MATCHMAKING BETWEEN DIGITAL COMPETENCES GAP OF ADULT EDUCATORS AND E-LEARNING OFFER

IO2 Guide for Course Providers

Skills Match

Skillsmatch - Matchmaking between digital competences gap of adult educators and e-learning offer

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SKILLS MATCH

INTRODUCTION

Introduction

Adult educators gained a lot of attention during the last years. It became evident that building their skills is crucial in order to cover the increasing needs of adult education in Europe. Adult education is considered as a tool to tackle Europe's most serious challenges, such as inclusion of migrants and refugees, automation and digitalization, the inclusion of socially isolated persons (EAEA, 2018). Digital technologies are growing fast and thus becoming an obstacle for a lot of educational bodies, the need for capacity building of adult educators in digital skills became apparent.

It also became evident that there is a need to enhance the relevance and the quality of the training offer to adult learners, particularly in Southern and Eastern European countries. With the sudden increase of online courses of different forms, learners have faced difficulties selecting the most relevant course that will guide them to develop the skills or competences they need and progress in their educational path.

The idea of SkillsMatch consists in supporting adult educators in developing digital skills and assisting course providers to develop new e-learning courses covering the demand for skills. The project has a wide range of definite objectives. The project intends to raise the demand for e-learning courses, certificates, and qualifications in the field of digital skills for adult educators.

Moreover, SkillsMatch was developed to provide feedback on course providers on competence gaps and learning needs of adult educators and to facilitate the enhancement in quality and relevance of e-learning courses on digital skills.

SkillsMatch has three main outputs:

01.

Online or mobile matching tool which matches the identified digital competences gaps of adult educator with the e-learning offer.

02.

Guide for course providers on how to match e-learning courses with actual needs of adult educators.

03.

Learning nuggets which are micro-learning modules

- **Output 1**: Online/mobile matching tool which matches the identified digital competences gaps of adult educator with the e-learning offer. It is based on a self-assessment tool, inspired by DigCompEdu that detects the learning need, and on a

smart search engine that searches over the internet, the courses offered and analyses information or metadata from the websites.

- **Output 2**: Guide for course providers on how to match e-learning courses with actual needs of adult educators. The guide pinpoints the need to offer relevant courses to the specific target group and gives tips on how course providers can adapt their e-learning offers to meet the needs of the adult educator's market.
- **Output 3**: Learning nuggets which are micro-learning modules, of a length of 5 or 10 minutes that address specific competences and learning outcomes.

Objectives and target groups of the guide

The present guide is addressed to providers of digital competences courses, and its aim is to help the providers understand better the market to reach their target group and to market better their courses.

The guide consists of three parts:

| Internationalisation and diversification | Future trends and relevance | Validation and quality |

- **The first part (Future trends and relevance)** regards the use of the matching tool and the use of the statistics regarding the market of the e-learning courses. The guide explains how to read and interpret the statistics and how to identify the gaps in the offer in comparison with the target group. Statistical data gathered from the matching tool (the 1st output of the Skills match project), regarding the digital skills gaps are presented and explained, with detailed instructions how to use the tool and get real time statistics. Information is given on how to interpret those data and use them in order to identify future trends in skills needs.
- **The second part (Internationalisation and diversification)** focuses on how course providers can effectively internationalise and diversify their course offers in order to reach a wider number of participants and have a long-term impact. This part also concentrates on market research using the search engine created, in order to differentiate courses offered and create added value.
- **The last part (Validation and quality)** focuses on improving quality and relevance of e-learning courses. The DigicompEdu and other European quality frameworks are presented and linked, and practical tools are given on how to validate competences acquired by learners.

PART 1: FUTURE TRENDS & RELEVANCE

Part 1: Future trends and relevance

The Skillsmatch self-assessment tool is based on the European Digital Competence Framework for Educators (DigCompEdu). DigCompEdu sets out 22 competences organised in six Areas. The competences are explained at six different levels of proficiency (A1, A2, B1, B2, C1, C2). DigCompEdu addresses educators at all levels of education, from pre-primary to vocational, higher and adult education. The focus of the framework is to support and encourage teachers in using digital tools to enhance and innovate education.

In order to achieve these objectives, SkillsMatch application has the following main functionalities:

1. Collects user's skills.
2. Collects online courses.
3. Skills matching

User's skills are collected from the self-assessment tool. SkillsMatch users have a list of skills which contain the following information:

1. Skill name: Name for the skill, e.g.: Creativity, etc.
2. Skill score: Scale from 1 to 5.
3. Skill areas?

The users are classified with a level of competence from A1 to C2, where A1 is the lowest and C2 the highest level.:

- A1: Newcomer
- A2: Explorer
- B1: Integrator
- B2: Expert
- C1: Leader
- C2: Pioneer

Summary of SkillsMatch Functionalities:

1. User management system: Authentication, authorization and user registration.
2. Users may do a "self-assessment".
3. Online courses are available for skills improvement. This process includes read courses from internet and add them to the database.
4. Users may compare their self-assessment results with others, if they wish to.
5. The search should return the required courses for provided skill(s)/ of course the search results will be shown the results with more details and statistics.
6. The skill's score will be considered in the courses search results.

Digital skills of adult educators, understanding your target group

We are living in a fast-paced digital era where new technologies are constantly transforming the way in which we live our lives. Additionally, the Covid-19 pandemic has further accelerated these changes especially in the education sector. Life-long learning and adult education are more important than ever as upskilling and continuous professional development have become essential in order to thrive in the current labour market. Adult educators need to be presented with opportunities to acquire new knowledge and skills, to protect their position in the labour market and remain active, autonomous members of society. It is widely known that

people with low levels of basic skills are among the most disadvantaged groups in the labour market and in society. Course providers can play an important role in identifying and reaching out to the most vulnerable groups of adult learners in order to encourage their participation in education and training.

Here are some of the main findings from the Eurydice report (2021) Adult education and

training in Europe:

- On average, around 40 % of adults in the EU are at risk of digital exclusion: they have either low levels of or no digital skills or their use of the internet is very limited or non-existent
- In 2019, fewer than one third of European countries had reached the EU 2020 benchmark of 15 % adult participation in education and training during the four weeks prior to the survey
- Adults mainly take part in shorter non-formal education and training courses. This goes hand in hand with the fact that formal learning activities, which commonly lead to qualifications, require a considerable investment in terms of time
- Low-qualified adults participate less in education and training than those with higher levels of educational attainment commonly lead to qualifications, require a considerable investment in terms of time
- In 2016, across the EU, around one in three adults with low levels of educational attainment who wanted to participate in education and training cited family reasons and/or conflicting schedules among the obstacles that prevented them from doing so.
- According to statistics from Eurostat (2017), there is a mismatch in Europe between the digital skills needed in the labour market and the digital skills that are currently available. It was recorded the 85% of EU jobs require basic digital skills, whereas, 43% of the EU population do not have the required digital skills level. Employers are struggling to find talent for digital oriented jobs.

Since digital transformation has taken over the labour market, and is something that is constantly changing and evolving, the digital competences of adult educators and learners need to be upgraded and developed respectively in order to minimize digital exclusion and the enlargement of the digital gap. Digital competence is considered an essential transversal skill to have in life in general, and not just important for employability reasons. Regarding employability and the workplace, digital skills are not just needed for technical tasks. They are essential for other job related aspects such as collaboration, digital content creation, critical evaluation of information etc. (Moderator, 2020). Training for adult educators should not only focus on developing technical knowledge of ICT tools as it will most probably be taken over by Artificial Intelligence and automations. Adult educators should promote trial-and-error learning processes. Instead of memorizing technical procedures which can be challenging especially for older adults, educators should focus more on presenting the process of making mistakes as a productive way of creating new ideas and methods. In addition, adult educators should promote the development of problem-solving skills related to the use of digital technologies. According to the DigiComp framework problem-solving skills related to the use of technology include skills from trouble-shooting for technical problems to creatively using technology to create knowledge and to innovate processes and products. Adult educators should use learning by doing methods and present their learners with challenges in order to enhance their problem-solving skills. (Moderator, 2020).

Adult educators need to develop the following digital and soft skills (Apostolopoulos, 2019 & (LINCS | Adult Education and Literacy | U.S. Department of Education, n.d.):

- Advanced research skills
- Strong communication skills
- Organizational skills
- Adaptability skills

- Critical thinking skills

- Navigating systems

- Problem solving skills

- Processing & analysing information

- Respecting differences & diversity

- Self-awareness
- Enthusiasm for lifelong learning

Source: https://pixabay.com/images/id-5597527/

The LINCS | Adult Education and Literacy | U.S. Department of Education website suggests **3** approaches for cultivating the skills and competences mentioned above:

- Integrated & contextualized learning

- Problem-based learning

- Project-based learning

Future trends in skills needs

According to Delloite (n.d) the EU labour market will face many challenges in the upcoming years due to digital innovations such as robotics and AI that will result in many jobs becoming automated. People will need to develop the necessary digital and transversal skills in order to stay active in the labour market. In 2016, the EU adopted a New Skills Agenda for Europe, to support member states in addressing the skills gap and increasing the level of preparedness of the workforce. The agenda gives priority to basic digital skills for all and recognises the importance of life-long learning, by supporting low-skilled adults to progress towards an upper secondary qualification or equivalent and attempting to reduce the risks of unemployment, poverty and social exclusion. At the same time, the Digital Skills and Jobs Coalition in 2016 has brought together various key actors to work together to foster the development of digital skills in the entire workforce, including advanced skills among IT professionals. Delloite (n.d.) also states that there is a need to prevent the increasing digital inequality gap by guiding and supporting lower-skilled workers, which are sceptical about technology, to develop essential skills and remain employable.

According to the report FUTURE OF SKILLS EMPLOYMENT IN 2030 developed by Pearson (n.d.), the top ten skills and knowledge areas associated with rising jobs in the UK are the following:

1. **Judgment and Decision Making**: Considering the relative costs and benefits of potential actions to choose the most appropriate one
2. **Fluency of Ideas**: The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity). E.g., ideation
3. **Active Learning**: Understanding the implications of new information for both current and future problem-solving and decision-making.
4. **Learning Strategies**: Selecting and using training/ instructional methods and procedures appropriate for the situation when learning or teaching new things
5. **Originality**: The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.
6. **Systems Evaluation**: Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.
7. **Deductive Reasoning**: The ability to apply general rules to specific problems to produce answers that make sense.
8. **Complex Problem Solving**: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
9. **Systems Analysis**: Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes
10. **Monitoring**: Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Based on these findings Pearson (n.d.) suggests that education systems, or in this case course providers, should promote and support better understanding, teaching methodologies and assessment of the skills that will be in higher demand. They should train and support educators in acquiring these skills so they can later transfer the knowledge to adult learners. The report also suggests that adult learners should focus on skills that are uniquely human such as originality, fluency of ideas, and active listening. Finally, it highlights that lifelong

learning and reskilling is essential as degree obtained early on in your life will not be enough for employees to remain up to date with their occupations.

PART 2: INTERNATIONALISATION & DIVERSIFICATION

Part 2: Internationalisation and diversification

Internationalisation of education

Internationalisation of education in the broadest sense describes the provision of education beyond national boundaries. The term however means more than only export of education, since education services embrace "scholarship, research, collaboration, dissemination of knowledge and the management and maintenance of the quality of education and economy-wide spillover effects of that process" (Chowdhury 2022). The latter one shows for example shows in "job creation, … improved research and innovation capabilities, and overall long-run economic growth and development for education-exporting countries" (ibid).

One of the major pillars of internationalisation of education (and respective sources of income from internationalisation) until recently has been the attraction of foreign students by higher education institutions. However, through the Covid-19 pandemics the vast majority of foreign students returned to their home countries, and local students who lived in hostels and other accommodations returned to their home towns, which in turn increased the demand for remote learning. It has been pointed out that "… the coronavirus pandemic has had the greatest adverse effects on those countries that rely heavily on incoming students as income generators" (Liu, J., Gao, Y. 2022). It is assumed that it will take universities several years to "to resume their internationalisation activities to the pre-pandemic level" due to financial cutbacks of governments:. Needless to say, that the war in Ukraine will further reduce the scope of strategic options: "As massive expenditures will target stabilising economies during the crisis and their recovery thereafter, it is expected that future public allocations to higher education will shrink, and in particular, universities will have fewer resources to mobilise for internationalisation (ibid)".

In vocational edcuation and training strategies of internationalisation in most publications are geared towards two goals: "Qualification of the employees of a country for the globalized economy" and "worldwide marketing of educational opportunities", whereas significant progress has been stated with regard to the first aim, while the latter one up until now shows mainly in international cooperations, strategic partnerships and projects, competitions or related types of cross-border collaboration among education providers and stakeholders in education. This includes technical assistance to third world countries and provision of expert knowledge for purposes of institution building. Internationalisation in the context of adult education specifically refers to the need to learn from one another across borders and thus be able to meet the global challenges of our time.

Diversification of education

The European Commission defines diversification of education and learning a megatrend: "New generations and hyperconnectivity are rapidly changing both educational needs and the way it is delivered. Advancements in cognitive sciences, the availability of information, new pedagogical approaches and an emphasis on lifelong learning are diversifying interests and the ways of learning, as well as access to education … The historical link between education and school-based learning could weaken in the future, with informal and unstructured learning gaining more recognition. This could have both revolutionary as well as disruptive effects on the global education landscape and the intelligence of future generations." (European Commission 2021).

Following this megatrend providers are requested to provide answers to both, increasingly mixed realities of education and the emergence of disruptive technologies that will dramatically change the ways how education is delivered.

E-Learning Markets

E-Learning in the broadest sense "may be defined as the delivery of instructional content through the use of electronic technology" (Global Industry Analysts 2022). The e-learning market falls into the following segments:

- Sale/Rental of (Software) tools for E-learning and knowledge management,
- Offering/Selling of digital learning content and e-learning courses
- Creation/Tayloring of digital learning content
- Consulting of (e-)learning providers
- Adaption of e-learning content and e-learning software
- Other e-learning services (e.g. hardware, usability tests, training for software)

Global

According to a recent market survey conducted in Germany, 40,2% of the sector's sales in 2019 account for delivery of digital learning content and e-learning courses, 20,6% for creation/tayloring of e-learning content, 24% for sale/rental of (software) tools for e-learning, 9,5% for Consulting of (e-)learning providers, 4,5% for adaption of content and software and 1,2% for other e-learning services. Compared to 2016 sales and rental of (software) tools for e-learning increased up to 4%, and selling of digital learning content and e-learning courses up to 1,5%, while sales revenues from creation of digital learning content decreased by roughly 6%. (mmb Institut 2020).

Kahn et al based on recent market analysis estimate that "the global e-learning market size was valued at $197.00 billion[1] in 2020, and is projected to reach $840.11 billion by 2030, registering a CAGR[2] of 17.5% from 2021 to 2030." (Kahn et al 2021). North America in 2020 is the world's market leader, and is expected to become even more dominant through the next years. The Asia-Pacific region is projected the highest CAGR of 17.4% during 2021-2030 (ibid).

Europe

The e-learning market size in Europe until 2024 is expected to increase by USD 28.36 bn, registering a CAGR of over 13% (Technavio 2021). Germany has the highest e-learning market share in Europe and is forecast to grow at approximately 9.7% CAGR until 2024 (Global Industry Analysts 2022). The average e-learning company in Europe employs 25 people and has an annual turnover of 3 million Euro (Learning Insights).

Covid-19 pandemics

"Doing online courses is a convenient way to learn something new or to deepen your knowledge in a specific field, for example improving your language skills, expanding your professional qualifications or simply learning something new for fun. During the pandemic,

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[1] US Dollar

[2] Compound Annual Growth Rate

people have been encouraged to limit social contacts and so online courses offer a safe alternative for education and training.

In 2021, 27% of people aged 16 to 74 in the EU reported that they did an online course or used online learning material in the last three months prior to the survey, a 4 percentage points (pp) increase compared with 23% in 2020.

In 2021, among all EU Member States, Ireland had the highest share (46%) of people aged 16 to 74 doing an online course or using online learning material. Finland and Sweden both registered a share of 45%, followed by the Netherlands with 44%.

At the other end of the scale, doing online courses or using online learning material was not very common in Romania (10%), Bulgaria (12%), and Croatia (18%).

Compared with 2019 before the pandemic, the share of people doing online courses or using online learning material increased in all Member States, except for Romania where it decreased (-4pp) to 10%. Among the sharpest increases were the Netherlands (+21pp), followed by Luxembourg and Slovenia (both +19pp), and Greece (+18pp)." (Eurostat 2022)

Future drivers of e-learning markets

Companies

90% of companies nowadays use e-learning, compared to just 4% in 1995, and it is assumed that businesses will remain one of the biggest drivers of the e-learning industry this decade as companies spend more and more percent of their learning and development budget on online learning.

Research & Development

Artificial Intelligence (AI) and Machine Learning: By leveraging AI and ML, it becomes possible to quickly analyze huge amounts of data, as well as identify patterns & trends to continuously optimize and improve learning experiences. Moreover, it helps make the course creation process much simpler, faster, and more agile without having to sacrifice quality.

For example, automatic translation and localization feature have enhanced the eLearning development process by offering more speed and efficiency. Furthermore, it is now possible to develop multi-language content for global companies that face the challenge of creating useful content for branches in multiple countries, or for the increasingly common situation of companies working with remote teams that speak different languages. Thus, growth in number of such developments is expected to provide lucrative opportunity for the market.

Newly developing markets

Developing countries: The e-Learning market in developing regions is evolving into a dynamic growth sector as public universities, governments and local providers push into the market. There are several factors driving e-Learning market in developing countries, for instance e-Learning helps to decrease infrastructure costs and reduce expenditures e.g., cost on classroom space along with textbook purchase or rental leading to lesser education costs for people in developing nations. In addition, online learning eradicates logistics problems on account of weak public transport and poor road infrastructure in developing

nations. (GlobeNewswire 2021)

Last but not least the fast growing availability of digital infrastructure, digital devices and faster internet connections in developing countries forms a solid ground for the development of e-learning markets.

Pedagogy and didactics

The emergence of several trends such as micro learning, gamification, adoptive learning, and mobile learning are expected to offer remunerative opportunities for the expansion of the market during the forecast period.

Sources

Chowdhury, M. B.: Internationalisation of education and its effect on economic growth and development, in: The World Economy Vol. 45 Issue 1, January 2022, pages 200-219, Wiley Online Library, https://doi.org/10.1111/twec.13174

European Commission: https://knowledge4policy.ec.europa.eu/diversification-education-learning_en, 2021

Eurostat: Interest in online education grows in the EU, 1/2022, https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/edn-20220124-1

Global Industry Analysts: Global E-Learning Industry, February 2022, https://www.reportlinker.com/p03646043/Global-Mobile-Learning-Industry.html?utm_source=GNW

GlobeNewswire: Global E-Learning Market to Reach $457.8 Billion by 2026, May 4 2021, https://www.globenewswire.com/news-release/2022/05/04/2435658/0/en/Global-E-Learning-Market-to-Reach-457-8-Billion-by-2026.html

Khan, S., Yogendra B., Kumar V.: E-Learning Market Statistics: 2030, 2021, https://www.alliedmarketresearch.com/e-learning-market-A06253

Liu, J., Gao, Y.: Higher education internationalisation at the crossroads: effects of the coronavirus pandemic. Tert Educ Manag 28, 1–15 (2022). https://doi.org/10.1007/s11233-021-09082-4

mbb Institut: Auch für die E-Learning-Branche wachsen die Bäume nicht in den Himmel Ergebnisse des mmb-Branchenmonitors „E-Learning-Wirtschaft" 2020

Taneja S., Goel A.: MOOC Providers and their Strategies, IJCSMC, Vol. 3, Issue. 5, May 2014, pg.222 – 228

Technavio: E-learning Market in Europe to Record $ 28.36 bn during 2020-2024, Press Release PR Newswire, New York, August 11, 2021, https://markets.businessinsider.com/news/stocks/e-learning-market-in-europe-to-record-28-36-bn-during-2020-2024-technavio-1030718236

Doing market research

Market research allows us to know the key characteristics of the audience and competition before launching a service or product.

We must previously review the characteristics of the sector we want to enter, both before starting to invest in the development of the product and in advertising campaigns or strategies.

Without information, without data or without a study that allows us to know the possibilities we have, we will be risking too much, without being able to understand people's real needs and without knowing the possibilities of success.

As an approximate figure, of the total number of products that come onto the market, only 20% of these are positioned.

Whether it is due to the need for a product or not, in this article we are going to develop and see an introduction to what a market study is. From its concept to the benefits, we will obtain and its costs.
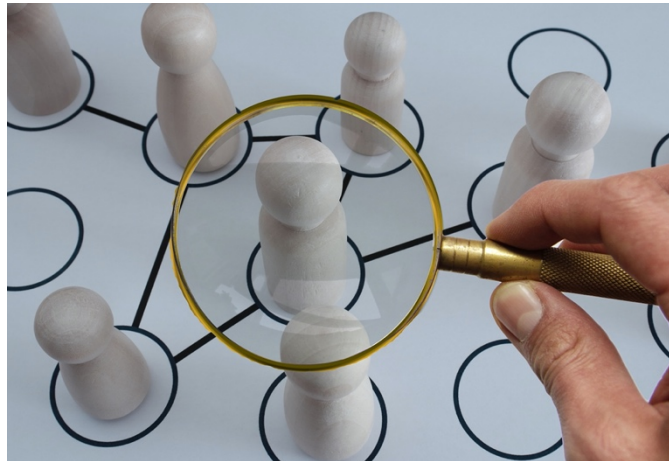
What does it really mean?

If we speak in economic terms and according to some sources, we can say that "market studies determine the viability of any economic activity".

The market study is the beginning and the previous foundations of any marketing strategy. We will analyse all the data in order to define among others

- Market position of the product or service
- Most important characteristics of supply and demand.
- Audience segmentation
- Price analysis
- Possible distribution and marketing channels

What is it for?

The main objective of market research is to validate economic profitability. Demonstrating the viability of an activity will make it possible to maximise profits from the outset and even attract investment.

Another important objective of this study is to anticipate the possible response of customers and competitors.

Differences with the concept of market research

This point is a constant when we ask ourselves what should I do? There is often confusion between market research and market research. Both strategies are different, especially because of the stage at which each of them should be used. Market research is done before and market research after.

Market research, as a marketing initiative, collects and analyses information from customers, suppliers and competitors. It is a strategy done before, in order to verify the viability of the venture and to formulate (later) a business plan.

In the case of market research, it is a method to obtain the interpretation of business data. That is, it is conducted after the launch of a product or service (and with some maturity in order to have consistent data).

In this way, the necessary forecasts and decisions can be made to improve the process. The following resources can be used as resources: surveys, interviews and competitor studies to gather the information.

Steps to carry out a market study

Among the needs to be covered by the study are:

- Barriers to market entry or difficulties.
- The level of existing competition in each territory
- The objective of the product/service in the market.
- The needs of the target within the market
- Special regulations in each country
- Segmentation

Therefore, we wanted to expand on these needs to be covered by the market research through the following steps:

1-Defining surveys

It is advisable to take the necessary time to formulate well the questions and details about which we want to know the answer.

The most appropriate methodology or survey should be selected to investigate and obtain the information we are looking for. Remember that, based on these results, conclusions and decision-making can be seriously affected.

With surveys we can find out:

- If the product or service is really good
- The potential market
- The prices over which the public is willing to pay
- Extra functionalities or features to be valued.
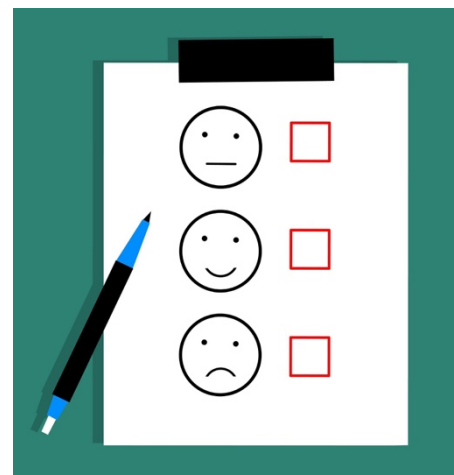
2-Segmenting the target audience

Market research, as a result, will allow you to have an orientation when targeting e.g. marketing campaigns on the total audience. You can find out as specific information as possible, which allows you to segment your audience. It can also be studied as the methodology of building a buyer persona. Thus, you will be able to target through:

- Geography
- Demographics
- Social segmentation.
- Behaviour or momentum.

3-Competitor research

Another of the highlights of market research is to get to know the competition in detail. You can learn a lot from their successes and mistakes. If they are where they are, it is because they have followed certain steps.

The first thing is to know which other companies or professionals offer similar products or services. We want to analyse them:

- Their work processes
- Observe their strengths and weaknesses
- Their customer service (we can even pretend to be one).
- Benefits or advantages of your product / service
- Analyse the key factors that have led them to where they are.

By analysing the results you will be able to determine what may not work or what does.

4-Check existing market regulations

Every project must have the appropriate legal advice and must be framed in the legislation and regulations of the geographical area it intends to cover.

Techniques for collecting and processing all information

It is advisable to select the appropriate study techniques for the data. In principle, they can be of two types: qualitative and quantitative.

If you require qualitative techniques, it is because you need to know the qualities, opinions or attitudes of consumers towards your product. In other words, they are value judgements, not quantifiable. For example, what would be the conclusions through discussion or interview (personal or group).

In the case of quantitative techniques, measurable data are required for statistical study. These may be forms or questionnaires specifically designed to ask for a rating in the form of a scale, and thus transform a qualitative opinion into a number that allows us to process it in a massive and automated way.

5-Analyse all information obtained

Once the ideal survey technique has been chosen, it is time to put it into practice. This can be done through the internet, government entities, potential consumers or competitors. Once collected, it is necessary to organise it in order to process it in a coherent way and draw conclusions.

6-Final report and inclusion of the study in the business plan

What is the structure of a market study? Depending on the objectives set, the structure may look something like this:

- In a first point Introduce about the needs to carry out the study.
- Explain the various sources of information needed to complete the study.
- Explain how the data collected was processed.
- Process the data and issue a final report.

Once the study is completed, its results can give you guidance on:

- Market sectors to invest in
- Market failures
- Business opportunities
- How your competitors' business is performing

In addition to this:

- You will get to know your target audience a little better.
- You will know first-hand the opinion of potential consumers.
- You will be able to rule out risky aspects of the product/service.

How to diversify your eLearning offer and increase your impact

First, let us put it in context by explaining in depth what diversification in general is all about. Companies are living and moving entities. The market and organisations grow, change, and expand. Remaining immobile and stagnant is the worst mistake an entrepreneur can make. Taking risks and betting on new products, sectors and customers will generate profits and improve your company's reputation. Do you dare to diversify your company?

Why diversify?

Business diversification is the process by which an organisation begins to offer new products or enter new markets by acquiring other corporations or investing in new businesses. These are growth and expansion strategies. This allows companies to attract new customers and expand their market reach.

Thus, a clothing shop could expand its product range by also offering fashion accessories, such as shoes, handbags, or jewellery. It could also choose to enter other markets by opening shops in other areas of the city, or by looking for a public with a different purchasing power. By adapting its products to the needs of new customers. To expand its scope of action, the most advisable would be to open an ecommerce and sell online, with subsequent home delivery.

The reasons why a company decides to start a diversification plan are numerous. Some of them are:

- **Risk reduction**: by broadening the scope of investment and having several businesses, companies reduce the risk of financial failure. The likelihood of one business failing is high, but the likelihood of several businesses failing is lower.
- **Market saturation**: The market is highly competitive and some industry sectors are oversaturated, with many organisations offering the same products and services. Diversification will open doors to new markets and allow new products to be offered.
- **Leveraging resources**: Some companies decide to invest their surplus resources and capabilities in creating new products or establishing links with other corporations.
- **Generation of synergies**: The development of new activities or relationships with other entities. This will result in a more efficient operation of the whole and greater control over the business.
- **Others**: Financial gain is not the only reason for diversification. Companies may seek to improve their market presence or reputation, adapt to changes in consumption or meet certain needs of their target audiences.

Types and strategies of diversification

Diversification broadens the horizons of the business and allows it to generate activity in new sectors. There are two main types of diversification: related diversification, which seeks relationships between the company's old and new activities; and unrelated diversification, whereby the new activities are unrelated to the company's original competencies.

Various development strategies can be used to implement the diversification plan:

- Horizontal: the company offers new products for sale in new markets that are related to the original business and industry. Amazon, which started as a simple online bookstore, now offers a huge variety of products of all kinds.
- Vertical: the organization engages in activities that it previously delegated to other players or market operations. This is the case of many supermarkets that, considering the consumption habits of their customers, incorporated their own logistics and distribution services to make home deliveries.
- Conglomerate: New markets and products are unrelated to the original ones. It is typical of large business groups. For example, Google started out as a search engine and offering cloud services. However, it now has Google Glasses and even cars.
- Concentric: Consists of the development of new products but keeping the same commercial line. Coca-Cola, for example, is not only limited to the production of the famous soft drink but has launched a whole range of similar beverages.

Having explained what diversification is in general, let's translate this to the eLearning sector. Standardised eLearning courses are no longer relevant in today's context. Personalisation has become the norm. Designing personalised courses is about delivering the right content, to the right audience, at the right time. To do this, designers need to pay attention to several elements, including:

E-learning elements
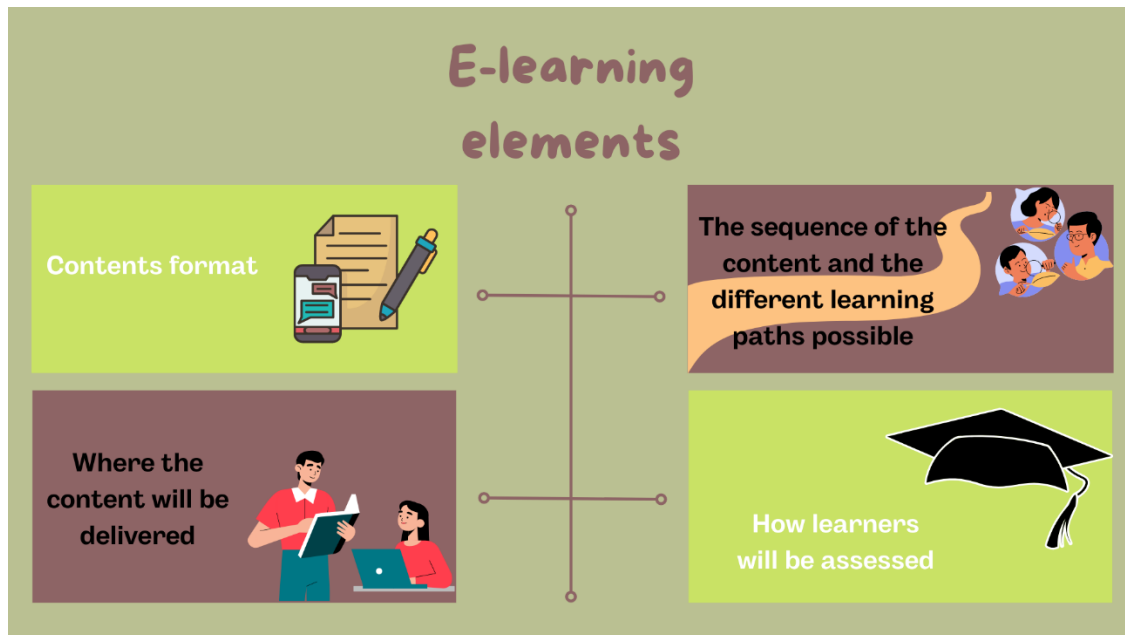
The following are different methods of how to diversify eLearning through new, more personalised experiences:

1) Provide Information in Multiple Formats

Nowadays, people may have different preferences in the way they learn new knowledge. Some may prefer to read books, listen to podcasts, or watch a PowerPoint full of slides. That is why when creating new content, it is considerable to create different formats that enable learners to choose how to visualise the content in the most comfortable way. More specifically in an eLearning module, learners would be able to:

- Watch a video overview of the topic
- Download an infographic
- Complete a comprehension assessment
- Participate in a discussion with other course participants.
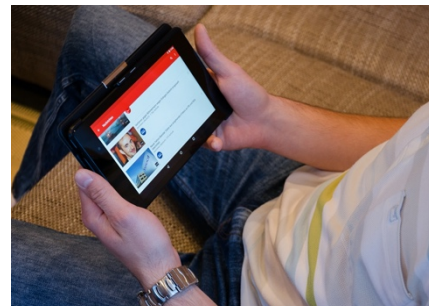
It should be noted that the different formats should be combinable with each other because the learner does not always have to use the same channel.

2) Share Short, On-demand Videos

It is very typical to find in eLearnig courses videos of about one hour in which learners listen to an expert talking about a topic. These videos can be tiresome for many learners, as they do not focus on the topic and can be confusing.

It is important to convert these videos into short videos of 3-5 minutes, which are more focused on specific topics and more enjoyable for the learner.

3) Develop Adaptive and Modular Content

Most of the time, courses are created for the average learner. Therefore, for example within a company, there will be a big gap between the more experienced and the more novice, as some will feel that they are wasting their time and others will feel that it is beyond their means.


That is why the contents must be adaptable according to the level of each learner. It would be considerable to have pre-assessments, and in case of success, to be able to jump to the next level. It is also important to make it adaptable to the learner's personal habits, as far as possible. eLearning courses should allow learners to define:

1. Their learning pathway (depending on their level of experience). Allow learners to create their own learning pathways. Create a design and establish a technological framework that allows learners to explore, find and 'pull' solutions to them rather than imposing learning on them.
2. The place and pace of learning
3. The device on which they want to view the content
4. The format: Determine when your audience is likely to access the content. This information is valuable because it will help you determine the type of content you should create.

4) Give Recommendations for Future Learning based on Their Needs

Just as, for example, film playback platforms recommend new films based on previously watched films, the same can be done with eLearning. Learners should be given recommendations of which courses they are most likely to be interested in based on their previous experiences. In this way, all learners can vary, as the next content they watch will be based on their preferences.
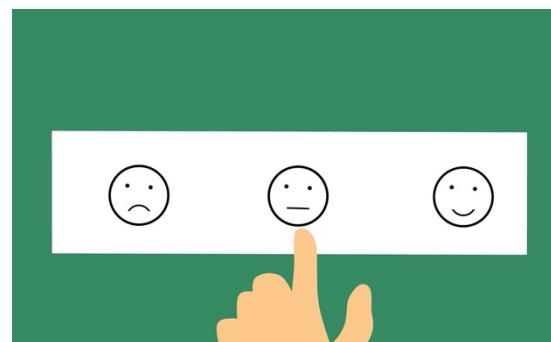
PART 3: VALIDATION & QUALITY

Part 3: Validation and quality

Presentation of DigiCompEdu

Teachers and educators are today in demand of a wide and more sophisticated set ok skills than before. Particularly the presence of digital equipment to help their students to become digitally skilled requires educators to increase their personal digital competence first. On national, European, and international level several frameworks, self-assessment tools and training programmes have been developed to demonstrate what are the features of digital competence for educators and to assist them evaluate their skill, define their training needs and offer appropriate training.

This chapter presents the common European Framework for the Digital Competence of Educators (DigCompEdu). The European Framework for the Digital Competence of Educators (DigCompEdu) is a scientifically sound background model that analyzes these needs. It assists to guide policy and be adapted to include national and regional tools and training programmes. Additionally, it offers a common procedure and language that will ease the implementation of a dialogue and exchange of best practices all over the European Union.

The targeted groups of this European framework are educators at all levels of education, from early childhood to higher and adult education, general and vocational training, non-formal learning contexts and special needs education are also included. In effect, DigCompEdu is also aimed to assist EU member states, regional authorities, educational institutions, private and public professional training providers, relevant national and regional agencies by providing them a general reference form for developers of Digital Competence models.

As presented on the following scheme, the DigCompEdu framework defines six different areas in which Digital competence of educators is stated with a total of 22 competences.
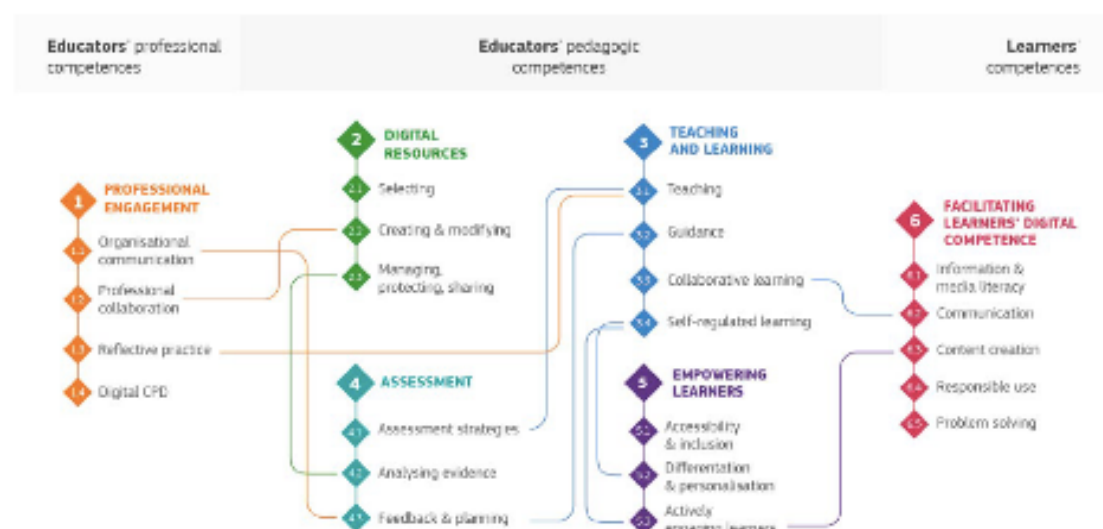
The six DigCompEdu areas focus on different aspects of educators' professional activities.
- The first area is Professional Engagement, this area is focused on using digital technologies for communication, collaboration and professional development.
- The second area is about Digital Resources which will consist of sourcing, creating and sharing digital resources.

- Teaching and Learning is the third area, and its activities will be managing and orchestrating the use of digital technologies in teaching and learning.
- The fourth area is regarded to use digital technologies and strategies to improve assessment.
- The fifth area intends to Empower Learners by using digital technologies to enhance inclusion, personalization, and learners' active engagement.
- The last area will be focused on facilitating Learners' Digital Competence, it will enable learners to use digital technologies creatively and responsibly for information, content, communication, creation, wellbeing, and problem solving.

We will now get more in depth by explaining the six distinguished areas. For each area we will present and analyze the competences it includes.

Professional Engagement

Professional Engagement is the main interest of Area 1. The advantages of educators' digital competence go beyond enhancing teaching, they are demonstrated in their capacity to use digital technologies, their professional interactions with colleagues, parents, learners and other interested parties, for their personal professional development and for the common good and permanent innovation in the institution and the teaching profession.

The first competence of this area includes is Organizational communication. This competence consists in using digital technologies aiming to improve organizational communication with learners, parents and third parties. Overall, its purpose is to contribute to collaboratively developing and improving organizational communication strategies.
The second competence is Professional Collaboration, it consists in using digital technologies aiming to engage in collaboration with other educators, sharing and exchanging knowledge and experience, and collaboratively innovating pedagogic practices.

The third competence is about Reflective Practice, in an individual and collective manner it's crucial to reflect on, critically evaluate and actively develop one's own digital pedagogical practice and that of one's educational community.

The fourth and last competence is Digital Continuous Professional Development, it stresses the importance of using digital sources and resources for permanent professional development.

Digital Resources

One of the main concerns of educators nowadays is the wealth of digital (educational) resources that they can utilize for their profession. A successful educator is the one who can make this variety of resources profitable, to select the appropriate resources that best fit his/her learning objectives, learner group and teaching style, to structure the wealth of materials, make connections and to modify, as well as adding on and provide themselves the proper digital resources to assist their teaching. In addition, it's essential to pay attention to how to responsibly use and manage digital content. For instance, they must respect copyright regulations when using, modifying or sharing resources, along with protecting sensitive information and data, such as digital exams or students' grades.

The first competence of this second area is about Selecting digital resources. This competence intends to identify, assess and select digital resources for teaching and learning, to consider the specific learning objective, context, pedagogical approach and learner group, when choosing digital resources and organizing their use.

Creating and modifying digital resources comes as the second competence of this area. This competence is developed when the educator can modify and build on existing openly licensed resources and other resources where this is authorized. It's acquired by creating or co-creating new digital educational resources or by considering the specific learning objective, context pedagogical approach, and learner group, when creating digital resources and planning their use.

The last competence of this area is Managing, Protecting and sharing digital resources. Organizing digital content and providing it to learners, parents and other educators is what is expected by the acquisition of this competence. The teacher must effectively protect sensitive digital content, respect and correctly apply privacy and copyright rules, but also comprehend the use and creation of open licenses and open educational resources, in addition to their relevant attribution.

Teaching and Learning

Digital technologies have a wide range of advantages when it comes to teaching and learning strategies, it can enhance them in various ways. However, whatever pedagogic strategy or approach is chosen, the educator's specific digital competence lies in effectively orchestrating the use of digital technologies in the different phases and settings of the learning process.

The fundamental competence in this area – and maybe of the whole framework is Teaching. This competence refers to designing, planning, and implementing the use of digital technologies in the different stages of the learning process.
Competences Guidance, Collaborative Learning and Self-Regulated Learning complement this competence by emphasizing that the real potential of digital technologies lies in shifting the focus of the teaching process from teacher-led to learner-centred processes. Thus, the role of a digitally competent educator is to be a mentor and guide for learners in their progressively more autonomous learning endeavours. In this sense, digitally competent educators need to be able to design new ways, supported by digital technologies, to provide guidance and support to learners, individually and collectively and to initiate, support and monitor both self-regulated and collaborative learning activities.

More precisely, the first competence concerns teaching. This competence aims to plan and implement digital devices and resources in the teaching process, in order to improve the

effectiveness of teaching interventions. Besides, it also intends to appropriately manage and orchestrate digital teaching strategies. This skill is also about experimenting with and developing new formats and pedagogical methods for instruction.

The second competence included in this area is guidance, its objective is to enable educators to use digital technologies and services to enhance the interaction with learners, individually and collectively, within and outside the learning session. It will ease the use of digital technologies to offer timely and targeted guidance and assistance. To experiment with and develop new forms and formats for offering guidance and support.

The third competence concerns collaborative learning, this acquirement of this competence will enable the use of digital technologies to foster and improve learner collaboration. It will also enable learners to use digital technologies as part of collaborative assignments, in the aim of improving communication, teamwork and collaborative knowledge creation.

The last competence this area covers is self-regulated learning. This competence enables the use of digital technologies to support learners' self-regulated learning, i.e., to permit learners to plan, monitor and reflect on their personal learning, offer evidence of progress, share insights, and come up with creative solutions.

Assessment

The fourth area covers the assessment. Assessment can ease to achieve innovation in education. It's important to integrate digital technologies into learning and teaching but it's also crucial to do the same with existing assessment strategies in order to enhance them. Additionally, it's essential to consider how they can be used to create or to facilitate innovative assessment approaches. Thus, digitally competent educators should be in capacity to use digital technologies within assessment with those two objectives in mind. Moreover, while using digital technologies in education, whether for assessment, learning, administrative or other purposes, a broad range of data on each individual learner's learning behavior will appear. Analyzing and interpreting this data and using it ease the decision-making process which will gain in value. Meanwhile, digital technologies can help to directly monitor learner progress, to ease feedback and enabling educators to assess and adapt their teaching methods.

The first competence of this area is focused on the assessment strategies. It aims to use digital technologies for formative and summative assessment. To improve the diversity and suitability of assessment formats and ideas.

The second competence is about analyzing evidence. It consists in observing, critically analyze and interpreting digital effects on learner activity, performance and progress, in order to inform teaching and learning.

The last competence of this area is feedback and planning. The objective is to use digital technologies to produce targeted and timely feedback to learners. It also aims to adapt teaching strategies and to provide targeted support based on the evidence produced by digital technologies. Conclusively, to permit learners and parents to understand the evidence provided by digital technologies and use it for decision-making.

Empowering Learners

Empowering Learners is the fifth area of interest of DigiCompEdu. One of the biggest advantages of digital technologies in education is their potential for assisting learner-center pedagogic strategies and improving the active involvement of learners in the learning process and their ownership of it. Consequently, learners' active engagement can be facilitated using digital technologies., e.g., while discovering a topic, experimenting with various options or solutions, comprehending connections, coming up with creatives solutions or creating an artefact and reflecting on it. Digital technologies can also offer learning activities adapted to each individual learner's level of skill, interests and learning needs thus contributing to

support classroom differentiation and personalized education. At the same time, it's fundamental to consider all learners, including those with special educational needs. All leaners must have access to digital technologies or digital skills in an equal manner.

Accessibility and Inclusion are the first competence of this area. Their aim is to ensure accessibility to learning resources and activities for all learners, including those with special needs. Another objective is to respond to learners' digital expectations, uses and misconceptions, additionally to physical, contextual, or cognitive limitations to their use of digital technologies.
Secondly, differentiation and personalization. Here we consider that this competence will use digital technologies to handle learners' diverse learning needs, by permitting learners to advance at various levels and speeds, and to track individual learning pathways and objectives.
The last competence of this area is to make the leaners actively engaged. By doing so, learners will be using digital technologies to foster their active and creative engagement with a subject matter. Digital technologies will be used within pedagogic strategies that support learners' transversal skills, deep thinking and creative expression. This competence intends to open up learning to new, real-world contexts, which learners participate themselves in hands-on activities, scientific investigation or complex problem solving, or in alternative ways increase learners' active engagement in complex subject matters.

Facilitating Learners' Digital Competence

The last area covered by this guide is focused on facilitating Learners' Digital Competence. Educators must be considering the importance of transmitting digital competence to their learners. Consequently, this ability requires a dedicated area in the DigiCompEdu guide. The European Digital Competence Framework for Citizens underlined the importance of learners' digital competence. Thus, the DigCompEdu area follows the same structure and details five competences aligned in description with DigComp 2.0 (see below).

Information and media literacy is the starting point of this area. With this competence it's expected to incorporate learning activities, assignments and assessments which demand learners to articulated information needs, to look for information and resources in digital atmospheres, to prepare, process, analyze and interpret information, and to compare and critically evaluate the credibility and reliability of information and its sources.

Digital communication and collaboration come as the second competence covered by this area. Here it's expected to incorporate learning activities, assignments and assessments which demand learner to use digital technologies effectively and responsibly for communication, collaboration and civic engagement.

The third competence is about Digital content creation. It consists in incorporating learning activities, assignments and assessments which demand learners to express themselves through digital means, and to modify and create digital content in different formats. It covers the teaching of learners on how to copyright and licenses apply to digital content, how to reference sources and attribute licenses.

The fourth competence highlights the responsible use by taking measures to ensure learners' wellbeing while using digital technologies. The acquirement of this competence will help learners to manage risks and use digital technologies in a safe and responsible way.

The last competence of this area is Digital problem solving. In order to incorporate learning activities, assignments and assessments which require learners to choose, to recognize and solve technical issues, or to transfer technological knowledge creatively to new situations.

Presentation off DigiComp 2.0,

The world is being transformed everyday through digital technology. However, 44% of Europeans lack the basic digital skills necessary for every life. Thus, a need for a new European conversation about Digital Skills became evident. Not just about the ability to use the latest software device or software but about everyone's ability to use digital technology to cover their needs. To tackle the issue, the European Commission collaborated with stakeholders and experts to develop DigComp "The European Digital Competence Framework". DigComp is a reference framework that gives information on the knowledge, attitudes and competences people need to become digitally competent in all aspects of life. DigComp can support with self-evaluation, setting learning objectives, identifying training opportunities and facilitating job search.
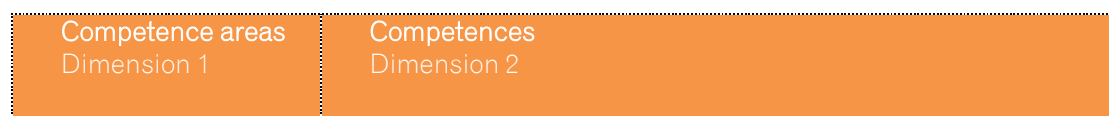
In this chapter we are going to present and explain the latest version of the Digital Competence Framework for Citizens which is DigComp 2.0. It was developed by the Human Capital and Employment Unit (Joint Research Center) on behalf of the Directorate General for Employment, Social Affairs and Inclusion of the European Commission.

DigComp divides digital competences into 5 key competence areas that we are going to present during this chapter. Within these areas 21 individual competences are included. From communication to digital content creation, to online safety and using technology to solve problems. DigComp provides comprehensive and detailed approaches on what Digital Competence brings to our society. Each of the 5 key competences is divided into 8 proficiency levels, that starts from beginner to exper. Proficiency levels can assist in identifying the next steps in the learning experience for people with any level of digital skills.

More precisely, DigComp was developed for citizens, it's about defining the competences that the citizens need in order to adapt to the digital future. It focuses on how we make digital tools and technology work for us. It deals with the risks such as comportment online and protection of identity. Moreover, DigComp intends to motivate and engage citizens in a new conversation about digital technology and the advantages it provides for creativity and active participation in a digital society. DigComp 2.0 is a free, flexible, and accessible tool that can be adapted to citizens' needs. It helps European Citizens to develop the skills they need to embrace a digital future and benefit from its advantages in all areas of their daily lives.

DigComp 2.0 - the Conceptual Reference Model

In this part, we are going to present the updated conceptual reference model for the Digital Competence Framework for Citizens.

Competence areas Dimension 1	Competences Dimension 2

1. Information and data literacy	Browsing, searching and filtering data, information and digital content To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies. Evaluating data, information and digital content To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content. Managing data, information and digital content To organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment.
2. Communication and collaboration	Interacting through digital technologies To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context. Sharing through digital technologies To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices. Engaging in citizenship through digital technologies To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies. Collaborating through digital technologies To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge. Netiquette To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments. Managing digital identity To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.

3. Digital content creation	**Developing digital content** To create and edit digital content in different formats, to express oneself through digital means. **Integrating and re-elaborating digital content** To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge. **Copyright and licences** To understand how copyright and licences apply to data, information and digital content. **Programming** To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.
4. Safety	**Protecting devices** To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy. **Protecting personal data and privacy** To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a "Privacy policy" to inform how personal data is used. **Protecting health and well-being** To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social well- being and social inclusion. **Protecting the environment** To be aware of the environmental impact of digital technologies and their use.

5. Problem solving	**Solving technical problems** To identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems). **Identifying needs and technological responses** To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility). **Creatively using digital technologies** To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments. **Identifying digital competence gaps** To understand where one's own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek opportunities for self-development and to keep up-to-date with the digital evolution.

To summarize what is presented on the above table, first we can note that Information and data literacy intends to articulate information needs, to locate and retrieve digital data, information and content. In addition, it aims to assess the relevance of the source as well as the content it includes. Storing, managing and organizing digital data, information and content are also part of this first competence area.

The second competence area Communication and collaboration aims to interact, communicate and collaborate with the use of digital technologies while being aware of cultural and generational diversity. Participating in society through public and private digital devices and participatory citizenship is also part of this competence area. In this competence area one's digital identity and reputation will be managed. Digital content creation comes as the third competence area. It aims to create and edit digital content. To improve and integrate information and content into an existing body of knowledge while considering how copyrights and licenses are to be applied. In addition, it intends to know how to give understandable instructions for a computer system.

The fourth competence area is focused on Safety, here it's that protecting devices, content, personal data and privacy in digital environments became crucial. Also protecting physical and psychological health. Be aware of digital technologies for social well-being and social inclusion and aware of the environmental impact of digital technologies and their use. Conclusively, problem solving comes as the last competence area in this framework. It aims to identify needs and problems, as well as resolving conceptual problems and problem situations in digital environments. It encourages the use of digital tools in order to innovate processes and products and, lastly, to observe the digital evolution.

Presentation of DigCompOrg

In this era of globalization, education is now acknowledged as one of the pillars for fostering competitiveness and prosperity. In order to keep up with the digital economy and culture, nations all over the world are currently looking to develop their education and training (E&T) systems. In 2020, Europe has defined a strategy that acknowledges that it's essential to transform Education and Training (E&T) in order to offer the knowledge, skills and

competences required if European Nations are looking forward to remain competitive, overcome the current economic crisis and exploit new opportunities. E&T systems innovation has become a primary objective in numerous flagship initiatives of the Europe 2020 strategy, particularly in the Agenda for New Skills and Jobs, Youth on the Move, the Digital Agenda and the Innovation Agenda. Additionally, to the digital transformation of education and training, improving digital competences and online learning were also part of the new priorities of the Juncker Commission, especially those focused on the Digital Single Market and on Jobs, Growth and Investment.

There is a clear need for educational institutions such as schools and universities to include and effectively use digital technologies in order to achieve their main mission: to enable students to be successful in a complex and interconnected world that faces rapid technological, economic, cultural, informational and demographic change. The impacts occurred by digital technologies can be seen in all educational sectors (e.g., higher education as well as informal and non-formal learning), they affect all facets of the educational value chain (e.g., curricular reform, teaching and learning practices, assessment, initial and continuing teacher professional development), as well as educational actors such as students, school directors and teachers. Digital technologies can enable a remarkable change in learning and teaching practices; hence they do not ensure it. However, if education organizations are willing to strengthen progress and to guarantee scale and sustainability, they must review their organizational strategies, to improve their capacity for innovation and to take advantage from the potential of digital technologies and content. Numerous frameworks and self-assessment tool are now applied in several European countries, however, there is still a need to establish a pan-European approach to organizational digital capacity. In other words, there is a need for a European Framework that can provide a systemic approach which can add value by supporting transparency, peer-learning and comparability.

In this context, the European Reference Framework of Digitally Competent Educational Organisation (DigCompOrg) is an initiative of the European Commission, Directorate General for Education and Culture (DG EAC). Research and design of the Framework was carried out by the Joint Research Centre - Institute for Prospective Technological Studies (JRC-IPTS). It was designed to be used by educational institutions to guide a process of self-reflection on their evolution towards comprehensive integration and effective implementation of digital learning technologies. DigcompOrg is expected to provide transparency and comparability between related initiatives all over Europe, as well as playing a role in tackling fragmentation and uneven development across EU countries. Moreover, the framework can be applied as a strategic planning tool to encourage policymakers to support comprehensive policies for the effective uptake of digital learning technologies by educational institutions at regional, national and European level. Furthermore, it can be used as a tool to raise awareness about the systemic approach needed for effective use of digital learning technologies.

DigCompOrg Framework

DigCompOrg framework is composed of seven key elements and 15 sub-elements that are common to education sectors. In addition, a scope for the addition of sector-specific elements and sub-elements was developed.

In effect, 75 descriptors were developed specifically for each of the elements and sub-elements of DigCompOrg. On the diagram below we can observe that the elements, sub-elements and descriptors of DigCompOrg are presented as the segments of a circle, with a highlight on their relatedness and inter-dependence.

In the context of DigCompOrg, digital learning technologies represent an essential enabler for educational institutions, which can assist their work to accomplish their mission and vision for quality education. In fact, in order to integrate digital technologies, there is a need to possess educational innovation, they also imply a process of planning for change on three basic areas: pedagogical, technological and organizational.

DigCompOrg offers a comprehensive and generic conceptual framework considered as an image of all aspects of the process of systematically including digital learning in educational institutions from all education levels and sectors. Another advantage of this framework is related to the fact that it was developed to be adapted to the specific contexts within which educational institutions, actors, intermediaries or project developers operate (e.g., sector-particular elements, sub-elements or descriptors may be added). DigCompOrg empower rather than replaces other European frameworks and tools already in application for particular targets: e.g., the DIGCOMP framework that can be applied to enhance relevant aspects of students' digital skill.

The main two objectives of DigComOrg are to first promote self-reflection and self-assessment within educational institutions as they gradually intensify their involvement in digital learning and pedagogies. Second to ease for policy makers (at local, regional and international level) the design, implementation and assessment of programmes, projects and policy interventions for the inclusion of digital learning technologies in E&T systems.

DigCompOrg is created to concentrate mainly on the teaching, learning, assessment and related learning support missions or activities thanks to a provided educational organization. In this way, it's not designed to tackle the full range of administrative and management information systems that may be in application with the organization. DigCompOrg is composed of elements, sub-elements and descriptors that may be viewed as connected to 'organizational responsibilities' (e.g. Infrastructure) or to 'individual responsibilities'(e.g., Teaching and Learning practices). Hence, it demonstrates the reality regarding the need for a balanced combination of strong leadership and governance for a digitally competent educational organisation (for vision and top-down strategies). Staff and stakeholders are in the capacity of being personally responsible (for self-initiated actions and bottom-up efforts and initiatives).

Presentation of the SELFIE TOOL

Digital technologies are changing several areas of daily life. Schools and classrooms are one of these areas that has changed their ways of educating and teaching by the usage of technology to support teachers and students. The main concern regarding this change is the readiness or not of schools to make the most of digital technologies for learning. Research revealed that there are still many things that must be enhanced. In order to help schools, accomplish where they stand in their use of digital technologies, in October 2018 SELFIE tool, a free online easy to use self-reflection tool was developed. In other words, taking a SELFIE of a school means focusing on various areas such as school strategies, teaching practices, infrastructure, curriculum, and experience of students. Indeed, every school has its features and particularities, consequently SELFIE can be customized. Each school can choose and even add its own questions and statements to suit a specific situation. Through SELFIEs school leaders, teachers and students can share and express their thoughts on how technology is used for teaching as well as learning. It's crucial to have the view of the whole school actors and the feedback produced is used to generate a SELFIE school report. An idea of how digital technologies are implemented in that school showing strengths, weaknesses, and potential areas for improvement. Moreover, this report is intended to be used as a dialogue within the school, additionally it serves to create an action plan to improve the use of digital technologies of teaching and learning. All data or information available on SELFIE is collected anonymously. This tool is considered as the first step in reflecting where the schools stand in digital age learning and to give an idea about what next steps could be.

SELFIE is an initiative of the European Commission and is funded through the Erasmus programme. It's free of charge for every school inside the European Union. SELFIE tool has been designed with a team of experts from schools, education institutions and research centers across Europe. Several European bodies participated in developing the tool such as the European Training Foundation, the European Center for the development of Vocational Training (CEDEFOP) and UNESCO's Institute for Information Technologies in Education.
During the creation and testing periods of SELFIE school leaders, teachers and students have been involved. In effect, 5000 staff and students gave input into the early design of the tool, 67000 people from 650 schools across Europe, took part in the pilot test. The testing process took place in primary schools to ensure it could be comprehended by younger students. Today SELFIE tool is used by more than one million and seven hundred users in 13151 schools in 82 countries across Europe.

How it works

SELFIE tool is composed of three main sections. The first section consists of setting up and managing SELFIE in your school. The second section is about interpreting and applying the results. On the last section it's possible to contact SELFIE team or find more about the tool.

SELFIE tool is beneficial for schools since it helps them to obtain a better understanding of how digital technologies are used to support teaching and learning. Through SELFIE students feel ownership of the decisions they have taken with their teachers and leaders on digital technologies as they gave input and participated in discussions on results. In simple words, SELFIE is a free, easy-to-use, customizable tool to assist schools evaluate their position concerning learning in the digital era.

Presentation of other Digital Skills competence frameworks

UNESCO Competency Framework for Teachers

The ICT Competency Framework for Teachers (ICT CFT)3 has been developed by UNESCO to guide pre- and in- service teacher training on the use of ICTs across the education system. It is intended to be adapted and contextualized to support national and institutional goals. Its target audience is teacher-training personnel, educational experts, policy-makers, teacher support personnel and other professional development providers.

UNESCO say "Implementing the ICT CFT requires an enabling strong environment, including a determined leadership from government, from those responsible for teacher education and professional development of in-service teachers, and from head teachers and school principals."

The UNESCO ICT CFT framework (V3) identifies 18 ICT competencies to which teachers should aspire and subdivides these into 64 specific objectives. The competencies range from encouraging teachers to understanding national priorities as identified in national ICT in Education policies, how ICT can support the curriculum, assessment strategies, pedagogy, school and class organization, administration as well ongoing professional development.

Figure 1: The ICT Competency Framework for Teachers

UNESCO have also created an Open Education Resources repository, where open courseware resources can be indexed according to the ICT CFT competencies and

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objectives. The ICT CFT Hub4 has a search tool that allows developers to search for, and identify, resources that support teachers to acquire a specific ICT CFT objective and the hub contains collections of Open Education Resources (OER) curated by UNESCO and partner countries, aligned to the UNESCO ICT Competency Framework for Teachers (CFT).

Technological Pedagogical and Content Knowledge (TPACK)

OECD has promoted the Technological Pedagogical and Content Knowledge (TPACK) theoretical framework aiming at specifying what knowledge is required for teaching in the 21st century5.

The framework stresses the complex intersection of technological, pedagogical and content knowledge within given contexts. The framework suggests that apart from considering these components in isolation, it is necessary to look at them in pairs as "Pedagogical Content Knowledge" (PCK), "Technological Content Knowledge" (TCK), "Technological Pedagogical Knowledge" (TPK), and finally, all three taken together, as "Technological Pedagogical and Content Knowledge" (TPACK)

Sally Willermark says: "The great impact of TPACK may be because it constitutes a theoretical framework that focuses on how technology is integrated into teaching. TPACK represents a holistic view of the knowledge teachers need to effectively apply technology in teaching." "She goes on to explain that 'Technological Pedagogical Knowledge' is knowledge of the existence and capabilities of various technologies that are used in teaching and learning settings, and knowing how teaching can transform when using particular technologies. This is based on an understanding that a range of tools exists for a particular task.

Digital Teaching Professional Framework

The Digital Teaching Professional Framework is a competency framework for teaching and training practitioners across all parts of the Further Education sector in the UK, including for learning providers in the workplace, community settings and prisons. It has been designed to focus on the benefits of good pedagogy supported by technology to enhance learning.

The framework sets out different teaching contexts and activities, and the main components that comprise each of these. Each component is mapped to relevant parts of the European Framework for the Digital Competence of Educators. There are statements that describe what competency looks like for each of the teaching and training activities that form the core elements of the framework. The competency statements describe three stages of competence – Exploring, Adopting, Leading – to show how practitioners can develop their skills.

Relationship of Digital Competence Frameworks to Occupational Skills Frameworks

There are two main occupational skills Frameworks used in European countries. The first is the long established O*Net Framework, supported by the U.S. Department of Labor/Employment and Training Administration. The second, ESCO6 (European Skills, Competences, Qualifications and Occupations) is the European multilingual classification of
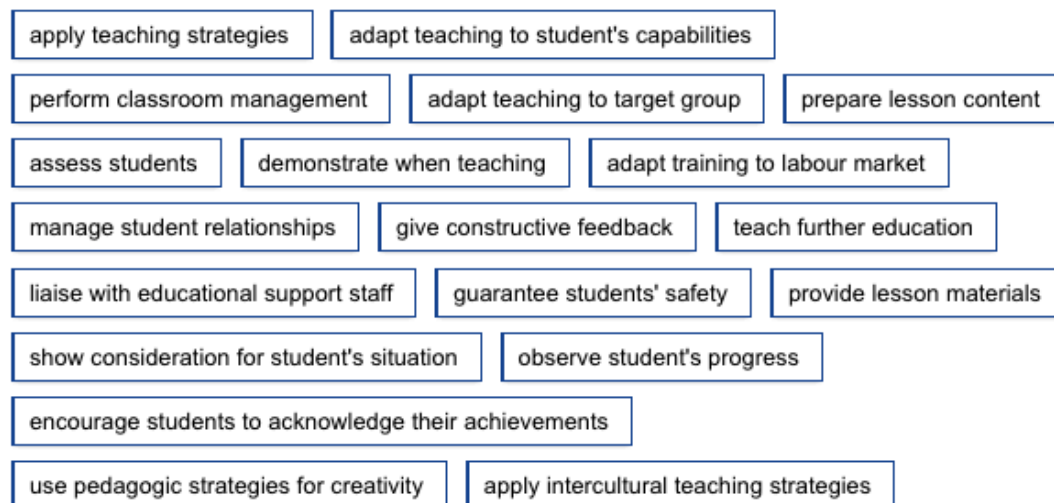

Skills, Competences and Occupations. Although differing somewhat in the occupations they classify, they work in a similar way. Here we will focus on ESCO.

ESCO works as a **dictionary,** describing, identifying and classifying professional occupations and skills relevant for the EU labour market and education and training. Those concepts and the relationships between them can be understood by electronic systems, which allows different online platforms to use ESCO for services like matching jobseekers to jobs on the basis of their skills, suggesting trainings to people who want to reskill or upskill etc.

ESCO provides descriptions of **3008 occupations and 13.890 skills** linked to these occupations, translated into 27 languages (all official EU languages plus Icelandic, Norwegian and Arabic).

Skills & Competences

Essential Skills and Competences

apply teaching strategies   adapt teaching to student's capabilities

perform classroom management   adapt teaching to target group   prepare lesson content

assess students   demonstrate when teaching   adapt training to labour market

manage student relationships   give constructive feedback   teach further education

liaise with educational support staff   guarantee students' safety   provide lesson materials

show consideration for student's situation   observe student's progress

encourage students to acknowledge their achievements

use pedagogic strategies for creativity   apply intercultural teaching strategies

Essential Knowledge

learning difficulties   curriculum objectives   adult education   assessment processes

training subject expertise

Figure 2. The ESCO Essential Skills and Competence and Essential Knowledge for a vocational teacher

The clear and detailed learning outcomes that are provided through ESCO can be used to identify, document, assess and certify the skills and experience that an individual has acquired through informal or non-formal learning.

Organisations can use ESCO to identify the skills developed in a given activity. ESCO say a labour market terminology that can help understanding which occupations and skills are related to a particular qualification allows learners, job seekers and employers to best use this information: ESCO fills this need by providing an updated, evidence – based and multilingual skills and occupation vocabulary.

ESCO supports education and training systems in the shift to learning outcomes that serves better the labour market needs and helping learning institutions to express their learning outcomes in a way that facilitates the understanding of their qualifications by labour market actors and to attract learners from within and across borders.

Competences and practice

What is means to be technologically knowledgeable is complex, especially in. fast changing knowledge domain, and studies show that although teachers may have technological knowledge, it does not automatically mean they are capable of using them in teaching practice.

Self Assessment of competences

DigCompEdu contextualizes the use of digital skills within the educational contexts and is designed as a tool for supporting both the identification of individual practitioners' competence and the design of initial and professional development programmes to further develop competences. DigCompEdu provides for each competence different levels of response based on frequency and complexity of use of technology in teaching and learning. There are an increasing number of online tools, based on DigCompEdu such as Skills Match allowing teachers and trainers themselves identify their own competence and what further competences they might need to develop. As Sally Willermark[7] points out "self-reporting questionnaires offer an opportunity of highlighting teachers' perspectives, as well as offering opportunities for reflection on teachers' own technology-related knowledge and skill."

However, she also draws attention to studies show that making accurate evaluations of one's own abilities is a difficult task and a risk that people to answer in a way that is more socially acceptable.

That having been said, DigCompEdu is being widely used in many European countries. Perhaps the bidder issue is the availability of flexible professional development opportunities to develop competences. Work we have undertaken in the SkillsMatch project reveals increasing number of online courses in using technology to support teaching and learning although it can still be difficult to match such programmes to the DigCompEdu competences and for those providing accreditation different approaches to more formal assessment.

Assessment of competences

Of course, in traditional initial teacher training courses, examinations or assessments that test teachers'knowledge are common and it is possible to extend those to include technology-related knowledge. But as we said before it is the use of technology for teaching and learning which is the real measure of competence here.

One approach is to provide tasks in which teachers are asked to perform teaching actions, such as planning or implementing teaching with technology in a fictional or authentic setting, and where the performance is observed, documented, and analysed. This still has restrictions in terms of understanding decision-making processes and the rationale behind the activities and performance. The use of video or even Augmented reality may help here, as will reflection on practice

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[7] https://www.oecd-ilibrary.org/sites/39f7744f-en/index.html?itemId=/content/component/39f7744f-en

Certification of competences

Certification of competences is another issue. Initial teacher training programmes provide certification at an institutional or national level. Professional development is another issue, although there is an increasing trend towards providing certificates of attendance or completion in seminars, webinars and especially for Massive Open Online Courses (MOOCs). Another development is the award of Open Badges. Open Badges are digital, verified by secure metadata, and are seen as a means for individuals to display, and organizations to easily verify certifications, achievements and awards online, including milestones on the way to a full certification.

Quality Assurance in eLearning provision

e-Learning background – a QA perspective

Since the 1990s, the proliferation of the World Wide Web led education institutions and learning providers towards the exploitation of the new technology in providing courses online. Online courses became really popular as an alternative to traditional educational provision, typically in the form of a Virtual Learning Environment (VLE) Primarily used for offering access to course content. At the same period, developments in Computer Supported Cooperative Work and Groupware technologies, enriched the variety of tools that could be incorporated in online courses. This meant that functionalities of online courses also included synchronous and asynchronous communication such as chat tools, threaded discussions, forums, and with the wide adoption of Web 2.0 technologies, online learners could engage with wikis, blogs and even electronic meeting systems and whiteboards. Later on, video conference tools triggered dramatic changes in real-time online delivery of course content.

These drastic changes across the sector meant that traditional Quality Assurance practices had to adapt to a new set of standards. In the UK, the Quality Assurance Agency for Higher Education (QAA) is an independent charity working to benefit students and higher education, and one of the world's experts in quality assurance. They are trusted by higher education providers and regulatory bodies to maintain and enhance quality and standards. We work with governments, agencies and institutions globally to benefit UK higher education and its international reputation (https://www.qaa.ac.uk//en/home). Increasingly QA practices started to incorporate aspects of e-learning as an acceptable mode of delivering education, gradually adopting new modes of delivery including:

- E-learning
- Blended learning
- Hybrid learning
- Flexi learning

The following list is an example of resources that are required as a reference guide for the accreditation and validation of a typical undergraduate course in higher education. These resources include benchmark statements that help to create learning outcomes, good practice for the use of technology, pedagogic models and techniques for aligning learning to relevant industry and employability initiatives.

- QAA Computing subject benchmark statements, Computing (March, 2022) (https://www.qaa.ac.uk/quality-code/subject-benchmark-statements/computing)

- QAA Quality Code for Higher Education (May, 2018) (https://www.qaa.ac.uk/quality-code)

- British Computer Society (BCS) guidelines on course accreditation (April, 2022) (https://www.bcs.org/media/1209/accreditation-guidelines.pdf)

- Certifications for IT Professionals (https://www.bcs.org/qualifications-and-certifications/certifications-for-professionals/)

- Skills Framework for the Information Age (SFIA) (https://sfia-online.org/en)

- Association for Computing Machinery (ACM) and Association for Information Systems (AIS) Curriculum Guidelines for Undergraduate Degree Programs in Information Systems (2010) (https://www.acm.org/binaries/content/assets/education/curricula-recommendations/is-2010-acm-final.pdf)

- Association for Computing Machinery (ACM) overview report on Computing Curricula, (December, 2020) (https://www.acm.org/education/curricula-recommendations)

- Association for Computing Machinery (ACM) and Association for Information Systems (AIS) Global Competency Model for Graduate Degree Programs in Information Systems (May, 2017) (https://www.acm.org/binaries/content/assets/education/msis2016.pdf)

- Descriptors defining levels in the European Qualifications Framework (EQF) that is now known as Europass (https://europa.eu/europass/en)

- European e-Competence Framework that is now known as IT Professionalism Europe (https://itprofessionalism.org/)

- Middlesex University Regulations (2022/23) (https://www.mdx.ac.uk/__data/assets/pdf_file/0020/665120/Final-Regulations-2022-23-V1.pdf)

- Middlesex University Learning and Quality Enhancement Handbook (section 3) (https://www.mdx.ac.uk/about-us/policies/academic-quality/handbook)

- Middlesex University Policies (https://www.mdx.ac.uk/about-us/policies)

- DigiCompEdu Framework (https://joint-research-centre.ec.europa.eu/digcompedu/digcompedu-framework_en)

e-Learning revised – post COVID19 sector development

The COVID19 pandemic had a dramatic effect across the world, also affecting learning providers and educational institutions. The main differentiating factor was the ability of certain organisations to swiftly adapt to the situation in order to deal with the disruptions caused by the pandemic.

Social distancing meant that both instructors and learners were not able to engage in traditional face-to-face learning activities. Teaching practices had to shift to online environments, assessment had to be revised and educational technologies were used for communication, coordination and collaboration of activities in any educational context.

This scenario meant that organisations experienced significant changes in a very short period, and there were extreme differences in the preparedness and readiness at international, national and institutional level. There were countries that had their entire education sector affected for years, only recovering now, almost three years after the first COVID19 cases. There were also cases where institutions in rural areas were more affected in comparison to the ones located in the nation's capital or big cities. The dependency on technology was higher for certain institutions as there was no infrastructure that was previously used extensively to support a transition towards e-learning. Finally, institutions had

to reflect their readiness level to shift to a complete e-learning provision and support based on a number of aspects including (i) supporting alternative pedagogic models, (ii) using educational technologies, (iii) revising instruction practices, (iv) enhancing learning, teaching and assessment experiences.

Understandably, QA priorities shifted towards assessing the role of QA in delivering, supporting and assessing e-learning provision. We will now focus on QA aspects that remain relevant in the psot-COVI19 era, covering international e-learning practices.

QA policy – UK

In July 2022, the QAA introduced "a UK sector-wide conversation about the future scope and structure of the Quality Code". **The Quality Code is based on a number of elements that together provide a reference point for effective quality assurance.** The QAA Quality Code is illustrated below and consists of the following elements:

- **Expectations** – express the outcomes providers should achieve in setting and maintaining the standards of their awards, and for managing the quality of their provision. They are mandatory requirements for all UK providers.
- **Core practices** – represent effective ways of working that underpin the delivery of the Expectations and result in positive outcomes for students. They are mandatory requirements for all UK providers.
- **Common practices** – focus on enhancement. They are mandatory requirements for all providers in Scotland, Wales and Northern Ireland. In England, providers may wish to work towards these, but are not required to do so as they are not regulatory requirements and will not be assessed as part of the OfS's regulatory framework.
- **Advice and guidance** – made up of sector-developed themes, designed to support providers in developing and maintaining effective quality assurance practices. This is not mandatory for providers, but illustrative of a range of possible approaches.

Figure: The QAA Quality Code

According to the QAA code (https://www.qaa.ac.uk/the-quality-code#) there are certain expectation for **standards** including (i) the academic standards of courses meet the requirements of the relevant national qualifications framework, and (ii) the value of

qualifications awarded to students at the point of qualifications and over time is in line with sector-recognised standards. Furthermore, the QAA code also includes expectations for **quality**, including (i) courses are well-designed, provide a high-quality academic experience for all students and enable a student's achievement to be reliably assessed, and (ii) from admission through to completion, all students are provided with the support that they need to succeed in and benefit from higher education. The full QAA code is available to download at https://www.qaa.ac.uk/the-quality-code#.

With regards to QA, the QAA code includes the following core and common practices.

<u>Core Practices</u>

- The provider has a reliable, fair and inclusive admissions system.
- The provider designs and/or delivers high-quality courses.
- The provider has sufficient appropriately qualified and skilled staff to deliver a high-quality academic experience.
- The provider has sufficient and appropriate facilities, learning resources and student support services to deliver a high-quality academic experience.
- The provider actively engages students, individually and collectively, in the quality of their educational experience.
- The provider has fair and transparent procedures for handling complaints and appeals which are accessible to all students.
- Where the provider offers research degrees, it delivers these in appropriate and supportive research environments.
- Where a provider works in partnership with other organisations, it has in place effective arrangements to ensure that the academic experience is high-quality irrespective of where or how courses are delivered and who delivers them.
- The provider supports all students to achieve successful academic and professional outcomes.

<u>Common practices</u>

- The provider reviews its core practices for quality regularly and uses the outcomes to drive improvement and enhancement.
- The provider's approach to managing quality takes account of external expertise.
- The provider engages students individually and collectively in the development, assurance and enhancement of the quality of their educational experience.

QA policy – EU

Since 2015, the **Standards and Guidelines for Quality Assurance in the European Higher Education Area** (ESG) (https://www.enqa.eu/wp-content/uploads/2015/11/ESG_2015.pdf) were adopted by the Ministers responsible for higher education in 2005 following a proposal prepared by the European Association for Quality Assurance in Higher Education (ENQA) in cooperation with the European Students' Union (ESU),1 the European Association of Institutions in Higher Education (EURASHE) and the European University Association (EUA). As explained in the ESG guide the ESG are a set of standards and guidelines for internal and external quality assurance in higher education. Furthermore, the ESG are not standards for quality, nor do they prescribe how the quality assurance processes are implemented, but they provide guidance, covering the areas which are vital for successful quality provision and learning environments in higher education.

Moreover, the **focus** of the ESG is on quality assurance related to learning and teaching in higher education, including the learning environment and relevant links to research and

innovation. The ESG **apply** to all higher education offered in the EHEA regardless of the mode of study or place of delivery. The ESG purposes are as follows:

- They set a common framework for quality assurance systems for learning and teaching at European, national and institutional level;
- They enable the assurance and improvement of quality of higher education in the European higher education area;
- They support mutual trust, thus facilitating recognition and mobility within and across
- national borders;
- They provide information on quality assurance in the EHEA.

The ten ESGs are described next. We will focus on those standards intended for internal and external QA, as standards intended for QA agencies are not relevant to the focus of this research.

<u>Internal QA</u>

1.1   Policy for quality assurance – standard: "Institutions should have a policy for quality assurance that is made public and forms part of their strategic management. Internal stakeholders should develop and implement this policy through appropriate structures and processes, while involving external stakeholders."

1.2   Design and approval of programmes – standard: "Institutions should have processes for the design and approval of their programmes. The programmes should be designed so that they meet the objectives set for them, including the intended learning outcomes. The qualification resulting from a programme should be clearly specified and communicated, and refer to the correct level of the national qualifications framework for higher education and, consequently, to the Framework for Qualifications of the European Higher Education Area."

1.3   Student-centred learning, teaching and assessment – standard: "Institutions should ensure that the programmes are delivered in a way that encourages students to take an active role in creating the learning process, and that the assessment of students reflects this approach."

1.4   Student admission, progression, recognition and certification – standard: "Institutions should consistently apply pre-defined and published regulations covering all phases of the student "life cycle", e.g., student admission, progression, recognition and certification."

1.5   Teaching staff – standard: "Institutions should consistently apply pre-defined and published regulations covering all phases of the student "life cycle", e.g., student admission, progression, recognition and certification."

1.6   Learning resources and student support – standard: "Institutions should have appropriate funding for learning and teaching activities and ensure that adequate and readily accessible learning resources and student support are provided."

1.7   Information management – standard: "Institutions should ensure that they collect, analyse and use relevant information for the effective management of their programmes and other activities."

1.8   Public information – standard: "Institutions should publish information about their activities, including programmes, which is clear, accurate, objective, up-to date and readily accessible."

1.9   On-going monitoring and periodic review of programmes – standard: "Institutions should monitor and periodically review their programmes to ensure that they achieve the objectives set for them and respond to the needs of students and society. These

reviews should lead to continuous improvement of the programme. Any action planned or taken as a result should be communicated to all those concerned."

1.10   Cyclical external quality assurance – standard: "Institutions should undergo external quality assurance in line with the ESG on a cyclical basis."

<u>External QA</u>

2.1   Consideration of internal quality assurance – standard: "External quality assurance should address the effectiveness of the internal quality assurance processes described in Part 1 of the ESG."

2.2   Designing methodologies fit for purpose – standard: "External quality assurance should be defined and designed specifically to ensure its fitness to achieve the aims and objectives set for it, while taking into account relevant regulations. Stakeholders should be involved in its design and continuous improvement."

2.3   Implementing processes – standard: "External quality assurance processes should be reliable, useful, pre-defined, implemented consistently and published. They include (i) a self-assessment or equivalent; (ii) an external assessment normally including a site visit; (iii) a report resulting from the external assessment; (iv) a consistent follow-up."

2.4   Peer-review experts – standard: "External quality assurance should be carried out by groups of external experts that include (a) student member(s)."

2.5   Criteria for outcomes – standard: "Any outcomes or judgements made as the result of external quality assurance should be based on explicit and published criteria that are applied consistently, irrespective of whether the process leads to a formal decision."

2.6   Reporting – standard: "Full reports by the experts should be published, clear and accessible to the academic community, external partners and other interested individuals. If the agency takes any formal decision based on the reports, the decision should be published together with the report."

2.7   Complaints and appeals – standard: "Complaints and appeals processes should be clearly defined as part of the design of external quality assurance processes and communicated to the institutions."

Considerations for QA of e-learning provision

A report from the ENQA working group VIII on QA and e-learning (ref: Occasional Papers 26) (available at https://www.enqa.eu/wp-content/uploads/Considerations-for-QA-of-e-learning-provision.pdf) provides considerations for QA of e-learning provision. More specifically, "recognising that recommendations for quality assurance and e-learning have already been written, the working group decided to create a new focus: to systematically examine both the applicability and relevance of the standards as defined in the ESG 2015, while considering and utilising existing papers and publications".

The report is based on the use of the following terms:

Distance education courses	Distance education courses are those where no classes are held on campus – all instruction is conducted at a distance.
Online courses	A form of distance education where the primary delivery mechanism is the Internet.
Synchronous online courses	Courses where students and an instructor participate at the same time, but at separate

	locations other than an institutional campus.
Asynchronous courses	Courses where students are not required to participate in sessions at the same time as the instructor.
Online programmes	A fully creditable programme that can be completed entirely by taking online courses, without the need for any on-campus classes.
Blended/hybrid courses	These are courses designed to combine both online and face-to- face teaching in any combination.
Open Educational Resources (OER)	Materials that are offered freely for use by teachers and learners
Massive Open Online Courses (MOOCs)	Online courses that are designed for large numbers of participants, often offered for free and without any entry qualifications.

The report's section on Policy for QA reflects on the ESG standard 1.1 (i.e., Institutions should have a policy for quality assurance that is made public and forms part of their strategic management. Internal stakeholders should develop and implement this policy through appropriate structures and processes, while involving external stakeholders). The report (available at https://www.enqa.eu/wp-content/uploads/Considerations-for-QA-of-e-learning-provision.pdf) recommends that institutional policies for e-learning may further include the constituting elements of quality, which include:

- "institutional support"
- "course development"
- "teaching and learning"
- "course structure"
- "student support"
- "faculty support with compulsory e-learning training for new members of staff"
- "technological infrastructures"
- "student assessment (learner authentication, work authorship and examination security) and certification"
- "electronic security measures"

The authors of the report explain that "involving stakeholders (e.g. students, teaching staff, authors, technical staff, student support staff, administration, etc.) in the internal quality assurance of e-learning can be a challenge due to the lack of an on-campus presence, so institutions may need to take steps to actively engage all stakeholders in internal quality procedures". The report identifies the following indicators (as listed at https://www.enqa.eu/wp-content/uploads/Considerations-for-QA-of-e-learning-provision.pdf):

- "E-learning is part of the overall strategy for the institution's development as well as the policy for quality assurance."
- "The institution uses a clearly articulated policy framework and governance structure when deciding on the adoption of new technologies to ensure the expected quality of e-learning provision."
- "Institutional policies, structures, processes, and resources are in place to guarantee the successful teaching and learning process of students, including those with special educational needs."
- "The institution has a policy and code of practice to ensure academic integrity and freedom and ethical behaviour."
- "Electronic security measures are considered by the institution's policy/code of practice."
- "If external services or expertise are utilised, written agreements/contracts that define the roles and responsibilities exist."

Modelling QA in e-learning

M'hammed Abdous proposes a process-oriented lifecycle model for ensuring quality in e-learning development and delivery. The author of the 'a process-oriented lifecycle model for e-learning QA' paper, explains that "to understand the dynamic of the contextual factors affecting QA, a metaphor using threefold-layered circles is proposed". This is illustrated below.
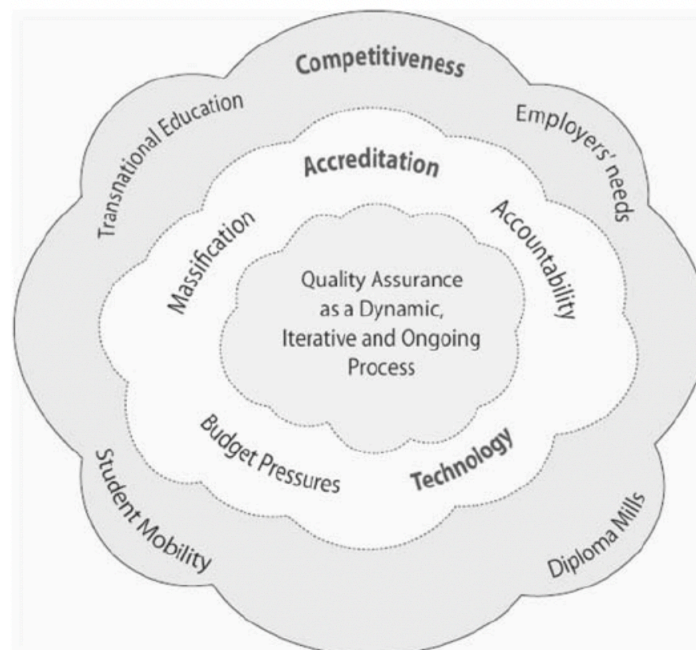

Figure: Situational factors affecting QA

Accordsing to Abdous "it is clear that, at the centric level, QA is a core value. It is perceived as a dynamic, iterative and ongoing process. Rather than serving as an after-the-fact approach, it can be embedded into the daily practices of the front-line academics shaping the e-learning experience".

The proposed lifecycle model, is structured around three sequential non-linear phases (as discussed at https://www.researchgate.net/publication/234725157_E-Learning_Quality_Assurance_A_Process-Oriented_Lifecycle_Model):

- before: planning and analysis
- during: design, prototype and production
- after: post-production and delivery
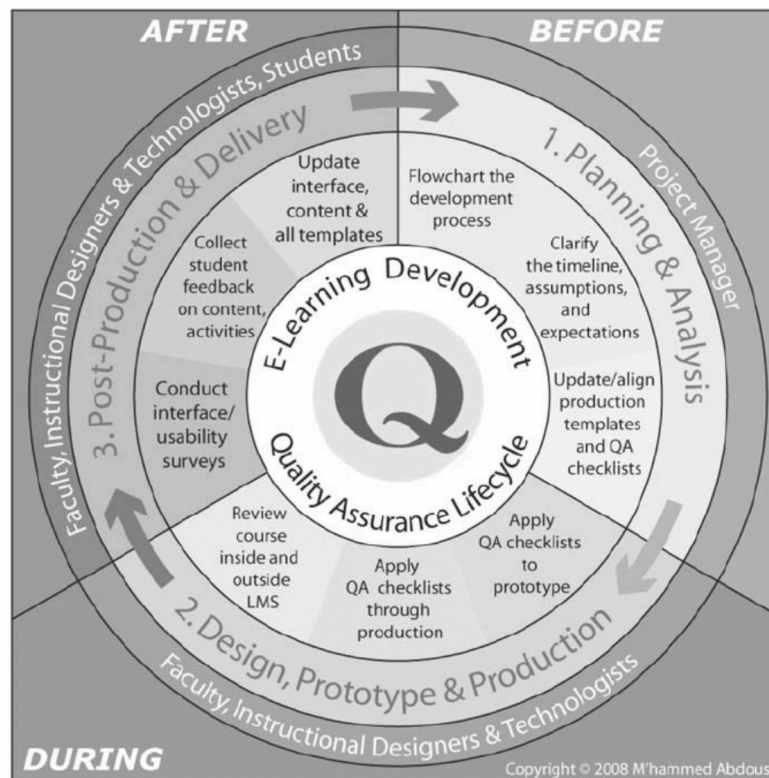
The model is illustrated below.

Figure: Process-oriented lifecycle model for QA in e-learning

Ginns and Ellis (2007) present their research work that "draws on a large body of seminal research showing that the approaches students take to learning, and the subsequent quality of their learning, is closely related to their perceptions of their learning experience". The authors present a model of the steps associated with **Quality of Learning Achieved** involving the following steps (as described at https://www.sciencedirect.com/science/article/abs/pii/S1096751606000728):

- Students' prior experience, knowledge , conceptions and reasons for studying
- Students' perceptions of the teaching-learning environment
- Type of teaching-learning environment provided
- University teachers' pedagogical course knowledge and conceptions of teaching
- How course material is selected, organized, presented, assessed
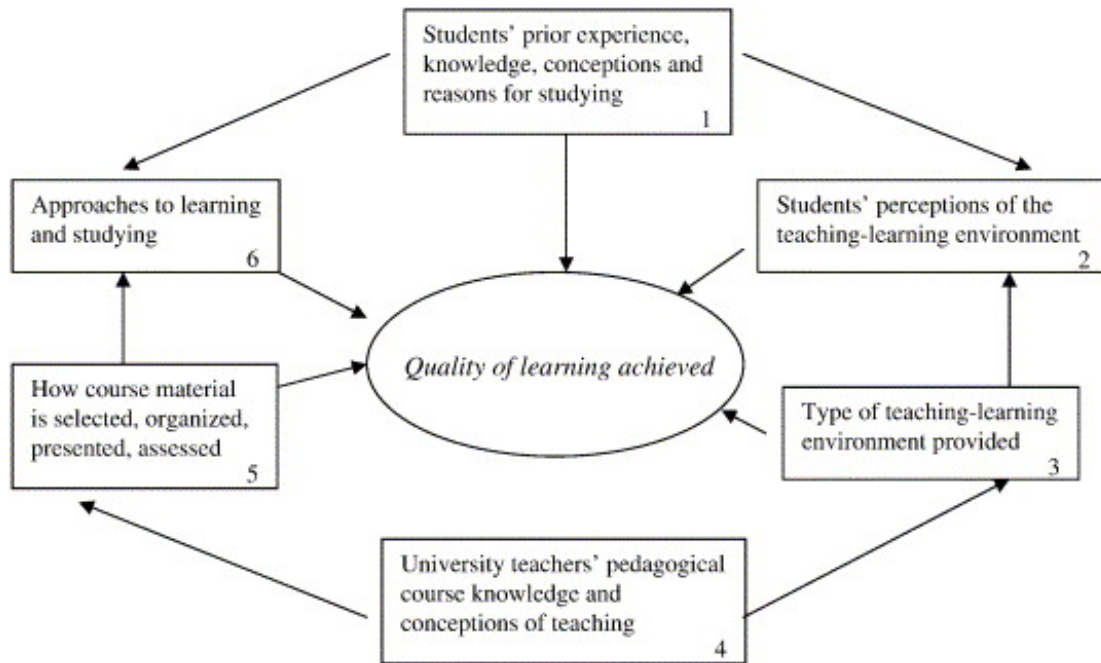- Approaches to learning and studying

Figure: Quality of Learning Achieved

Frances Deepwell (2007) in the 'Embedding Quality in e-Learning Implementation through Evaluation' paper discusses a case example is a five-year evaluation study of an institution-wide implementation of e-learning focusing on (i) monitoring, (ii) development, and (iii) knowledge. The author argue that "the participatory nature of the devised evaluation framework has enhanced the quality of the initiative and afforded its embedding within pedagogical, technological, cultural, and organisational domains" (the paper is available at https://www.researchgate.net/publication/220373997_Embedding_Quality_in_e-Learning_Implementation_through_Evaluation). The following figure illustrates the proposed evaluation process that involves the following steps:

- Defining the purposes of the evaluation
- Collecting and organizing the data
- Making sense of the findings
- Reporting the evaluation

Deepwell identifies the following influences:

- A countenance approach (Stake, 1967) – Stake's countenance approach to evaluation is represented schematically with three phases (i) antecedent, (ii) transaction, and (iii) outcome
- Action evaluation (Rothman, 2003) – a participatory evaluation method and involves stakeholders from the outset
- Report and respond (Stronach & MacLure, 1997) – the evaluator presents a structured report to the stakeholders at a number of points within an evaluation.
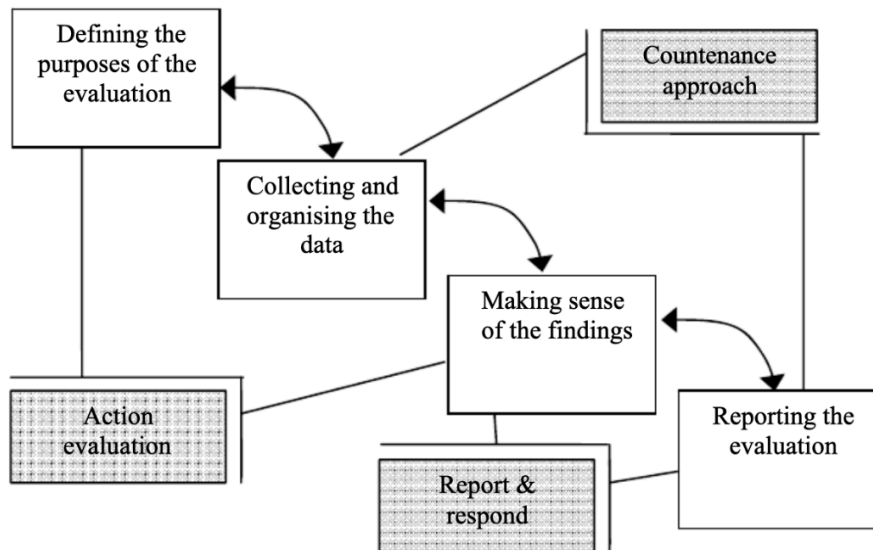
Figure: e-Learning evaluation process

The role of QA in ensuring accessible and equitable provision

Professor David Webster, Director SOAS Foundation College, presented his thoughts on the role of quality assurance at the recent Advance HE Curriculum Symposium 2022 (available at https://www.advance-he.ac.uk/news-and-views/hybrid-learning-and-teaching-role-quality-assurance-ensuring-accessible-and). A key reflection from his talk was that "the UK Quality Code doesn't say much about what quality teaching looks like, and during a QAA audit, no one watches anyone teach". He advocates that HEIs should create policy documentation with guidance on teaching delivery. These should also cover e-learning provision, and could be used to compare education provision. Some recommendations for such documentation are outlined as follows (further supported at https://www.advance-he.ac.uk/news-and-views/hybrid-learning-and-teaching-role-quality-assurance-ensuring-accessible-and):

- "Where/how recordings are made: from virtual/actual background to length, to how many per CATs point. Should recordings be made in a bespoke on-line location? What limits/leeway is granted in these choices? "
- "What processes and checks should apply when using tools beyond HEI-approved/sourced ones – or should they not be used at all? "
- "What information are students asked to provide in using/registering for online tools-is there some data they shouldn't be asked or expected to share? "
- "Is there a limit on students' re-use/sharing of content – where students might download content and then share it beyond the institution (rules about these are often implicit but not always in lecture capture policies which may need updating) "
- "What is expected of staff – and where to stop (equity/workload between colleagues) "
- "What if a student doesn't want to interact? What are the HEI's digital engagement policies?"

Kanika Vatsyayan, in her FE News article identifies a number of challenges associated with e-learning and in particular QA of Learning Management Systems. These challenges are as followds (as described at https://www.fenews.co.uk/education/role-of-quality-assurance-in-driving-growth-for-elearning-industry/):

- Adaptability – "it is challenging to create a solution that can cater right content to the desired audience in the right manner"

- Navigation – "it usually refers to defining the path to process plus the ease with which the users could navigate on the LMS to fetch the content they need"
- Engagement – "it is important to make sure that technology can communicate well, platform can offer unique and valuable content, along with the simplified e-learning journey in a personalized manner"
- Functionality – "functionality of the e-Learning software must be crafted to offer maximum convenience to the users"
- Interactiveness – "it can be the use of audio, visuals, and video content on the software plus the ease of access with the content along with content quality"

QA aspects of e-learning implementation

In her FE News article, Kanika Vatsyayan explains how different testing types can help e-learning providers to achieve maximum learnability and user engagement. These testing types are as follows (as described at https://www.fenews.co.uk/education/role-of-quality-assurance-in-driving-growth-for-elearning-industry/):

- Functional Testing – "can be done at the initial stages of the project as every build shared by the development team should run for a check on functionalities surrounding audio, video, and other course material."
- Multi-browser Testing – "can be done to ensure the proper functioning and accessibility of the developed software or application across various browsers, devices, and platforms."
- Localisation – "is all about availing the content to the users as per their geographical region. This means the LMS should be tested for its accountability and consistent response, irrespective of the region or country to ensure maximum interactiveness and engagement."
- Compliance Testing – "allows a product to offer maximum interoperability between different content and platforms" (note: compliance testing involves the use of SCORM standardisation and specifications surrounding the sharable content available on the eLearning solution).

QA policies must drive e-learning implementation, which usually has the form of a series of design guidelines. The importance of QA in e-learning is summarized as follows by Swift Learning Services (https://www.swiftelearningservices.com):

- Bug-free courses – a thorough quality check is necessary to identify these errors and eliminate them before delivering them to the customer
- Customer satisfaction – customers feel satisfied if their training satisfies the objectives without any hassle, without any errors
- Increase in company value – a bug-free development of a course increases trust in the customer for delivering quality courses, further enhancing the value of the company

More specific QA tips in e-learning are also listed below (available at https://www.swiftelearningservices.com/tips-and-strategies-of-quality-assurance-in-e-learning-and-its-importance/):

- Determine the scope of the training – "when a course is first sent for testing, the scope of the work needs to be determined, so as to get a high-level idea of what items will be tested and how to execute the QA testing process."
- Proof-read the content by referring to the storyboard – "Thorough proofreading of the content for typos and corresponding errors is done with the reference of the storyboard provided."

- Check for branding guidelines – "The analyst should also check if all the branding guidelines such as logos, company standards, color codes, fonts, designs, etc., provided by the client are maintained."
- Scrutinize the images and animations – "Check the images for their quality and watermarks if any. Make sure the images are not blurry, not skewed, and also the way they are cropped."
- Proper functioning of the UI elements – "Thoroughly check if the UI elements are functional. A simple way to check it is by clicking the 'Tab' key on the keyboard and seeing if the indicator highlights the UI buttons or not."
- External Resources – "Check if external links or other resources can be opened and take us to the right page."
- Translations – "In case the course is translated to other languages, proof-check the content onscreen and captioning, the UI elements, etc."
- Device responsiveness – "Testing courses on different devices for responsiveness should be done."
- Test for Accessibility – "Last but not the least, quality analysts should test how accessible the course is for the learner. Principles of proximity, ease of navigation, relevant instructions, etc., should be scrutinized for effective learning."

SKILLS MATCH

CONCLUSION

Conclusions

Even though each framework targets a different issue. All frameworks are connected and linked to each other. For instance, both DigComp 2 and the DigCompEdu were developed from the need to establish reference frameworks that help all citizens in general, and EU citizens in particular. During the last decade, technology has been booming and it had to be included in all areas of our lives, thus, citizens (DigComp 2) and educators (DigCompEdu), hence it is essential to develop tool to measure the impact of these in our lives especially referential frameworks to be able to assess the knowledge that we possess of the issue and to be in the right direction to be able to improve with the knowledge. Additionally, the questions in SELFIE and its methodology were based on the European Framework for DigCompOrg. In a way both the framework and the tool aim to support universities, schools, policymakers in dealing with the digital transformation of education practices.

Conclusively, digital transformation in our society and the economy impacts organizations, educators, students, and citizens. To address these challenges all the previous Digital competence frameworks were developed by the European Commission. All these frameworks set out the most important competences (knowledge, skills, methods, and attitudes) people and organizations need to live and progress in our growing digital age.