timing, grading, and feedback to allow student practice within their ZPD. To date, more than 170 million exams have been taken online through Networking Academy's continuously refreshed assessment bank.

## INTEGRATED AND INNOVATIVE

While experts believe that the human psychology behind learning has not changed vastly over time, the external factors affecting how we comprehend, retain, and receive new material are constantly evolving. As



the digital revolution accelerates, technology gives us exciting opportunities to shape learning experiences and achieve learning goals.

Applying learning science insights to IT education, educators can create a dynamic, digital, and hands-on learning experience that is tailored, flexible, and relevant, developing the talent needed to power the digital economy.

For example, Networking Academy's digital platform has enabled expansion into more countries than Cisco itself has operations. Additionally, the "learning science DNA" insights generated from Cisco's design-based research, are being used to create a variety of learning tools, courses, bootcamps, and academic programs in IoT and big data

At the same time, it is important to recognise the role that a human teacher will always play in the classroom. They have a unique and personal insight into each learner's progress, serving as a role model and local expert, and providing inspiration in a way technology itself cannot.

Combining the learning sciences with digital innovation, we can leverage the best of what digitally enhanced and human-driven education have to offer, creating learning experiences that keep pace with the digital skills demanded by the market. In turn, affecting individual lives, supporting business, and transforming global communities.

GAMIFICATION IN

DIGITAL EDUCATION



## THE RELEVANCE OF GAMIFICATION IN DIGITAL EDUCATION

For some time now, gamification is a hot topic in e-learning. All of us enjoy playing games. The sense of performance, improvement, the fight against an adversary and the feedback and benefits you receive are all kinds of things you want to get back to.

Gamification is the use of the same game elements to non-game activities, so that you can participate and participate in the way you wish. Consider how often flyer programs work, for instance. There's something in us profound that enjoys advancing from silver to gold.

87 percent of staff think gamification renders them productive and 84 percent say they are more committed, according to a Talent LMS study.

## WHY DOES GAMIFICATION WORK IN EDUCATION?

Gamification enables individuals to learn by doing so that procedures and results eventually improve. Gamification offers students the capacity to learn at their own speed and time. Gamification also enables students to

monitor and learn independently. Taking part in an unthreatened setting, participants are free to fall apart. Teachers can feel feelings such as frustration, wonder, and mystery, as well as diversion, each of which provides a private link to the game or others who play.

### WHY GAMIFICATION IN DIGITAL EDUCATION?

It all comes down to motivation...

Basically, there are two types of motivation:

- The external motivators came from outside: punishment, tangible recompense, peer pressure etc. The carrot is more efficient than the stick—potential rewards are stronger than potential penalties.
- The intrinsic motivators are derived from within: skill or trust or autonomy development, for example.

Digital education can be great for intrinsic motivators, in which people lead the way in their own learning. Good done, gamification can build on intrinsic motivation by adding social links and opening up opportunities for alien motivators like leaderboards and badges. A great gamification strategy can do great things for users.

## **GAMIFYING TRAINING ALSO PROFITS YOU AS A PRODUCER**

As students compete, they will probably talk about it, share it and invite others to do so. (The above US research shows that 81 percent of people are more likely to call on others to use an app or software if they were gaming.)

Gamification can also encourage users to explore more and more features or encourage them to do so. Dropbox is one great example: Users value the amount of storage space so that is the prize they have to make, including using specific functionalities or referring friends. Dropbox increases commitment and ensures a stream of new users without hard selling.



## THREE MORE REASONS TO USE GAMIFICATION TECHNIQUES

**1. To personalise experience.** The most excellent games allow participants to choose the results. For instance, the learner can be a powerful way of creating commitment by using connectivity scenarios to control a gamified journey.

**2. To give feedback.** The most attractive games quickly show the effect: make a move and soon you'll know whether it's good or if next time you have to adopt a different approach. Your imagination (and what your audience must learn!) limits the ways in which a feedback cycle can be implemented, but the commitment principle is the same. The 360 feedback from Elucidat and badges from lessons can help.

**3. Because it's what students love!** People love games, but remember that playing games is not just fun. It's about encouraging people to participate actively in your learning to change their behaviour.

Games are everywhere. You've probably been motivated in the past by points, badges, leading boards, and more. So why not try to motivate your students to better learn with the same strong levers??

THROUGH NON-FORMAL TO DIGITAL — EDUCATION IN THE DIGITAL AGE