Report

DIGITRANSFORMEDU

R3: Concepts, case studies, best practices, and blueprint for the strategical approach to digitalisation

A2: Exploring the institutional approach to digital strategy

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FOREWORD

This essay represents Project Result 3 (R3), Activity 2 (A2), of the Erasmus+ KA2 KA220-HED-DAAC2117 "Digital Transformation of Higher Education and Training" (DigiTransformEdu) project. This intellectual output and related activities are led by the project partner institution ALGEBRA University College, Croatia.

The essay is part of the series detailing the developments in the DigiTransformEdu project partner countries, i.e. Bulgaria, Germany, Croatia, Italy, as well as developments in the EU in general. The project DigiTransformEdu is a 26-month Erasmus+ project (2021-2023) that aims to foster the digital transformation of higher education (HE) and tertiary vocational education and training (VET) institutions by mapping the digital readiness and resilience of educational and training institutions in response to the COVID-19 (COVID) pandemic, among other objectives. The project is centred on the transformation to digital/online education which is defined as a distance form of education, in which digital tools and information and communication technologies are used to enable teaching, learning, assessment, certification, and the organisation of the educational process, while learners, teachers, and administrators might be located in different places and the process might be either synchronous or asynchronous in time.

R3 refers to: **Concepts, case studies, best practices, and blueprint for the strategical approach to digitalisation**. The ultimate scope of R3 is to design a blueprint for the digital transformation of educational institutions and the entire education process, through the research of the current concepts and practical approaches, and the presentation of the selected best practices in HE/VET institutions and their case studies. The scope will be defined by but not limited to the institutional reactions on COVID pandemic situation.

A2 refers to: **Exploring the institutional approach to digital strategy**. This task is building upon the exploration done in R1, and focus on the analysis of the institutional reactions to COVID pandemic from the strategic rather than only operational or tactical perspective. The scope of the research is based on the data collected in the R1, but also focusing on other available data researched in this area, the analysis will focus on examination, selection, and qualitative research of the strategical institutional practice developed in that area in the meantime.

The other R3 related and following Activities are:

R3/A1: Exploring Analysis and presentation of the existing digital transformation concepts

R3/A3: Collection of best practices and development of case studies

R3/A4: Blueprint for digital transformation strategy in education

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1 INTRODUCTION

During 2022, project partners have mapped the digital readiness and resilience of HE/VET institutions in response to the COVID crisis in the context of governance and enabling services, teaching and learning practices, and infrastructure in Bulgaria, Croatia, Germany, Italy and EU. Project partners also collected information about concepts and frameworks, examined case studies and best practices, and were outlining a blueprint for the strategical approach to digitalisation while exploring the institutional approach to digital strategy.

The records revealed that pre and post-COVID digitalization efforts in HE/VET institutions have been a complex issue. In both periods, digitalization has been high on national policymakers' agenda, with obvious more prominence given in the post-COVID period. The accent on digitalization in the pre-COVID was driven more by the need for innovation (digitalization has been perceived as inextricably linked with innovation, either as a vehicle or an end by itself), while during COVID and in the post-COVID period digitalization was more driven by needs (during pandemics digital modes of delivery was the only way to continue with education process and services).

Though there was vocal commitment by government, the implementation has been exacerbated by different issues, such as underfunding, scepticism in academia, lack of competent or trained staff, and lack of institutional execution capacity (among others).

Institutions have made an amazing effort for moving all their educational activities online, despite the existing technical constraints (i.e. schools were not equipped with digital learning platforms, not all students had appropriate and required devices, connectivity was an issue in some residential areas, etc.) and unprepared staff and educators (i.e. appropriate teaching methods, ICT skills, etc.).

During the pandemic, schools and universities have shown great response capacity and resilience, and they have held it up during the COVID emergency. At the same time, distance teaching instead of being taken as an opportunity to leap forward, from the pedagogical perspective have rather represented a step back, since educators were widely sticking to traditional frontal teaching, albeit online.

However, digitalisation of HEIs could also be assessed in the context of the Bologna Process in the European Higher Education Area and the Digital Agenda for Europe of the European Union (EU). Moreover, it is strongly associated with the development of distance education that has had strong historical roots in the higher education and received a new impetus in the early 21st century when personal computer and internet technology were introduced as a new means of education. By that time many HEIs started developing and introducing their own e-learning platforms. This process got a particular momentum when significant budgets were invested in support to the development of electronic systems for distance education.

The challenges of digital transformation can be categorized and associated with five groups of issues: learning styles and cultures, digital pedagogy, technology, technical training, and time management challenges. On the other hand, enablers of digital transformation are educators, and their passion for and innovations in distance teaching and learning is crucial. Institutions are challenged more in their capacity and capability to adapt by enhancing the quality of teaching while providing for the de-bureaucratization of processes and freeing up resources required for innovative approaches to education, curricula design and research networks.

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Digital transformation is one of the key dimensions of modern social, economic, and organizational development in adapting to the increased internal and external use of digital technologies and ascending digital society and economy. In order to successfully initiate and implement transformation, educational and all other organizations need to be able to answer a number of related questions: how to manage processes and communicate digitally, which social networks to use, how to optimize online operations, how to dynamically manage costs, should physical libraries be kept? These are just some of the questions that need to be answered in order to prepare the appropriate plan, harmonize procedures and master changes that will affect all activities of the organization. Digital transformation also implies making changes in the strategy, operational model, procedures, as well as in the organization's culture. Digital transformation brings an opportunity for reinterpretation and fundamental change in almost all aspects and segments of living and doing work. But digital transformation also bears many transitional risks when it comes to understanding and grasping its complexity, formulating appropriate digital alternatives, implementing, and transforming processes, coping with transformation obstacles and barriers, and achieving expected added value gains out of transformation.

Due to the experience in digitalisation gained by educational institutions before, during and after the pandemic, they have now accomplished preconditions for setting up a more comprehensive approach to the process of digitalisation: through strategic planning and regular assessment of the results achieved. The Council of EU, in its *Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education[1],* has recommended developing longer-term strategic approaches to blended learning and building on successful innovations introduced or tested during the pandemic to share and scale good practices.

In an OECD research document (Reimers et al., 2022), on how the COVID pandemic was disrupting and changing education, the authors discuss opportunity to rethink how to create a business culture for innovation in education, since they found out that for most of institutions it appeared easier to buy new tools and systems than to invest in redesign of all its processes. In that context, policymakers and institutions' management will need to become much better at building agenda for innovation, resilience and change, and support for digital transformation.

The education systems are large and complex, and process of digital transformation will be extremely difficult venture. In addition, it is necessary to consider all its multidimensional segments integrally if aiming to achieve essential, planned for and comprehensive transformation. EU is making great effort in providing development resources, supporting research and designing varied frameworks for digital knowledge and skills, hoping European educational institutions would be moving on and catching-up.

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[1] The Recommendation was adopted at the Council meeting on 29-30 November, 2021 (Official Journal of the European Union, 14.12.2021, p. 5, no. 1).

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2 INSTITUTIONAL CONTEXTS

During 2022, project partners have mapped the digital readiness and resilience of HE/VET institutions in response to the COVID crisis in the context of governance and enabling services, teaching and learning practices, and infrastructure in Bulgaria, Croatia, Germany, Italy and EU. Country reports were submitted encompassing many information about different concepts and frameworks used, identified case studies and best practices, and efforts to design both institutional and pedagogical strategical approach to digitalisation. Not surprisingly, that mapping has showed many similarities, but also many differences in the momentum, approaches and outcomes in the digital readiness and resilience response of HEI/VET to the COVID crisis.

2.1   Pre-COVID State of Digitalisation

Before COVID pandemic, all project partner countries were adhering to the EU frameworks and programmes in the field of education and its digitalisation in particular, such as the Digital Agenda for Europe, the Digital Education Action Plan 2021-2027, the European Skills Agenda for sustainable competitiveness, social fairness and resilience, the European Education Area by 2025, etc. In all project countries digitalization of education was simultaneously supported for and limited by regulations and policies on all government levels: national, regional and county or municipality, up to the university and educational institutions' authorities.

Many different policies, activities, projects and programmes focusing on digitalization were designed, developed and implemented in all partner countries at all levels of formal and informal education, including HEI and VET, albeit with the varied success. In all these countries, strategic plans aiming at implementing information technology in education were developed, initially at university and later at the pre-tertiary institutional level.

Despite all the programs, funding, and actions for speeding up the digitalization of education system before the pandemic, institutional practice was still holding back. Different constraints were indicated that were preventing more dynamic digital transformation: from lack of high-speed connections and proper infrastructure, to non-preparedness and cultural resistance of educators and administrators toward new, digitally enabled teaching, learning and management practices.

The drivers and motivators referenced in most of the countries were:

– Prepare people better for the demands of 21st century and digital professions
– Strengthen digital literacy in the digital era
– Include more citizens in education
– Flexible form of higher education
– Motivation of teachers to integrate new technologies into the educational process.

The barriers and obstacles referenced in most of the countries were:

– Distance education supressed vs. on-site formats
– Lack of strategic commitment, clear vision and good strategy from the top
– Deficient communication and collaboration among different stakeholders

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- Attitude of the administration on fixing things with 'new techno'
- Lack of continued and structural support and guiding for students and staff
- Resistance to change
- Marginalised and vulnerable students in the gap of digital services
- Concerns about data protection, privacy and data austerity

2.2   During and Post-COVID State of Digitalisation

Although the impact of COVID pandemic on education institutions was stressful, since in most cases they had no contingency plans ready, education systems in general responded with solidarity and acted with bare uniformity: teaching was continued by use of pedagogical modalities that did not require physical presence. Since institutions were not ready and had no time to prepare, and they were forced to close on-site and move overnight to online operations, participants (both educators and students) sought their own delivery paths and eventually relied on creativity and innovation when were accelerated into this new form of teaching and learning.

Most of the governments have developed some sort of guidance documents to support educational institutions in the fast adaptation to new circumstances and conditions caused by the pandemic. Those documents were typically structured around:

- **Governance**:
  - How in-presence and online teaching and learning should be organized in terms of timing schedule and blending of synchronous and asynchronous activities
  - Which communication tools should be available for both students and families
  - Platforms and tools in use for digital learning
- **Teaching methods**:
  - Importance of using teaching methods appropriate for digital learning
- **Assessment methods and tools**:
  - Use of both summative and formative assessments, with the aim to assess and stimulate several dimensions, including the quality of the processes activated
  - Willingness to learn and to work in groups, the autonomy, personal and social responsibility, and the process of self-evaluation
- **Training for educators**:
  - For example, Italian guidelines required schools to appoint a digital animator with the responsibility to develop a school action plan and oversee its implementation
  - Plan had to start from the Digital School contents and provide its delivery indicators
  - Digital animator had to identify purposes, objectives, and actions within the areas of internal training
  - Involvement of the school community and creation of innovative solutions were expected

Identified drivers, motivators, enablers and driving forces behind digitalization of different aspects of education during and after COVID pandemic were:

- Connectivity services and devices

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- E-learning and communication & videoconference platforms
- Digital content, simulations, augmented/virtual reality emulation of physical environment, and artificial intelligence
- Trainings for educators
- Tutoring and assistance services for students
- Internationalization without travel
- Assessments and examinations done online
- Provision of more flexibility
- Different innovative tools fostering better pedagogy
- Online administrative processes enabling smooth functioning of the educational system
- Fostering partnerships between institutions
- Carrying out apprenticeships and on-the-job delivery online
- Establishing several communication channels
- Equipment for students with lower socio-economic backgrounds
- Instructions for the age-appropriate use of the pre-prepared content
- Monitoring and support
- Educators motivation and training
- Helpdesk services for educators encountering problems with e-learning technologies
- Students prefer to continue studying online (online education was found to be more flexible and convenient for students, especially the more mature ones)
- Both students and lecturers saw their digital skills improved after the pandemic

Barriers, obstacles and pitfalls that have been observed in the context of education during and after the COVID pandemic could be sorted out into the four categories of issues:

- **Technological**
  - Lack of appropriate digital infrastructure (stable connection and bandwidth) to carry out effective education process
  - Internet connection and connectivity problems, system failures, devices not compatible or working properly
  - Remote areas without adequate infrastructure for digital learning and teaching
  - Unsustainable funding models for digitalization
- **Privacy**
  - Data privacy and protection regulation
  - Academic authorities exercising greater control and reducing the teaching autonomy
  - Teaching materials used and disseminated improperly
  - Proctoring and supervision
- **Well-being and logistics**
  - Exercising of joint and practical activities
  - Disruption of work-life balance, increased workload for both students and staff
  - Digital exhaustion and lack of focus, particularly after the long hours in front of the screen
  - Increased digital divide for students from disadvantaged social backgrounds
  - Distractive elements such as parallel social media communication, other family members in the same space, or a growing sense of isolation due to the lack of human contact

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- **Didactics and other competencies**
  o Lack of competencies and skills of staff implementing digital content
  o Lack of time and motivation of teaching staff to create attractive and engaging digital educational content
  o Lack of pedagogical skills to manage work in a virtual environment
  o Lack of student engagement (attentive following of online lectures; difficult learning in online; organization of time; mental concentration, social contact, etc.)
  o Inclusion (some students without appropriate computer skills, devices and other equipment for a successful and positive online learning experience)
  o Lack of comprehensive competencies required for successful methodology and approach for effective conversion of non-digital into digital content

In all project participating countries sources emphasized that the pandemic led to a more structured approach to digital transformation, better analysis of the enabling services and infrastructure already available in the institutions and among students, and to the creation of plans and preparedness for future crises of any kind.

2.3   Outlook and Opportunities

Looking into the evolution of digitalization offerings from time before and after the COVID pandemic, acceleration of efforts in HEI/VET is more than evident. Some transformation efforts have been made prior to the onset of COVID, but governments have made quite a push on it through and after the outbreak of pandemic. Though they used pandemic as an opportunity to accomplish education system reform and modernization agenda, implementation momentum was often sluggish and sporadic. As for the education institutions, the pandemic has been widely acknowledged as an accelerator for digital transformation, however it came along with a range of difficulties and obstacles.

The COVID pandemic accelerated the process of digitalization in education, but also disclosed many remaining legacy issues that were hampering proper and comprehensive educational reforms before its outbreak, including leveraging of digital potential. Underfunding is often seen as a major problem, but the state of mindset, resistance to change and inadaptability for new skills acquisition were also identified as barriers to an uptake. In addition, digitalization also raises complex policy and regulatory issues such as ethics, privacy, and social justice.

In an abrupt and forced shift to online mode of delivery for all, it appears that some institutions who were offering distance education and use of the online e-learning platforms before, managed to go through the pandemic transition without significant process disruptions and compromised quality. Others have struggled and experienced serious omissions in the educational process. This can be explained by the fact that institutions providing distance education are very often technologically and methodologically better equipped and prepared, both in terms of hardware, software, and digital content, as well as in availability of lecturers trained and prepared for delivery of distance or online education.

Looking forward, probably the most important opportunity for digital transformation in education will be the range of programmes and courses that were developed, or are in the process of development,

to help train and re-train teachers to deliver digital education in terms of new pedagogy, content, and methods of assessment. This refers not only to digital skills *per se* but also to cultural, interpersonal and communication abilities. There is also an extensive discussion at the national, European, and international levels about how to narrow the digital gap and ensure inclusive digital education.

One more positive aspect of learnings coming out of COVID transition is realisation of need for strategy in digital education, to help guide institutions through the process of preparing delivery of high-quality digital education and institutional digitalisation. Today, every educational institution needs to develop a digital strategy and have a clearly defined execution plan, including a contingency response in case of crisis situations. Strategy has to encompass digital education program contents but also elaborated requirements for the professional development of educators, like new methods and ways of assessing and evaluating acquired knowledge and skills of students. It is especially important that the digital strategy is linked to other strategies at the institutional level and directions of development.

Digitalisation has been clearly a thorny path in all project countries, but it certainly has no alternative for the future. Irrespective of how the COVID pandemic affected institutions, digitalization is here to stay and propagate through all levels, kinds and forms of education.

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3 DIGITAL STRATEGY APPROACHES

In order to approach to designing a strategy for the digital transformation blueprint within the project DigiTransformEdu, we are combining exploration and analysis done in R1, findings about not only barriers, obstacles and pitfalls, but also drivers and motivators, enablers and driving forces behind digitalization of different aspects of education in Bulgaria, Croatia, Germany, Italy and EU with the presentation of the selected best practices in HE/VET institutions.

Digital transformation is not anymore a novel phenomenon nor is isolated to organizations and institutions. It became already a societal and economic common practice conditioned by digital paradigm shift. But business organizations are more exposed and use a variety of standardised frameworks and solutions to cope with it: improve their performance and keep up with the digital economy market demands. They continually invest huge and creative efforts to transform and improve their operational model, come up with new and innovative products, services, processes and business models, in order to sustain as either market challengers or leaders. This business context, experience and practice refers to HE/VET educational institutions as well. Though educational model is institutionally inherent and regulated at large, with the focus on providing educational services and knowledge creation as main outputs, educational institutions also strive for excellence, recognition, and better positioning towards competition. Intensive digital transformation in business provide educational institutions with frameworks, application experiences and operational practices that may encourage and inspire their own digital transformation proactivity and creativity.

In his working paper: *Digital strategies in education across OECD countries: **Exploring education policies on digital technologies***, van der Vlies (2020) reports that many OECD countries have adopted a specific strategy on digital education or integrated this topic into a generic strategy on digital innovation as such. There is a high awareness among OECD countries of the benefits of digitalisation, and the role of government to support digital innovation in education. This paper covers more than fifty digital education strategies published between 2015 and 2019[2].

From a HEI specific perspective (Mohamed et al., 2021; Matt et al., 2015; Shaughnessy, 2018), digital transformation strategies aim to:

a) increase the total revenue
b) enhance productivity
c) generate value through innovative practices and
d) develop a brand reputation and novelty.

Meaning, they need to formulate agile, realistic and scalable digital transformation strategies that assist the centric philosophy that integrates the entire university's function (Mohamed et al. 2021). These require a comprehensive and different institutional approach to planning, implementation and monitoring, e. g. strategic planning with real action plans.

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[2] *OECD Education Working Papers No 226,* 50 digital education strategies (p 24).

The joint ILO-UNESCO report: *The Digitization of TVET and Skills Systems*[3] provides a global, high-level overview of how digitalization is affecting technical and vocational education and training (TVET) and skills systems (i.e. lifelong learning systems). The fundamentals of TVET digitalization are in the three-way collaboration between employers, students (or employees) and educational institutions with the support of the government as policymaker. This process is also accelerating hybridization of tertiary education.

As stated in this ILO-UNESCO report, very few countries have a coherent strategy of TVET and skills systems digitalization. From policy perspective, **TVET and skills strategies tend to focus on digital adaptation**, with varying degrees of emphasis on:

- Modernizing TVET and skills development, so that it teaches 'new skills' (both technical and transversal) required by the labour market
- Increasing the responsiveness of TVET and skills development to the labour market, notably by improving labour-market intelligence and the timeliness of programme responses
- Equipping students better for the labour market
- To a lesser extent, equipping students with entrepreneurial skills to find or create jobs themselves.

A corollary to the lack of policy focus on digital TVET and skills development is that much digital innovation is taking place at the institutional level. Such innovation tends to iterate and improve existing processes through the use of technology. Essential prerequisites for such grassroot innovation may include:

- Institutional management that keeps abreast of technological developments and is open to change
- Availability of basic infrastructure, such as electricity, broadband and equipment
- Sufficient institutional autonomy to invest in technology
- Ability to create a culture of innovation encompassing all institutional staff
- Close connection with students and industry to respond to demands for digitization.

The team of the Erasmus+ Powerhead project (POWERHEAD, 2022)[4] found out essential preconditions for the digital transformation of HEI, which are very similar to the findings of our DigiTransformEdu project:

- Modernising the infrastructure
- Adequate funding Professionalisation of teaching staff
- Developing students' digital competencies
- Importance of support functions in and outside institutions
- Developing and conveying a vision in higher education institutions
- Embedding in quality assurance and Health aspects.

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[3] *The Digitization of TVET and Skills Systems*. (n.d.). Retrieved January 18, 2023, from https://www.ilo.org/skills/areas/skills-policies-and-systems/WCMS_752213/lang--en/index.htm

[4] Powerhead is an EU Erasmus+ project coordinated by the Flemish Department of Education and Training, and implemented in cooperation with the Flemish Education Council and the Ministry of Education and Science in Latvia in 2020-2022. Retrieved January 18, 2023, from https://www.vlor.be/powerheadproject

3.1   Leading the Way

Looking for the institutional best practices in approaches to digital educational strategy we identified a couple of notable 'leading the way' examples.

Durham University Digital Strategy[5] pursues to an institution-wide strategy, very much focused on delivering benefits, not just technology, and experience-based, agile, flexible and grounded. This is an example of the organisational strategy, not a strategy of the IT department. It seeks to unite the entire organisation behind a single digital vision, with a clear roadmap that is setting out when the new functionality will be delivered (Durham University, 2020). It has envisioned a comprehensive approach to its development in four critical stages (Figure 1).
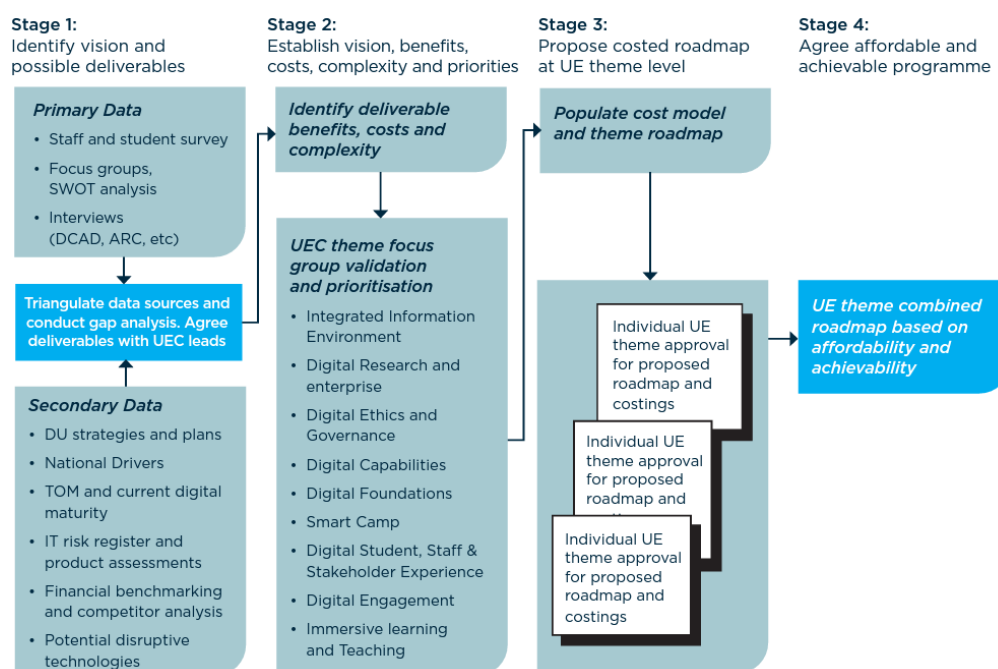

Figure 1: Digital strategy approach (Durham University, 2020)

These stages are structured around the following set of internal and external activities:

Stage 1: Identify vision and possible deliverables. The goal in this stage is to review available secondary data and undertake a digital staff satisfaction survey of IT services. Interpretation of the survey results were conducted through three focus groups with representation from across the organisation. This evidence served as the baseline position for identification of potential projects and corresponding costs.

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[5] *Digital Strategy - Durham University*. (n.d.). Retrieved January 18, 2023, from https://www.durham.ac.uk/about-us/professional-services/computing-information-services/strategy/digital-strategy/

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Stage 2: Establish vision, benefits, costs, complexity and priorities. The goal is to categorise potential projects into themes and refine them with theme leads. Thereafter undertake theme workshops in order to identify any gaps, add further project detail and prioritise into a roadmap. Individual project details are to be added by working with project sponsors to a defined template. External partner to undertake interviews with IT providers to support the identification of an agreed University operating model.

Stage 3. Propose a costed roadmap at the theme level. The goal is to publish a draft strategy for consultation and input from various stakeholders and committees, including the strategy Council. Concurrently populate a cost model and propose an affordable and achievable portfolio in line with organisational priorities and benefits. Present to individual theme leads and refine.

Stage 4. Agree on an affordable and achievable programme. The ultimate goal is to agree on a finalised strategy and roadmap, and disseminate through the University governance structures. Transition into implementation.

Jisc, a UK digital, data and technology not-for-profit agency focused on tertiary education, envisages that education and research improves lives and that technology improves education and research. In the guide *How to shape your digital strategy*[6] they explain 'how to create a broad, organisationally focused digital strategy that develops digital capabilities and harnesses the potential of digital devices and services' (Thomas and Ayton, 2021) .

They suggest starting with a digital vision in which an institution will share and communicate what the digital experience looks like, help stakeholders to stay connected to the values that inform digital practice, support new members' integration into the way they do things and act as a call to action. Once a vision for the institution's digital future has been agreed, there is a need to identify the strategic goals for achieving the vision. The selected strategic goals should be created through the collection of evidence and analysis of trends, using external and internal analysis methods (i.e. PESTLE or/and Porter's Five Forces, SWOT or/and SOAR analysis, etc.).

ILO-UNESCO (ILO-UNESCO, 2020) proposed a set of recommendations[7] which they grouped under the following two headlines:

1) Programmes to improve the evidence base informing digital transformation
2) Strategies for digital transformation.

In practice, the recommendations are interlinked and need to be addressed integrally, holistically and as a composite. This segmented approach to policymaking and implementation creates multifaceted pressure for TVET to modernize in response to a changing world, industry sectors and labour market, reflecting TVETs role as a service provider.

Notwithstanding, the fragmented and complex nature of skills systems do not necessarily work in favour of integrated policy approaches.

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[6] *How to shape your digital strategy | Jisc*. (n.d.). Retrieved January 18, 2023, from
https://www.jisc.ac.uk/guides/how-to-shape-your-digital-strategy#
[7] *The Digitization of TVET and Skills Systems*. (p. 77-79). Retrieved January 18, 2023, from
https://www.ilo.org/skills/areas/skills-policies-and-systems/WCMS_752213/lang--en/index.htm

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Powerhead project (POWERHEAD, 2022) have delivered a number of quality outcomes and within, prepared a set of digitalisation policy guidelines[8] for the national authorities and higher education institutions, including the action items recommended in areas such as:

- Vision
- Policy and Quality Assurance
- Skills and Digital Readiness
- Funding and Infrastructure
- Students
- Course & Curriculum Design
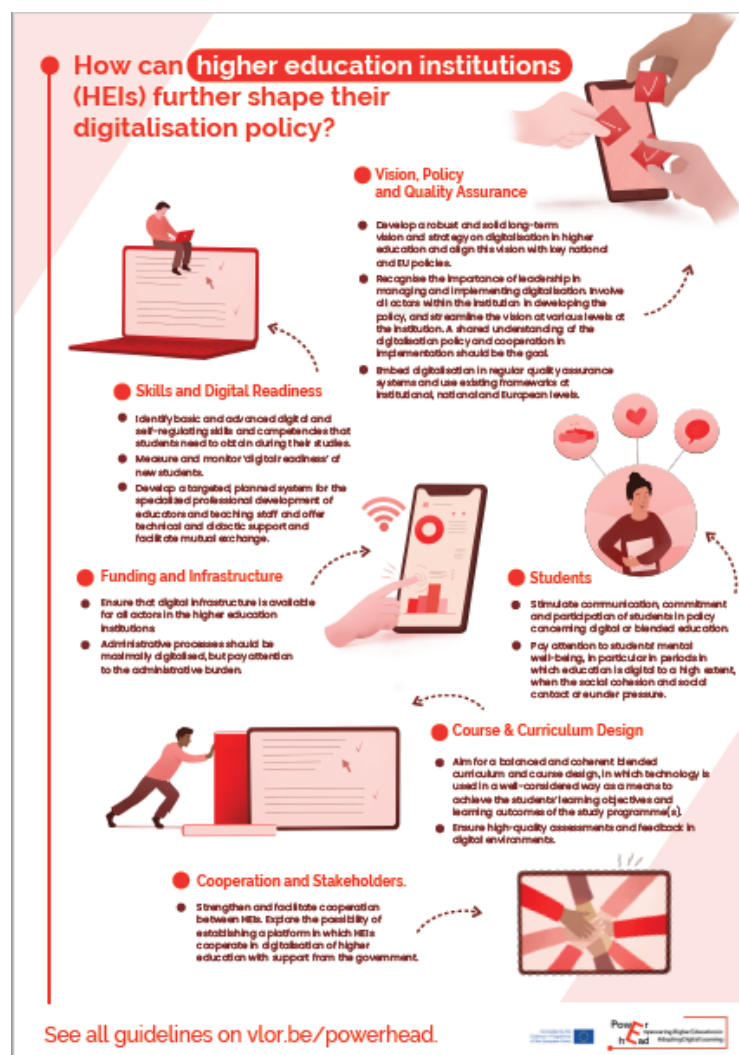- Cooperation and Stakeholders.

Figure 2: A summary of guidelines for shaping digitalisation policy in HEIs (POWERHEAD, 2022)

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[8] *Outcomes | Vlor*. (n.d.). Retrieved January 18, 2023, from https://www.vlor.be/powerheadoutcomes

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3.2   Involving All Stakeholders

Aforementioned examples, as well as elements defined by the experts who are working on digital transformation strategy in education, indicate that comprehensive approach to it is inevitable. When planning for and approaching to this topic we should not considering one segment and disregarding others, like e-learning, teaching platforms and tools, digitalisation of documentation or teaching materials. Likewise, digitization and transformation should be not only comprehensive but also well thought through and integrated, like reformed program content and redesigned curricula. That requires including the broad social, economic and political exterior environment in which HEI operates, and many individual and institutional external stakeholders.

In *A guide to creating a digital strategy in education* (NetSupport, 2021), the authors Kingsley and Anderson[9] are providing **a brief overview and mapping of all the interlocking stakeholders** who need to take part in delivering a successful digital strategy for a school, district, local authority, or any other education institution.

Figure 3: A stakeholder map to creating a digital strategy in education (NetSupport, 2021)

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[9] *A Guide to Creating a Digital Strategy in Education - Version 2 - out now! - NetSupport*. (n.d.). Retrieved January 18, 2023, from https://www.netsupportsoftware.com/20210114a-guide-to-creating-a-digital-strategy-in-education-version-2-out-now/

Besides other typical segments of a strategic document, this guide is also putting some attention on public regulation in areas like Special Education, Data Privacy and Online Safety, supported in EU through the Digital Service Act[10], GDPR[11] and soon-to-be-published AI Act[12].

An important step in the strategy creation process is to identify, understand, empower and include all relevant stakeholders (Thomas & Ayton, 2021), that could be achieved by the following steps:

- Assemble the views of your key stakeholders
- Map the stakeholder views to organisational aims, objectives and policies
- Assign objective owners to build and implement objectives for their areas.

The **stakeholder consultation process** was a very important part of development of the new *Ireland Digital Strategy for Schools to 2027* (Department of Education Ireland, 2022). The development of this Digital Strategy has been informed by a wide-ranging and extensive consultation process to ensure that all voices were given an opportunity to contribute and inform its development. The consultation process consisted of:

- Online questionnaires for teachers, principals, parents, and students
- Open call for submissions for interested stakeholders, including management bodies, teacher unions, industry representatives, individual businesses, teachers, principals, and parents
- Focus Groups: Following an analysis of the findings from the questionnaires and open call, themes were developed for discussion in more detail
- Consultative Group: This was a key group comprising representatives from the education partners, parents and students' groups and an overarching industry representative
- Bilateral discussion with Denmark, Estonia and Finland's education authority.

Figure 4: Ireland Digital Strategy for Schools to 2027 consultation process map (DEI, 2022)

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[10] *The Digital Services Act package | Shaping Europe's digital future*. (n.d.). Retrieved January 18, 2023, from https://digital-strategy.ec.europa.eu/en/policies/digital-services-act-package
[11] *General Data Protection Regulation (GDPR) – Official Legal Text*. (n.d.). Retrieved January 18, 2023, from https://gdpr-info.eu/
[12] *The Artificial Intelligence Act |*. (n.d.). Retrieved January 18, 2023, from https://artificialintelligenceact.eu/

Through 2021 and 2022 Oxford University have been developing a new *Digital Education Strategy*[13] which aimed at shaping the future of its digital education (University of Oxford, 2022). During the consultation between staff and students, an inventive step in the process was organized and conducted: **student writing competition to help inform the new Digital Education Strategy for Oxford University**. Students were invited to write about:

- Inclusion and digital education: *How could digital technologies make learning spaces more inclusive at Oxford?*
- Innovation and digital education: *How could digital technologies engender educational innovation at Oxford?*
- Openness, global reach and digital education: *How could digital technologies enhance Oxford's capacity for openness and ability to reach wider audiences (e.g. open access, knowledge exchange and outreach)?*

As with any strategy, the success is based on the time taken to cooperate and co-produce, with all stakeholder voices well heard, and then ensuring it is sufficiently embedded into the execution plan, so that it will remain effective and deliver impact over time.

3.3   Beyond Devices and Technology

Digital transformation in education is leveraging digital technologies to enable major educational improvements, enhance learner and educator experiences, and create new instructional modalities through policies, planning, partnerships, and support (Martin and Xie, 2022).
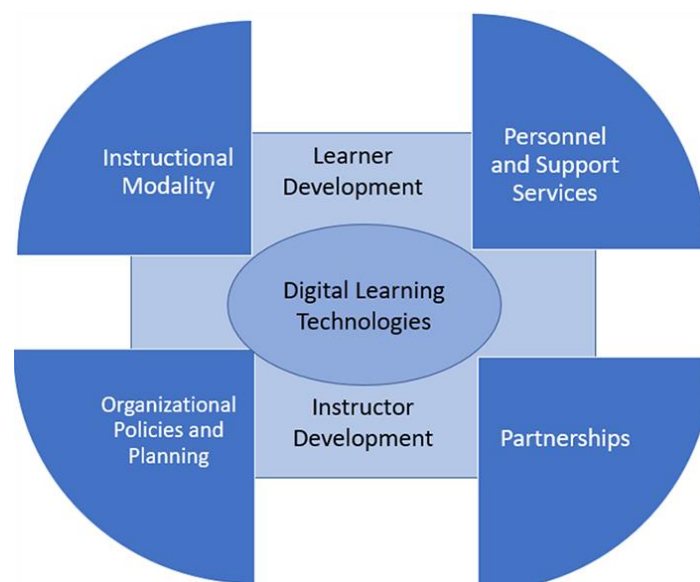

Figure 5: Digital learning matrix in Higher Education (Martin and Xie, 2022)

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[13] *Shaping the future of digital education at Oxford | Centre for Teaching and Learning*. (n.d.). Retrieved January 18, 2023, from https://www.ctl.ox.ac.uk/digital-education-strategy

As for the **Instructional Modality,** besides already often used on-site technology enhanced learning, blended, asynchronous and synchronous online learning and teaching, Marin and Xie are suggesting that learning can also be facilitated through additional instructional modalities like:

- **Bichronous online**: blends asynchronous and synchronous online teaching and learning. Students participate in the asynchronous classes at the time and location of their choice, and they participate in the synchronous classes in real-time
- **HyFlex**: offers the most flexibility. It combines in-person and online students in the same classroom. HyFlex learning is similar to hybrid or blended learning, but it allows students to choose their modality based on their needs and daily circumstances.

In the area of **Organizational Policies and Planning**, Marin and Xie are pointing out that institutional policies and standards need to be set up for digital teaching and learning: digital transformation must be part of the strategic planning, examining funding models for different modalities and ensuring equitable learning opportunities for all students. They also emphasize the importance of **partnerships and collaboration** with other universities, professional organizations, and industries.

However, the Department of Education Ireland (2022) recommends a three-pillar approach to the transformation strategizing:

- Supporting the embedding of digital technologies in teaching, learning and assessment
- Digital technology infrastructure
- Looking to the future: policy, research and digital leadership.

This approach follows the strategic objectives of the EU Digital Education Action Plan[14] and includes developing a "**high-performing digital education ecosystem**" and "enhancing digital competences for digital transformation". To this end, Ireland *Digital Strategy* will continue to support school leaders and educators through effective initial education and ongoing professional learning. Aim is in supporting educators to develop essential skills and empowering them to gain the maximum advantage from digital technology in every classroom, for the benefit of all learners.

Ireland Digital Strategy points that it is created with the **learner in the centre**, ensuring that:

- All learners will be supported to reach their full potential
- All learners will be supported to have appropriate and equal access to digital technologies, in particular individuals at risk of educational disadvantage and those with additional learning needs
- Use of digital technology becomes as much a core part of the education journey as basic literacy and numeracy skills are, with a deliberate and increased use of digital technology in teaching, learning and assessment
- All teachers are supported to further embed the use of digital technologies in their classrooms to support all learners in a safe, responsible, and ethical way.

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[14] *Digital Education Action Plan (2021-2027) | European Education Area*. (n.d.). Retrieved January 18, 2023, from https://education.ec.europa.eu/focus-topics/digital-education/action-plan

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The digitization of TVET was not identified as a separate area of government strategy: in the countries surveyed in the ILO-UNESCO report[15], no single ministry or body was found responsible for taking ownership of the strategy implementation or any underlying programmes. Digitization of TVET and skills systems hosts **different policies and regulatory frameworks** (ILO-UNESCO, 2020), thus:

- Core infrastructure required for TVET provision, including provision of (mobile) broadband, is typically covered by telecoms policies and regulators
- Industrial and economic policies typically set the pace of digitization across the whole economy, often with a country picking certain sectors. TVET and skills systems then typically react to these decisions, by teaching the applied skills required to meet these demands
- Regulation of specific education and training institutions, including the approval of new digitally enabled pedagogies and decisions on funding for digitization of VET institutions, are typically handled at the level of the education or labour ministries, or related agencies
- Policies on digital-skill development are often shared competencies between 'digital ministries', together with education and training strategists
- Opportunities for work-based learning will also involve job agencies and employment ministries.

ILO-UNESCO (2020) report states that **just-in-time learning** is gaining increasing value. This also has implications for TVET institutions: rather than offering monolithic programmes for pre-set professions, they need to apply a 'plug-and-play' approach, whereby different skills units are bundled in different configurations for different stakeholders and different purposes. That would enable microlearning modules, teaching a discrete skill at any time. Thus, when individuals need specific skills for their job, they can quickly undergo the training. These lifelong education and training pathways also require innovation in digital credentials and e-portfolios, aiming to ensure that competencies and skills are presented concisely, with the verification and visibility of the full lifelong learning standards.

One of the elements in VET digital transformation is **digitally enabled guidance pathways** which typically involve: self-assessment tools, personal skills profiles, and recommender engines, which can suggest suitable employment opportunities based on a certain skills profile or appropriate learning. An example of digitally enabled guidance pathways could be found in the *Singapore Skills Framework*[16] co-created by employers, industry associations, education institutions, unions and the government, for the Singapore workforce. It aims to create a common skills language for individuals, employers and training providers, further facilitating skills recognition and supporting the design of training programmes for skills and career development.

Creation and provision of digital transformation plans for VET require involvement of a **broad range of professionals**, especially when it comes to advanced skills. It is up to industry and manufacturers of the live systems to create and provide training or simulation. Some of the professionals mentioned in the research are also instructional designers, media creators, assessment and specific skills experts (ILO-UNESCO, 2020).

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[15] *The Digitization of TVET and Skills Systems*. (n.d.). Retrieved January 19, 2023, from https://www.ilo.org/skills/areas/skills-policies-and-systems/WCMS_752213/lang--en/index.htm

[16] *SSG | Skills Framework for Training and Adult Education*. (n.d.). Retrieved January 19, 2023, from https://www.skillsfuture.gov.sg/skills-framework/tae

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ILO-UNESCO report also highlights **virtual apprenticeships and internships** as a mean of work-based learning from home. 'Virtual apprenticeships' or 'virtual internships' are conducted remotely, with learners and mentors interacting and collaborating with the rest of the company teams through digital communication tools. Typically, these arrangements lend themselves to jobs which can be performed in this manner, e.g. programming, digital marketing, journalism and media production. But also to the jobs that are supported by simulation technologies, like welding, customer service or specific industrial control systems (ILO-UNESCO, 2020).

Apprenticeships and internships at the VET/HE level provide students with smart opportunities to build up new skills and knowledge, both on and off the job, while providing companies with a reliable way to evaluate and shape potential future hires. The *Apprentice Track* project[17] researched and created a roadmap supported by the *Tool-Prototype for Management of Apprenticeships* to assist in matching the learning outcomes of students with the needs of specific employers.
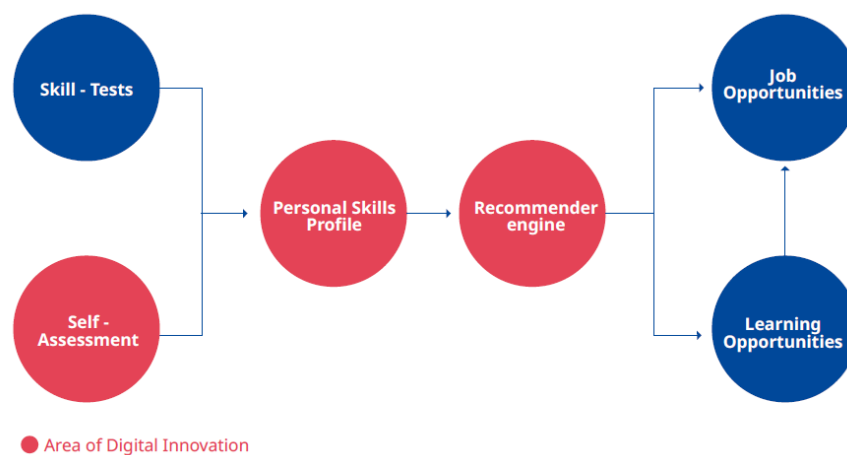

Figure 6: Digitally enabled guidance pathways (ILO-UNESCO, 2020)

ILO-UNESCO (2020) report stress that the **ethical implications of digitization** are receiving insufficient attention. Missing from this conversation include: ethics of introducing various technologies, digital TVET reinforcing or addressing digital divides, the pitfalls of algorithmic bias in AI, reinforcing social stereotypes, implications of competence-based learning for professional values, academic autonomy and digital performance surveillance tensions, power dynamics between employers, competition between public and private educational providers, and technology enabled students. Developing a digital strategy should also bear in mind EU **data privacy** and **online safety** policy recommendations like the Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators[18]. These aspects that should be part of any future HE/VET institutional digital strategy.

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[17] *Welcome - Apprenticetrack*. (n.d.). Retrieved January 19, 2023, from https://apprenticetrack.eu/
[18] *Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators | European Education Area*. (n.d.). Retrieved January 19, 2023, from https://education.ec.europa.eu/news/ethical-guidelines-on-the-use-of-artificial-intelligence-and-data-in-teaching-and-learning-for-educators

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4 CONCLUSION

During 2022, project partners have mapped the digital transformation readiness and resilience of institutions in response to the COVID crisis in the context of governance and enabling services, teaching and learning practices, and infrastructure in Bulgaria, Croatia, Italy, Germany, and EU. The mapping showed many similarities and differences exist across the HEI/VET digital readiness and resilience in response to the COVID.

Although the impact of the pandemic on education institutions was stressful and, in most cases, there were no contingency plans, education systems as a whole responded in solidarity and acted uniformly: teaching continued using pedagogical modalities that did not require physical presence. As there was no time to prepare for the online environment when the university and schools closed, educators and students sought their own paths by showing creativity and innovation that accelerated the new era of teaching and learning. All country participants emphasized that the pandemic led to a more structured approach, analysis of the enabling services and infrastructure, and plans for creation digital strategies and readiness for the future crises.

Comparing state of affairs before and after the COVID pandemic, acceleration in digitalization offerings and efforts in HEI/VET is evident. Though some efforts have been put in place prior to the onset of COVID, and governments have been making a push in reforming and modernizing education, implementation was often sluggish and sporadic. The pandemic has been widely acknowledged as an accelerator for education institutions digital transformation, though it came along with a range of new difficulties and obstacles.

All the project partner countries adhere to the EU frameworks and programmes in education and its digitalisation in particular, such as the *Digital Agenda for Europe*, the *Digital Education Action Plan 2021-2027*, the *European Skills Agenda for sustainable competitiveness, social fairness and resilience*, the *European Education Area by 2025*, etc. In all countries digitalization of education is supported and framed by regulations and policies on several government levels: from state, regional and county to university and educational institution authorities.

Digital transformation brings an opportunity for reinterpretation and fundamental change in almost all aspects and segments of living, doing work and education. Digital transformation also bears many transitional risks when it comes to understanding and grasping its complexity, formulating appropriate digital alternatives, implementing, and transforming processes, coping with transformation obstacles and barriers, and achieving expected added value gains out of transformation.

Digital transformation strategies for HEI/VET aim to increase the total institutional input and output, enhance productivity, generate value through innovative practices, develop brand reputation and novelty while facilitating collaboration between all stakeholders: employers, students (or employees) and educational institutions with the support of government as the policymaker.

Digital strategy is usually a process and developed through several stages including: identifying vision and deliverables, benefits, costs, complexity and priorities, proposing a roadmap, publishing a draft strategy for consultation and input from various stakeholders, agreeing on an affordable and achievable programme. The selection of strategic goals should be achieved through the collection of

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evidence and analysis of trends, using external and internal analysis methods in consultation with different stakeholders and partners.

Digital strategy should support embedding of digital technologies in all aspects of teaching, learning and assessment, digital infrastructure and future outlook. It should also encompass policy, research and digital leadership objectives of EU in developing high-performing digital education ecosystem and enhancing digital competences for digital transformation. It should not be covering only devices and technology, but also enable the development of new instructional modalities and student support processes, like *HyFlex* and *Just-in-Time* learning, digitally enabled guidance pathways, digital credentials and e-portfolios, virtual apprenticeships or internships, and remain agile and flexible in opening possibilities for learning innovations.

When developing a digital strategy, one should also have in mind ethical implications, data privacy and online safety in accordance with different EU policies and recommendations, like the *Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators*, *Digital Service Act*, *GDPR* and *AI Act*.

As with any strategy, its success is based on the time taken to co-produce, with all stakeholder voices heard, and then ensuring it is sufficiently embedded into the smart delivery plan with objectives turned into a roadmap, so to remain effective and deliver impact over time. Digital transformation in education is leveraging digital technologies to enable major educational improvements and should be an iterative process concerning the continuous enablement of digital society and economy.

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5.2   List of Literature References

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