

1.1.1. Changes suffered in our society in the past years.

Introduction

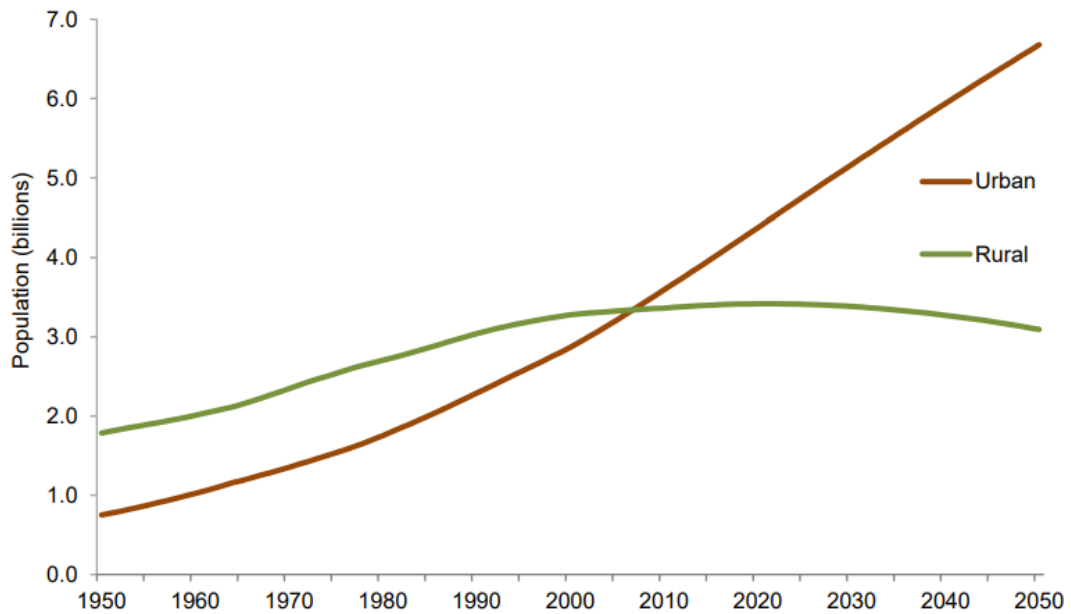
Over the past few decades, society has undergone significant changes, such as advancements in technology, economic upheavals, environmental issues, and social movements, impacting the way we live, work, and interact. To manage the complexities of our rapidly evolving world, it is vital for individuals, communities, and policymakers to comprehend and analyze these societal changes. The great health crisis of Coronavirus (Covid-19), which was declared as a pandemic by WHO, created major economic and sociological problems and in combination with the war between Russia and Ukraine brought great changes in habits and everyday life. One of the most conspicuous and influential of these shifts has been the proliferation of social media and online connectivity. These platforms have revolutionized the way we communicate, share information, and foster virtual communities, ultimately redefining our social interactions. Moreover, there has been an escalating emphasis on social justice and equality, as an increasing number of people champion the rights of marginalized groups and demand heightened accountability from those in positions of power. Additionally, there has been a shift towards more sustainable and environmentally conscious lifestyles, with individuals and businesses taking steps to reduce their carbon footprint and promote a more sustainable future. Overall, these changes have had a profound impact on society and will continue to shape the way people live and interact with one another in the years to come, especially with the rise of digitalization. This unit aims to provide a comprehensive understanding of the transformations that have occurred, fostering critical thinking and awareness among students.

1. Environmental Awareness and Sustainability

Increasing Urbanization

One of the significant changes experienced by our society the recent years is urbanization, which presents both opportunities and challenges. Urbanization refers to the process of population concentration in urban areas, resulting in the growth and expansion of cities. Urbanization is characterized by the movement of people from rural areas to urban centers, resulting in the physical expansion of cities and the growth of urban populations. The world's population has gone through a process of rapid urbanization since 1950. By 2030, when the Agenda for Sustainable Development comes to an end, the percentage of people living in is anticipated to reach 60% in urban areas.

Figure 1. Urban and rural populations of the world, 1950-2050



Data source: United Nations, Department of Economic and Social Affairs, Population Division (2018a). *World Urbanization Prospects 2018*.

Increasing urbanization poses several challenges to our society.

Pressure on Infrastructure

- The rapid influx of people into urban areas strains the existing infrastructure, including housing, transportation, utilities, healthcare, and education. The demand often surpasses the capacity of these systems, leading to overcrowding, inadequate services, and inequitable distribution.

Environmental Impact

- The expansion of cities encroaches upon natural habitats, leading to loss of biodiversity and disruption of ecosystems. Additionally, urban areas are responsible for significant energy consumption and greenhouse gas emissions.

Social Inequality

- Urbanization can exacerbate social inequalities, as marginalized communities may face limited access to housing, education, healthcare, and employment opportunities.

The visible manifestations of increasing urbanization are evident in various aspects of our society. One of the remarkable aspects, is the skyline transformations, as urban areas undergo physical transformations with the construction of high-rise buildings, skyscrapers, and iconic structures. Dramatic changes in city skylines reflect the rapid urban growth and the concentration of economic activities in urban centers. Moreover, urbanization leads to increased population density

in cities. This can be observed through crowded streets, packed public transportation systems, and bustling urban centers that are constantly active and vibrant. Another remarkable aspect is the socio-cultural diversity. Urban areas often become melting pots of diverse cultures, languages, and traditions. The influx of people from different backgrounds leads to vibrant multicultural communities, diverse cuisines, and a rich tapestry of artistic and cultural expressions.

Addressing the challenges of increasing urbanization requires a multi-faceted approach. Sustainable urban planning practices play a crucial role in managing urban growth efficiently. This involves promoting compact and connected cities, preserving green spaces, implementing smart infrastructure, and prioritizing public transportation. Another important aspect is ensuring access to affordable and adequate housing to mitigate housing shortages and address homelessness. Governments, urban planners, and stakeholders must collaborate to develop affordable housing options and promote mixed-income neighbourhoods. Additionally, adequate investment in infrastructure is necessary to support the growing urban population. This includes expanding and improving transportation networks, upgrading utilities, enhancing healthcare and educational facilities, and ensuring equitable access for all residents. Environmental sustainability is also a key consideration in sustainable urbanization. It involves promoting energy-efficient buildings, implementing waste management systems, preserving green areas, and integrating renewable energy sources into urban infrastructure. Moreover, social inclusion and equity should be prioritized in the process of urbanization. This requires ensuring access to quality education, healthcare, and employment opportunities for all residents, regardless of their socio-economic background. It also involves addressing the needs of marginalized communities and promoting social cohesion.

By adopting this comprehensive approach, urbanization can be managed in a way that balances economic development, social well-being, and environmental awareness and sustainability, creating cities that are inclusive, resilient, and liveable for all residents.

2. Climate Change

Climate change is a pressing challenge that our society has faced in recent years, with far-reaching implications for the environment, economy, and social well-being. The increasing concentration of greenhouse gases in the atmosphere, primarily caused by human activities, is driving changes in global temperatures, weather patterns, and ecosystems. These changes have significant consequences that are visible across the world.

One of the visible impacts of climate change is the rise in global temperatures, leading to more frequent and intense heatwaves. This poses risks to human health, particularly for vulnerable populations such as the elderly and those with pre-existing medical conditions. Changing precipitation patterns result in more frequent and severe droughts in some regions, impacting water availability for agriculture, communities, and ecosystems. On the other hand, other areas experience increased rainfall and flooding, causing infrastructure damage, displacement, and loss of life. Climate change also affects ecosystems and biodiversity. Rising temperatures and changing habitats disrupt ecosystems, leading to the loss of biodiversity and the extinction of species. Coral reefs, for example, are particularly vulnerable to the warming and acidification of the oceans, resulting in the degradation of these vital ecosystems. Changes in ecosystems can have cascading effects on various industries, including fisheries, agriculture, and tourism, impacting livelihoods and food security.

The consequences of climate change extend to economic and social aspects as well. Extreme weather events, such as hurricanes, wildfires, and storms, have become more frequent and severe, causing substantial economic losses and displacement of communities. In addition, changing climate conditions affect agricultural productivity, posing risks to food production and supply chains. The distribution of infectious diseases is also influenced by climate change, with shifts in disease vectors and the spread of waterborne illnesses.

Addressing the challenges posed by climate change requires concerted efforts at various levels. Mitigation strategies, such as reducing greenhouse gas emissions through renewable energy adoption, energy efficiency, and sustainable land use practices, are crucial to limit further temperature rise. Adaptation measures, such as building resilient infrastructure, enhancing disaster preparedness, and implementing sustainable agricultural practices, help communities and systems cope with the impacts of climate change. Furthermore, raising awareness and fostering education about climate change is essential to drive individual and collective action. Promoting sustainable lifestyles, supporting green technologies and innovation, and advocating for policy changes are key steps towards a more sustainable future.

3. Changing Workforce Dynamics

Changes in the Labor Force

As we delve deeper into the changes suffered in our society in recent years, another significant transformation that has had a profound impact is the changes in the labour force. This change is closely linked to increasing urbanization, as urban areas serve as key hubs of economic activities and employment opportunities. The evolving dynamics of the labour force have reshaped industries, job markets, and the nature of work itself. The labour force is undergoing a series of transformative changes in response to various factors, such as globalization, technological advancements, and shifting socio-economic trends. These changes have far-reaching implications for individuals, businesses, and society. Some changes that occurred the last years, are:

- *Shifting Employment Patterns:* The rise of the gig economy has seen a surge in temporary and freelance work. Technological platforms have facilitated the connection between workers and short-term job opportunities, allowing for greater flexibility but also presenting challenges in terms of job security and benefits. Advances in technology have enabled remote work to become more prevalent. The COVID-19 pandemic further accelerated this trend, with many organizations transitioning to remote work setups. Remote work offers flexibility and work-life balance, but it also poses challenges in terms of collaboration, communication, and maintaining work-life boundaries.
- *Technological Advancements:* Automation has automated routine and repetitive tasks, leading to increased productivity and efficiency. However, it has also disrupted certain job sectors, with some jobs being replaced by machines or algorithms. This necessitates reskilling and upskilling to remain relevant in the evolving job market. The digitalization of work processes has revolutionized industries and job roles. Digital platforms, cloud computing, and data analytics have become integral parts of many sectors, requiring workers to adapt to digital tools and acquire digital literacy skills. From smartphones to smart home devices, connectivity is now at our fingertips, allowing us to control our environments, access information, and stay connected wherever we are. Artificial intelligence (AI) and automation are transforming industries and the workforce. Machines and algorithms are increasingly capable of handling routine tasks, raising questions about job security and the need for

reskilling. This digital transformation shift has implications for the way we work, shop, and interact with companies.

- *Upskilling and Adaptability:* With technological advancements and evolving job requirements, continuous learning has become essential for individuals to remain competitive in the labour market. Lifelong learning initiatives, such as online courses, vocational training programs, and professional development opportunities, are crucial for acquiring new skills and knowledge. Alongside technical skills, the demand for soft skills, such as communication, critical thinking, problem-solving, and collaboration, has increased. These skills are essential for navigating the complexities of the modern work environment and adapting to changing job roles.

Technological advancements and automation can lead to job displacement in certain sectors, contributing to income inequality and socio-economic disparities. Efforts should be made to address this through retraining programs, social safety nets, and policies that promote inclusive growth. Rapid changes in job requirements can result in a skills mismatch, where the skills possessed by the workforce may not align with the needs of the job market. Bridging this gap requires effective collaboration between educational institutions, industry stakeholders, and policymakers to develop relevant curricula and training programs. The evolving nature of work offers opportunities for flexibility and work-life balance. However, it also raises concerns about blurred boundaries between work and personal life, increased workloads, and potential burnout. Balancing these aspects is crucial for the well-being of workers. Anticipating future workforce trends, such as the impact of artificial intelligence, robotics, and the gig economy, is essential for policymakers, businesses, and individuals to proactively adapt and create strategies for sustainable and inclusive employment.

4. Public health

Covid-19 pandemic

The outbreak of the Covid-19 pandemic has had an unprecedented impact on our society, reshaping various aspects of our lives and posing numerous challenges, since 2020. The rapid spread of the virus has led to significant disruptions in public health, economies, and social interactions across the globe. Covid-19 is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and primarily spreads through respiratory droplets when an infected person coughs, sneezes, or talks. The virus has demonstrated high transmissibility, leading to outbreaks and surges in cases worldwide.

The impact of Covid-19 on public health has been profound. The virus has resulted in millions of infections and significant mortality rates globally. It has placed immense pressure on healthcare systems, with shortages of medical supplies, hospital beds, and healthcare professionals. Efforts such as lockdowns, social distancing measures, and widespread vaccination campaigns have been implemented to mitigate the spread of the virus and reduce the burden on healthcare systems. The pandemic has also caused extensive economic disruptions. Many businesses have faced closures, job losses, and financial hardships. Sectors such as travel, hospitality, and retail have been particularly affected. Governments and organizations have implemented various economic stimulus packages, financial aid programs, and policies to support affected individuals, businesses, and industries. Socially, Covid-19 has forced significant changes in the way we interact and live. Social distancing measures, travel restrictions, and lockdowns have limited physical gatherings, leading to feelings of isolation and loneliness for many individuals. Remote work and online education have become the norm, highlighting the importance of digital connectivity and

adaptability. The pandemic has also exacerbated existing social inequalities, with vulnerable populations facing disproportionate impacts in terms of health outcomes, access to resources, and socioeconomic disparities.

Efforts to combat Covid-19 have involved global collaboration in terms of research, development, and distribution of vaccines. Vaccination campaigns have played a critical role in curbing the spread of the virus and reducing the severity of infections. However, challenges such as vaccine hesitancy, inequitable distribution, and emerging variants continue to pose obstacles in achieving widespread immunization and reaching herd immunity. As we navigate the ongoing Covid-19 crisis, it is crucial to prioritize public health measures, evidence-based decision-making, and support for vulnerable populations. Learning from the lessons of the pandemic, strengthening healthcare systems, and investing in pandemic preparedness can help society better respond to future health emergencies.

Covid-19 and Economy

The Covid-19 pandemic has had a profound impact on the global economy, leading to significant disruptions, recessions, and shifts in various sectors. The measures implemented to control the spread of the virus, such as lockdowns, travel restrictions, and social distancing, have resulted in economic slowdowns and contractions.

One of the primary impacts of Covid-19 on the economy has been the widespread closure of businesses and disruptions to supply chains. Many industries, including travel, tourism, hospitality, and retail, have experienced sharp declines in demand, leading to revenue losses, layoffs, and closures. Small and medium-sized enterprises (SMEs) have been particularly vulnerable, facing challenges in accessing financial resources and adapting to the changing market conditions. The pandemic has also led to shifts in consumer behaviour and spending patterns. With the uncertainty and financial constraints caused by the crisis, consumer confidence has been affected, leading to reduced spending in non-essential goods and services. Online shopping and e-commerce have witnessed significant growth as consumers turned to digital platforms for their shopping needs. Government intervention and stimulus packages have played a crucial role in mitigating the economic impact of the pandemic. Fiscal policies, monetary measures, and financial assistance programs have been implemented to support businesses, protect jobs, and provide relief to affected individuals and households. Central banks have lowered interest rates and injected liquidity into financial markets to stabilize the economy and facilitate recovery.

The pandemic has also accelerated digital transformation and technological advancements in various sectors. Remote work, online education, e-commerce, and digital platforms have experienced significant growth and adoption. Companies have had to adapt and innovate to maintain operations and meet changing consumer demands. This has led to opportunities for digital startups, technology-driven solutions, and the expansion of the digital economy.

While the global economy has shown signs of recovery, the path to full economic rebound remains uncertain. Factors such as the pace of vaccination, emergence of new variants, and geopolitical dynamics continue to influence economic outlooks. Building resilience, diversifying economies, investing in digital infrastructure, and strengthening social safety nets are essential to foster sustainable economic recovery and mitigate future risks.

Covid-19 and Health and Wellness Focus

In recent years, our society has experienced a significant shift towards prioritizing health and wellness. This shift encompasses a wide array of changes, from our approach to mental health to the integration of technology in healthcare and the adoption of healthier lifestyles. The outbreak of the COVID-19 pandemic served as a catalyst for a remarkable change in how healthcare is delivered. Telehealth services, once a niche option, have now become a mainstream method of seeking medical care and consultations. This transformation was driven by the need for safe and remote healthcare during the pandemic, and it has since reshaped the way we access medical services. Individuals now have the convenience of consulting with healthcare professionals online, making medical care more accessible and adaptable to our increasingly digital lives.

A prominent facet of this transformation is the heightened awareness surrounding mental health. There has been a conscious effort to destigmatize mental health issues and encourage open discussions about emotional well-being. Initiatives, resources, and support networks have emerged to provide individuals with the tools and information they need to prioritize their mental health. The realization that mental health is as vital as physical health has led to greater acceptance and understanding of conditions such as anxiety and depression, creating a more empathetic and supportive society. The proliferation of wearable fitness trackers, wellness apps, and online fitness classes is a testament to our society's embrace of technology to enhance our physical health. These innovative technologies empower individuals to monitor their physical well-being, from tracking their daily steps to monitoring heart rate and sleep patterns. Wellness apps provide guidance on nutrition, workouts, and mindfulness, making it easier than ever for people to take control of their health and well-being. The result is a more informed and health-conscious population.

The focus on health and wellness extends to the choices we make in our daily lives. An increasing number of individuals are making conscious decisions to adopt healthier lifestyles. This includes making mindful dietary choices, incorporating regular exercise into their routines, and prioritizing their overall well-being. The wellness industry has responded to this shift by offering a wider array of organic and natural products, catering to those seeking a holistic approach to health. Whether it's the food we eat, the fitness routines we follow, or the products we use, there is a growing awareness of how our choices impact our well-being, promoting healthier and more fulfilling lives.

5. Digitalisation

Social Media and Online Connectivity

Social media and online connectivity have undergone a transformative evolution, fundamentally changing the way we communicate, share information, and foster communities. These profound changes have not only redefined our social interactions but also how we access and disseminate information in our interconnected world. The advent of social media platforms has marked a significant shift in the way we access news and information. Traditional media sources are no longer the sole gatekeepers of information. Social media has democratized the process, allowing individuals to share, comment on, and engage with news stories and events in real-time. This has undoubtedly increased the accessibility of information, enabling a broader spectrum of voices to be heard and issues to be addressed. However, this newfound freedom in information sharing has also given rise to pressing concerns. The proliferation of user-generated content can lead to the spread of misinformation, fake news, and disinformation. The need for media literacy has become more critical than ever, as consumers must navigate a landscape where not all information can be

taken at face value. Fact-checking and critical thinking have become indispensable skills in the digital age, as individuals are bombarded with a multitude of information sources, some of which may lack credibility or accuracy.

Online connectivity has provided a platform for individuals to form communities based on shared interests, experiences, and passions. Virtual communities have risen to prominence, transcending geographical boundaries and connecting like-minded people from around the world. These communities offer a space for individuals to discuss their hobbies, advocate for social causes, seek emotional support, or simply bond over shared experiences. The power of online communities is evident in their ability to bring together individuals who may have otherwise remained isolated due to their niche interests or experiences. Whether it's a forum for a particular fandom, a support group for a health condition, or an advocacy network, these online communities provide a sense of belonging and support that can be invaluable in an increasingly digital world.

On the other side, the continuous connectivity that social media and online platforms afford us has raised important questions about its impact on mental health. The curated and idealized online lives that individuals often present can lead to social comparison and feelings of inadequacy. Users may find themselves comparing their real lives to the carefully curated content of others, which can contribute to anxiety, depression, and low self-esteem. Cyberbullying has emerged as a significant concern in the digital age. The anonymity provided by the online environment has enabled harmful behaviors, including harassment and bullying. Victims of cyberbullying may experience profound emotional distress, highlighting the importance of addressing online safety and promoting digital empathy. On the flip side, online platforms have also become spaces for mental health advocacy and support. Many individuals use social media to share their mental health journeys, reducing stigma and encouraging open conversations about well-being. Online therapy, support groups, and mental health resources are more accessible than ever before, providing much-needed support to those in need.

As personal information is shared in unprecedented quantities online, concerns about data privacy and security have surged. Users and regulators alike are advocating for stringent privacy protections and security measures to safeguard personal information from misuse or breaches. Data breaches and privacy violations have underscored the importance of robust privacy regulations. These incidents have resulted in the exposure of sensitive personal data, such as financial information and personal details, leading to identity theft and fraud. In response, governments and organizations are being called upon to adopt stricter privacy policies, enforce data protection measures, and empower users with greater control over their personal information. Individuals have become more conscious of their online privacy and are actively seeking ways to protect their data, from adjusting privacy settings on social media profiles to using virtual private networks (VPNs) to encrypt their online activities. As a result, a culture of privacy and data security awareness is on the rise, emphasizing the need for digital platforms to prioritize user privacy and data protection.

6. Political and Geopolitical Changes

Economic Crisis (Global financial crisis)

The global financial crisis, often referred to as the Great Recession, was a severe economic downturn that originated in the financial sector and had far-reaching consequences on the global economy. The crisis, which began in 2007-2008, was triggered by the collapse of the subprime

mortgage market in the United States and the subsequent contagion effect on financial institutions worldwide. The global financial crisis exposed vulnerabilities in the financial system and revealed interconnected risks within the global economy. The collapse of major financial institutions, had a cascading effect, leading to a freeze in credit markets, liquidity shortages, and a decline in investor confidence. Stock markets plummeted, housing markets collapsed, and unemployment rates soared in many countries.

The crisis had profound impacts on individuals, businesses, and governments. Many individuals faced job losses, foreclosures, and financial hardships. Businesses, especially those heavily reliant on credit, struggled to access funding and experienced declining demand. Governments were forced to intervene with bailout packages, stimulus measures, and regulatory reforms to stabilize financial markets and support the economy. The crisis also highlighted systemic issues within the financial sector, including risky lending practices, inadequate regulation, and complex financial instruments. It prompted policymakers and regulators to reassess and strengthen financial oversight, implement stricter regulations, and enhance risk management practices. The global financial crisis had long-lasting effects on the global economy. It resulted in a prolonged period of slow economic growth, reduced investment, and increased government debt. Austerity measures were implemented in several countries to address fiscal imbalances, leading to public sector cutbacks and reduced social spending.

Lessons learned from the global financial crisis include the importance of prudent financial management, effective regulation and oversight, and the need for systemic risk monitoring. Efforts have been made to enhance transparency, strengthen financial institutions' resilience, and promote responsible lending and borrowing practices. While the global economy has shown signs of recovery since the global financial crisis, it remains important to remain vigilant and learn from past mistakes. Ensuring financial stability, fostering sustainable economic growth, and reducing inequality are ongoing challenges that require continuous attention and proactive measures.

Ukraine war

The Ukraine war, also known as the Russo-Ukrainian War, is a conflict that erupted in 2014 following Russia's annexation of Crimea and the subsequent pro-Russian separatist movements in eastern Ukraine. The war has had a profound impact on Ukraine and the region, with far-reaching political, economic, and humanitarian consequences. The conflict has its roots in the historical, cultural, and political complexities of the region. It has involved a range of actors, including Ukrainian government forces, pro-Russian separatist groups, and Russian military intervention. The war has resulted in a significant loss of life, displacement of people, and destruction of infrastructure.

The Ukraine war has had political implications, both domestically and internationally. It has strained relations between Ukraine and Russia, leading to a deterioration of diplomatic ties. The conflict has also caused geopolitical tensions, with implications for regional security and international relations. Efforts to find a peaceful resolution through diplomatic negotiations and ceasefire agreements have been ongoing but have faced challenges and intermittent escalations. The economic impact of the war on Ukraine has been substantial. The conflict has disrupted industries, trade, and investment in the affected regions, leading to economic instability and contraction. Infrastructure, including transportation networks and energy facilities, has been damaged, further hindering economic recovery and development. The war has also strained public finances, requiring substantial resources for defence, humanitarian assistance, and

reconstruction efforts. The humanitarian consequences of the Ukraine war have been severe. The conflict has led to the displacement of a significant number of people, both internally and across borders, seeking safety and shelter from the violence. Human rights abuses, including violations of international humanitarian law, have been reported, further exacerbating the suffering of the civilian population. Humanitarian organizations have been working to provide aid, protection, and support to those affected by the war.

Resolving the Ukraine war and achieving a lasting peace remains a complex and challenging task. It requires concerted efforts from all parties involved, as well as the support and engagement of the international community. Addressing the underlying political, economic, and social issues, ensuring respect for human rights, and promoting reconciliation are crucial steps towards a sustainable resolution.

7. Cultural and Social Shifts

Gender Equality

Gender equality is a fundamental principle that advocates for equal rights, opportunities, and treatment for individuals of all genders. It aims to eliminate discrimination, biases, and social norms that perpetuate inequality based on gender. Achieving gender equality is not only a matter of human rights but also essential for promoting social justice, sustainable development, and inclusive societies. Significant progress has been made in advancing gender equality in recent years. Efforts have focused on various areas, including education, employment, political representation, healthcare, and legal rights. Laws and policies have been implemented to protect against gender-based discrimination, harassment, and violence. International frameworks, such as the Sustainable Development Goals (SDGs), explicitly include gender equality as a key objective.

However, challenges persist in achieving full gender equality. Women and marginalized genders continue to face various forms of discrimination and inequality, including unequal access to education and economic opportunities, limited political representation, and gender-based violence. Stereotypes and social norms often reinforce traditional gender roles and limit individuals' choices and freedoms. Promoting gender equality requires multifaceted efforts. It involves raising awareness about gender biases and challenging harmful stereotypes. Education plays a crucial role in promoting gender equality by providing equal opportunities and empowering individuals to challenge gender norms. Economic empowerment of women and marginalized genders, including access to decent work, financial resources, and entrepreneurship opportunities, is essential for narrowing gender gaps. Ensuring gender equality in political representation is vital for inclusive decision-making processes and policies. Encouraging the participation and leadership of women and marginalized genders in political and public spheres can lead to more equitable and responsive governance. Engaging men and boys as allies and advocates for gender equality is also crucial to fostering systemic change and dismantling patriarchal structures.

Addressing gender-based violence is a critical aspect of achieving gender equality. It requires comprehensive strategies that encompass prevention, protection, and support for survivors. Efforts should focus on promoting respectful and healthy relationships, challenging attitudes that perpetuate violence, and providing accessible and comprehensive support services. Sustained commitment and collaboration are necessary to advance gender equality. Governments, civil

society organizations, businesses, and individuals all have a role to play in promoting gender equality. It requires creating an enabling environment, implementing effective policies and programs, and fostering partnerships to accelerate progress towards a more just and equal society for all genders.

LGBTQ+ Community

The LGBTQ+ community refers to a broad coalition of groups that are diverse with respect to gender, sexual orientation, race/ethnicity, and socioeconomic status. The recognition and inclusion of the LGBTQ+ community are essential for promoting equality, respect, and dignity for all individuals, regardless of their sexual orientation or gender identity. Over the past years, there has been significant progress in recognizing the rights and experiences of the LGBTQ+ community. Many countries have implemented laws and policies to protect LGBTQ+ individuals against discrimination and violence. Activism and advocacy have played a crucial role in raising awareness, challenging stereotypes, and promoting acceptance and understanding.

Despite these advancements, challenges and barriers persist for the LGBTQ+ community. Many LGBTQ+ individuals continue to face discrimination, prejudice, and stigma in various aspects of their lives, including employment, housing, healthcare, and education. Bullying, harassment, and hate crimes targeting these individuals are still prevalent in many societies. Promoting LGBTQ+ rights and inclusion requires ongoing efforts. It involves challenging heteronormative and cisgender norms, educating communities about diversity and inclusivity, and fostering safe and supportive environments for LGBTQ+ individuals. It is important to provide comprehensive healthcare services that are sensitive to the needs of LGBTQ+ individuals, including access to gender-affirming care and mental health support. Advancing LGBTQ+ rights also involves advocating for legal protections and equal rights, including marriage equality, adoption rights, and the right to legal recognition of gender identity. Ensuring access to inclusive and comprehensive sexuality education can promote understanding and respect for diverse sexual orientations and gender identities from an early age.

Supportive organizations, community centers, and LGBTQ+ support networks play a vital role in providing resources, counselling, and community building for LGBTQ+ individuals. The media, including film, television, and literature, also have the power to shape narratives, challenge stereotypes, and promote positive representation of LGBTQ+ characters and stories. Creating an inclusive society that values and respects the rights of LGBTQ+ individuals require collaborative efforts from governments, civil society organizations, communities, and individuals. Embracing diversity, fostering empathy, and actively challenging discrimination and prejudice are essential steps towards building a society that celebrates the full spectrum of human identities and experiences.

Conclusions

In conclusion, the past years have witnessed significant changes in our society, encompassing a range of challenges and opportunities. These changes have had profound effects on various aspects of our lives, including our physical environment, economic systems, social structures, and cultural norms. They have presented both challenges and opportunities, demanding our attention, understanding, and proactive responses.

Increasing urbanization has reshaped our cities, impacting infrastructure, services, social dynamics, and the environment. The changing labour force has been marked by technological

advancements, automation, and the need for upskilling and adaptability. Climate change has emerged as a pressing global issue, calling for sustainable practices and mitigation efforts to protect our planet. The COVID-19 pandemic has disrupted lives, economies, and healthcare systems, highlighting the interconnectedness of our world and the importance of resilience and collective action. Economic crises, such as the global financial crisis, have exposed vulnerabilities in our financial systems and emphasized the need for inclusive and equitable growth. The Ukraine war has underscored the consequences of political conflicts on regional stability, human rights, and socio-economic development. The pursuit of gender equality has made significant strides but continues to face challenges in dismantling discrimination, promoting inclusivity, and ensuring equal opportunities for all. The experiences of the LGBTQ+ community highlight the ongoing struggle for acceptance, rights, and social inclusion.

In navigating these changes, it is crucial to recognize the interconnected nature of our globalized world and the shared responsibility we have in shaping the future. Collaboration, dialogue, and understanding are essential for addressing these challenges and leveraging the opportunities they present.

As we move forward, it is important to foster resilience, empathy, and sustainable practices. This requires comprehensive strategies, inclusive policies, and the engagement of diverse stakeholders, including governments, civil society organizations, businesses, educational institutions, and individuals. By embracing change, fostering inclusivity, and working together, we can strive for a more just, equitable, and sustainable society.

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1.1.2. High development of teaching programs: increase of people studying, interventions in learning difficulties, career management.

Introduction

As presented before, in recent decades, major societal changes have taken place which are challenging the role of Higher Education Institutions throughout Europe. The Higher Education sector has an essential role to play in Europe's post-pandemic recovery and in shaping sustainable and resilient societies, of which deeper and more effective transnational cooperation is a key element.

To tackle the needs of a fast-changing society and the most pressing societal challenges, universities are now focused on developing policies, courses, and research agendas to equip students with skills and knowledge to be able to thrive in a complex society (Clark 1998, 2004). Universities become more and more responsible for the sustainability of these changes and there is an emerging need of supporting a “transformative” approach to Higher Education.

A focus on technical skills is no more enough and there has been a push for universities to play a pivotal role in creating more responsible citizens and in empowering students to be able to contribute to societal challenges and build their careers in a protean context.

To do so, a series of initiatives have been implemented. These encompass different assets of Higher Education namely innovative students' services, improvements in didactics, investments toward Third Mission activities. All these aim at reshaping Higher Education activities in order to support students' academic success and successful and impactful careers in complex and fast changing societies.

1. The need of increasing people studying

The lines of actions which will be described later in the Chapter refer to a set of initiatives which can all be considered among the strategies that the EU has proposed to make further progress in the development and implementation of inclusion and educational success of vulnerable students and for reducing the rate of dropping out from Higher Education in all member States.

Another challenge is also to favour a broader entry to Higher Education, including for young workers and for those over 30 years old, with a system of micro-credentials that also functions as an integration mechanism.

With the aim of fostering more inclusive Higher Education, the EU strategies foster the promotion of initiatives that adapt organisational and learning processes to the needs of all learners and that promote information and accompaniment programmes, including individualised mentoring and guidance, both during Higher Education and at earlier educational stages to ensure academic success and impactful and sustainable careers.

The need for increasing participation in Higher Education in Europe is a crucial challenge for all member States and for all local communities. The EU 2030 target pinpointed that the share of 25–34-year-olds with tertiary educational attainment should be at least 45%, by 2030. The tertiary educational attainment rate of 25-34 year olds in the EU stood at 41.2% in 2021. This continues the steady growth seen in the past decade, up from 34.1% in 2012 and 37.6% in 2017. In all but three Member States, attainment rates have increased compared to 2017/22. At EU level, the current rate is 3.8 percentage points far from the 45% target for 2030, with 13 Member States surpassing it in 2021. Top performers are Luxembourg (62.6%), Ireland (61.7%), Cyprus (58.3%), Lithuania (57.5%) and the Netherlands (55.6%). Eight Member States have yet to reach 40% (OECD, 2023).

Young people whose parents have a low level of education are more than three times less likely to attain a tertiary-level qualification. Strengthening equity and inclusion in accessing Higher Education is still a challenge for most countries. In nearly every country with available data, the completion rate after three years is lowest for students whose parents did not complete upper secondary education and highest for students with at least one tertiary-educated parent.

Disparities in gender equity in access to tertiary education also persist. On average across OECD (2023) countries in 2020, women made up only 31% of new entrants to science, technology, engineering, and mathematics (STEM) bachelor's programmes, although the gaps narrow at master's and doctoral levels. Moreover, women are a clear minority among senior academic staff. Across all fields, women typically make up between one-fifth and one-third of full professors in European tertiary institutions.

Career services and mentoring are activities that help students from disadvantaged backgrounds who find it more difficult to follow the dynamics of the courses. These mentorships can be provided by career practitioners, but also a great support can be made up of older students from the same university degree (with a specific training in mentoring).

2. The challenge of improving career management

Considering these data and the scenarios described in Chapter 1.1.1, one of the main areas of interventions for Higher Education to become “transformative” and responsive to recent societal challenges has to do with the implementation of services for supporting career management.

The European Policy on Lifelong Guidance introduced in 2008 the approach of Career Management as one of the main focus of the national and regional systems of career services and lifelong learning.

The concept of career management refers to the intentional management of work, learning and other aspects of life by each person, through reflective, evaluative and decision-making processes (Haines, Scott, & Lincoln, 2003; Watts, 2006). In this definition «Career is lifelong progression in learning and work. Learning is about education, but also about training, and informal learning. Work includes paid employment, but also about self-employment, and unpaid work within households and communities. Progression can be lateral as well as vertical» (Watts, 1996).

The right for all citizens of an intentional career management implies that everyone has the freedom but also the responsibility to make effective choices in study and working life, to promptly seize the opportunities that exist in an increasingly complex society characterised by rapid changes and unpredictability.

Career management means also that all services and new training paths should be designed for helping people to learn how to manage their career in changing and complex contexts all lifelong.

Following this approach, the main framework of the EU policy in lifelong guidance (LLG) is based on Career Management Skills (CMS), as a set of skills that people need to navigate their own way through life, learning and work. There are already some different national CMS frameworks in Europe, following different traditional approaches on career guidance and on skills description. Despite the differences in reference frameworks, the importance of these skills to handle complexity and navigate in the contemporary labour market is well proven. Universities are called to implement services to ensure the promotion of these skills from enrolment to graduation, but a main question still remains open: how do people learn career management skills? How can career services be redesigned to support students to develop these skills? Traditional didactical approaches, based on disciplines and on content teaching do not meet this need. All career learning activities must be designed to improve one or more specific skills, related to the career management of each single person. Career learning needs to be strongly centred on the experience and the aspects, values, life approaches of each learner. Learners must be actively involved in career learning activities to enhance their career management skills. For an effective design of all interventions, at any level, reflection, evaluation and exploration by learners will be the key point and will request adequate timing.

This challenge translates into major changes and commitment towards the structuring of strategic career services in universities. Career services in universities should be proactive, student-centred, and adaptable to the dynamic labour market. Fundamental assets of these services refer to:

- Personalisation of guidance services to tailor career planning and job search strategies.
- Skills development moving from a career information approach to an educational one where the learning component is central.
- Offering networking opportunities such as networking events, career fairs, alumni connections. It is well known that building a strong professional network is crucial for job placement and career advancement.
- Continuous update of labour market information which needs to stay current and provide information on emerging industries, job roles, and skills in demand. The job market is

constantly evolving, and students should be aware of the latest opportunities and of future literacy skills to allow them to foresee future trends.

- Mental health and well-being support as recognising the emotional and psychological aspects of job searching and career development is crucial.
- The use of data and analytics to monitor the success of career services programs. It is also important to consider the possibility of data-driven improvements and to establish mechanisms for students to provide feedback on career services, so they can continually feed data and improve and better meet the needs of the student body.
- Teaching students how to leverage technology and maintain a professional online presence through platforms and digital literacy.

3. Supporting students for academic success and active engagement

Another strategic area for “transformative” Higher Education refers to innovation in didactic methodologies. Universities are working to develop and improve teaching programs and implement new didactic approaches to empower students to address new societal challenges. The following sections present powerful methodologies to make the learning experience meaningful and “change maker”.

Experiential Learning

Experiential learning is an educational theory and methodology that emphasises the acquisition of knowledge, skills, and understanding through direct, practical experiences. It involves the active engagement of learners in real-world situations or simulations, allowing them to reflect on and draw meaning from their experiences. This methodology usually translates into internships, research projects, and community engagement activities. Practical experience can provide students with valuable insights into real-world challenges (Kolb, 2014). The Kolb cycle, named after the American educator who developed it, is a model that defines experiential learning as a spiral process. Specifically, by following the four phases that compose it, everything starts from an experience one can acquire, and then the person develops and improves competencies and skills that must be tested and verified again, resulting in a new experience from which the cycle can begin again. The theory of experiential learning is based on the fact that ideas are not fixed or immutable but change according to experience. In fact, the learning process develops and changes from the very experiences we have. Therefore, even in academic contexts, it is necessary to integrate theory and practice. The steps identified by Kolb's exponential cycle that make experiential methodology effective and efficient are:

- Concrete Experience: Personally experiencing and discussing the lived experience within the training workshop, emphasising emotional aspects and intuition.
- Reflective Observation: Observing, reflecting and interpreting the feelings and behaviour that emerged during the experience, focusing on understanding and depth of analysis.
- Abstract Conceptualisation: Producing and schematising concepts and skills by extending them to external situations, both work-related and personal, emphasising logic and generalisation.

- Active Experimentation: Testing acquired knowledge and skills in new situations, focusing on change and evolution.

This last phase in turn becomes a Concrete Experience that starts a new learning cycle, hence David Kolb's definition of experiential learning as a spiral process (Kolb, 1984).

Service Learning

Service learning is an educational approach that combines community service with academic instruction, focusing on both community and student development. Burnett and colleagues define service learning as “structured learning experiences that facilitate the acquisition of awareness, knowledge, and skills while promoting a commitment to personal, social, civic and professional responsibility” (2005, p. 158). This method is designed to enhance students' learning experiences by actively engaging them in real-world problem-solving and community service. Students involved in service learning participate in structured, meaningful community service activities that address community needs. These activities may vary widely, from tutoring and environmental conservation to working with marginalised populations. Service learning is not just about volunteering. It integrates academic goals and curriculum into the service experience. Students are guided in reflecting on their service experiences and connecting them to course content, theories, and concepts. This helps students understand the real-world applications of what they learn in the classroom. Reflection is a critical component of service learning. Students are encouraged to reflect on their experiences, both in the service activity and their academic studies. They consider how the two relate and what they've learned from their service experiences. Collaboration with community organisations or agencies is a fundamental aspect of service learning. Universities often partner with local non-profits, schools, or other entities to identify service opportunities that align with academic goals. In the service learning approach, the objectives are established to guide students' service experiences. These objectives connect the service to academic content and skills development.

Interdisciplinary Approach

This transversal approach aims at encouraging interdisciplinary learning, as many societal challenges are complex and require multiple perspectives. An interdisciplinary approach in universities involves integrating knowledge and methods from multiple academic disciplines to address complex problems. Interdisciplinary approaches foster collaborations between different departments and faculties (Tobi & Kampen, 2018) and encourage collaboration between different departments or schools to provide a more holistic education and tackle real-world issues. This approach can lead to innovative solutions and a broader perspective for students and researchers.

Critical Thinking and Problem Solving

Focus on developing critical thinking, problem-solving, and adaptability skills. Encourage students to think creatively and apply their knowledge to novel situations (Snyder & Snyder, 2008). Developing critical thinking and problem-solving skills is essential for making informed decisions, finding effective solutions, and navigating the complexities

of life. Remember that developing these skills takes time and practice. Regularly apply these strategies in your personal and professional life to become a more effective critical thinker and problem solver. Critical thinking, problem-solving, and challenge-based learning are crucial components of higher education, and universities play a pivotal role in nurturing these skills in students. Universities can design curricula that intentionally integrate critical thinking and problem-solving across various disciplines. Instead of compartmentalizing subjects, encourage interdisciplinary approaches that require students to apply their knowledge to complex, real-world challenges. Incorporating critical thinking, problem-solving, and challenge-based learning into the university experience prepares students to tackle the complexities of the modern world, equipping them with valuable skills for their academic and professional journeys.

Incorporate Technology

Leverage technology for online learning, virtual labs, and data analysis. Technology can help students develop digital literacy, a crucial skill in today's world (Pianfetti, 2001). Incorporating technology into the university environment is essential for enhancing teaching, research, administration, and student learning experiences.

Incorporating technology into the university environment requires a strategic approach, investment, and ongoing commitment to stay current with technological advancements. When done effectively, it can enhance the quality of education, improve administrative processes, and better prepare students for a digital-centric world.

Supporting teaching

The need to improve the quality of university teaching through the activation of qualified training pathways and specific monitoring and evaluation strategies of faculty development actions is a priority for the higher education system. These challenges are part of the main axes of the Bologna Process (Wihlborg & Teelke, 2014) and of the various European reforms (EUA Trends, 2018; EHEA, 2015; Eurydice, 2017) that support a pedagogical training in teachers and the development of competences not only disciplinary and research, but also didactics, design and evaluation. As the EUA Trends 2018 Higher Education Report (Gaebel & Zhang, 2018) points out, although the topic of teacher training is increasingly discussed and a key axis in innovation and development, it still remains an often critical and little explored issue. Moreover, teacher training in Italy is a recent topic compared to other European countries, and is developing differently in the various universities (Lotti & Lampugnani, 2020).

Available research on the topic shows how the training courses delivered to teachers have an impact on how they teach (Stes, 2011). The research results of Gibbs and Coffey (2004) show significant changes in the way students perceive the lessons delivered by teachers who have undergone training. Lecturers have a great responsibility in preparing young people for their entry into the world of work and this means equipping them with all the cognitive and metacognitive tools that will enable them to be adequate and capable professionals, and to be suited to a world characterised by complexity (Coggi, 2022). The challenge, therefore, for guaranteeing the quality of university teaching would seem to lie in the possibility of creating an environment that fosters the acquisition and strengthening of a shared internal culture. In this sense, investing in improving the skills of one's staff is considered a strategic operation (Loukkola & Zhang, 2010) as it is

intentionally aimed at developing the system's capacity to maintain and improve its performance and identity (Mushtaq & Khan, 2012). Indeed, training can become an enabler of the factors that determine the educational quality of work contexts, i.e. the educational potential expressed by the interactions that guarantee their functioning and are renewed due to the capacity of each organisation to evolve and transform (Vicari, 2008). Training, if strongly contextualised and connected to organisational processes, contributes to enhancing the educational potential that characterises the university organisation, enabling a possible synergic integration between intentional training activity and the informal dimension of learning generated by conscious and responsible participation in the overall system (Del Gobbo, 2021).

Faculty Development and Teaching and Learning Center

Provide training and resources for faculty to keep up with the latest research and teaching methods. Encourage research on topics related to societal challenges (Bergquist & Phillips, 1975). Faculty development and teaching and learning centers (TLCs) play critical roles in higher education by supporting faculty members in their teaching and professional growth. These centers are dedicated to enhancing the quality of teaching and learning at universities.

What is Faculty Development? Faculty development refers to the process of improving the skills, knowledge, and expertise of university faculty members. It encompasses various activities and initiatives that aim to enhance their teaching, research, and professional growth. In order to ensure constant training of skills and updating of teaching methods, there are centres linked to universities that take care of teacher training. The TLCs were created to ensure that teachers develop not only technical but also pedagogical skills. Teaching and Learning Centers are dedicated units within universities or colleges that focus on improving teaching and learning practices. TLCs provide a range of services and resources to both faculty and students. Indeed, university lecturers are responsible for training students and equipping them with the set of skills that will enable them to face the world of work, be aware and active citizens and manage their career path.

Continuous Improvement

Regularly review and update the curriculum based on feedback and changing societal challenges. Stay agile and responsive to emerging issues. Integrating the Sustainable Development Goals (2015) into a university's curriculum is a crucial step towards preparing students to be informed, responsible global citizens who can contribute to the achievement of these goals. The alignment of training courses with the needs of the world of work and the challenges of society remains central. For this, a clear reference to Sustainable Development Goals (SDGs) is required. The SDGs established by the United Nations in 2015 are a set of 17 interconnected global goals designed to address a wide range of social, economic, and environmental challenges. The objectives outlined should be a clear guiding reference for structuring university pathways so as to ensure that students develop the competences, knowledge and skills they will need to meet the needs of society. The university is therefore concerned with training future professionals who can have a significant impact on the world and society, starting with the areas in which they live.

Assessment and Feedback

A significant moment for the harmonisation of assessment systems in higher education is the ministerial meeting in Bergen (2005). The Bergen meeting (May 2005) marks two important events. The Framework for the Qualifications of the European Higher Education Area (EHEA), i.e. the framework within which countries are required to place higher education qualifications, was approved. A fundamental element of the Framework is the Dublin Descriptors (the final act of their elaboration takes place in Dublin). The Descriptors, defined for the three levels of higher education, identify the nature of the qualification through five types of learning that students must demonstrate that they have acquired in order to be able to obtain the qualification. The focus is therefore on what the student has to learn and on the development of his/her competences. Having defined this framework, the five Descriptors concern:

- Knowledge and understanding
- Applying knowledge and understanding
- Autonomy of judgements (making judgements)
- Communication skills
- Learning skills

The other relevant event that characterises the Bergen (2005) meeting is the definition of the Guidelines for Quality Assurance in the Higher Education System, i.e. the document Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG 2015) drawn up by ENQA, the European Association for Quality Assurance in Higher Education (<https://enqa.eu>).

ENQA is the international body established following the Recommendation of the Council on European co-operation in quality assurance in higher education. ENQA's tasks include the accreditation of Quality Assurance and Evaluation Agencies operating in the Bologna Process countries. Therefore, universities should use the indicated criteria and guidelines as a measure for the assessment, evaluation and structuring of university courses in order to be able to guarantee high levels of teaching quality for students, teachers and the territory. Furthermore, as the guidelines suggest, tools for the impact assessment of training pathways should be introduced to monitor the activities and services introduced. Qualitative-quantitative measurement of impact serves the organisation to be able to better structure its courses and adapt them to the challenges that society imposes. Adapting university pathways to these needs means, once again, equipping students and lecturers with the necessary tools to respond to the needs and requirements of this rapidly changing world.

Needs Assessment

Understand the current societal challenges and the skills and knowledge students need to address them. This may involve consulting experts, industry leaders, and conducting surveys. Building strong connections between universities, industries, and local territories is crucial for fostering economic growth, innovation, and community development. These connections can lead to mutually beneficial relationships and collaborations.

Collaboration among these stakeholders can lead to a stronger, more resilient local economy and a thriving community. The increasingly relevant need is given by the theory-practice connection and the overcoming of the university-world of work dichotomy. Creating a continuum between formal, informal and non-formal learning serves to contextualise student learning and provide them with a concrete vision of the world of work. This allows students to be aware of their possible impact on today's and tomorrow's society, as people and as professionals. Incorporating career-related learning into university curriculum is essential for preparing students for the workforce and ensuring their academic experience aligns with their career goals. Integrating career-related learning into the university curriculum not only benefits students in their job search but also enhances their overall educational experience. It helps bridge the gap between academic knowledge and practical application, making graduates more competitive and better prepared for their chosen careers. The university must commit itself to responding to dual needs: preparing students to structure their careers in a complex world; preparing tomorrow's professionals to respond to society's needs.

In this chapter the importance of collaboration between university, business and the world of work was emphasised. This challenge is part of the many actions that universities will have to implement to meet the criteria of the Third Mission. This topic will be discussed in depth in subsequent chapters.

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1.1.3. Use of new technologies and addressing digital transformation through development of digital readiness.

Introduction

In this era of rapid technological advancement, new technologies, such as the web, social networks, and other digital platforms, are at the forefront of shaping our society, and academia is no exception. The digital transformation sweeping across universities worldwide is both a challenge and an opportunity. It requires a fundamental shift in how we teach, learn, conduct research, and engage with the wider community. With grit as our guiding principle, we will explore how academia can navigate the digital landscape, cultivate the necessary digital readiness, leverage AI and machine learning, tackle ethical implications, foster a digital culture, make a social impact, and glean insights from successful cases of digital transformation.

Understanding the Digital Landscape

The digital landscape represents an extensive ecosystem of technologies and platforms that cater to a broad spectrum of functions and purposes. Recognizing the variety and intricacies of this landscape is essential to successfully navigate and exploit it for education and research goals.

Digital platforms span across social media, online learning platforms, content-sharing sites, and digital collaboration tools. Each of these platforms exhibits distinct features and functionalities that cater to different needs. Social media platforms such as Facebook, Twitter, LinkedIn, Instagram, and Snapchat have transitioned from mere tools for social interaction to platforms for news dissemination, professional networking, academic discussions, and marketing. In academia, they are leveraged for purposes like sharing research findings, promoting events, facilitating collaboration, and public engagement (Aguirre, 2019).

Online learning platforms like MITx, Coursera, edX, and Khan Academy, as well as Learning Management Systems (LMS) like Moodle and Blackboard, have revolutionized education. They have provided avenues for online courses, digital classrooms, and resources for self-paced learning while equipping instructors with analytics and tools to monitor student progress. Content sharing sites like YouTube, SlideShare, and ResearchGate act as repositories for sharing diverse forms of content ranging from video lectures and presentations to academic papers and datasets. Digital collaboration tools like Google Suite, Microsoft Teams, Slack, and Trello have become instrumental

in facilitating collaborative work and project management in the digital space, making them crucial for coordinating group work in remote or online settings (Sugimoto, 2017).

Accompanying the rapid technological advancements, several significant digital trends have surfaced that are influencing both society and academia (Zhang, 2020). The growth in connectivity with the spread of mobile devices and enhanced internet access has ushered in an era of hyperconnectivity. This allows for real-time communication and collaboration and has far-reaching implications for how learning, teaching, and research are conducted (Arafah, 2023). The digital age has also seen the creation of enormous amounts of data. Harnessing this data through analytics can offer valuable insights for researchers and educators, aiding in decision-making, customizing learning experiences, and advancing our understanding of complex phenomena.

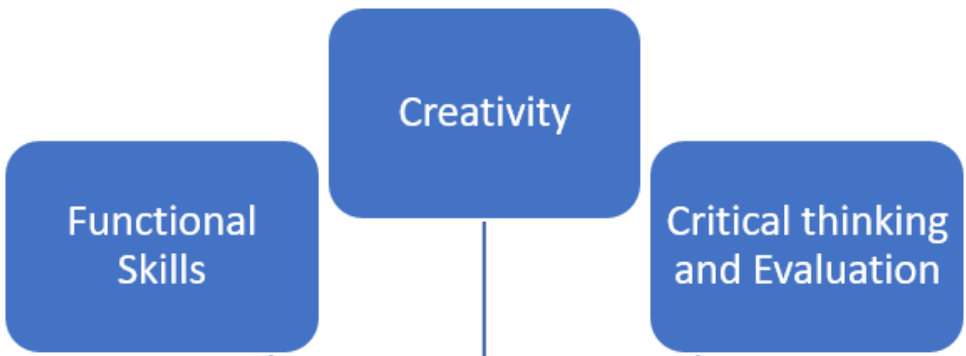
Artificial Intelligence and Machine Learning are increasingly being utilized in a range of applications, from predictive analytics to personalized learning and automation (Sarker, 2021). Within academia, these technologies hold the potential to revolutionize research methodologies and pedagogical approaches. As our dependence on digital technologies intensifies, so does the significance of cybersecurity. Safeguarding sensitive data and maintaining privacy have emerged as critical challenges in today's digital landscape (Sarker, 2021).

In summary, a thorough understanding of the digital landscape—its platforms, trends, and impacts—is a vital first step toward effectively deploying technology for academic pursuits. This understanding can act as the bedrock for developing digital readiness and implementing a successful digital transformation strategy.

Digital Readiness and Skill Development

In our digitally dominated world, digital readiness represents a cornerstone of empowerment, enabling individuals to participate fully in our information-intensive society. **Digital readiness** can be defined as the ability to use digital technology effectively and responsibly and encapsulates the breadth of digital literacy and other pivotal skills necessary to confidently navigate the digital world, including critical thinking, information literacy, data literacy, and media literacy.

Digital literacy extends beyond basic computer skills or the ability to use specific software. It is a composite understanding that empowers individuals to interpret and create digital content, comprehend the underlying technology, and appreciate the ethical considerations associated with digital technology use (Liza, 2020). Essentially, it's about having the competence to understand, use, and interact with anything in a digital form. Figure 1 shows the eight components of Digital literacy as presented by Payton and Hague (2010).



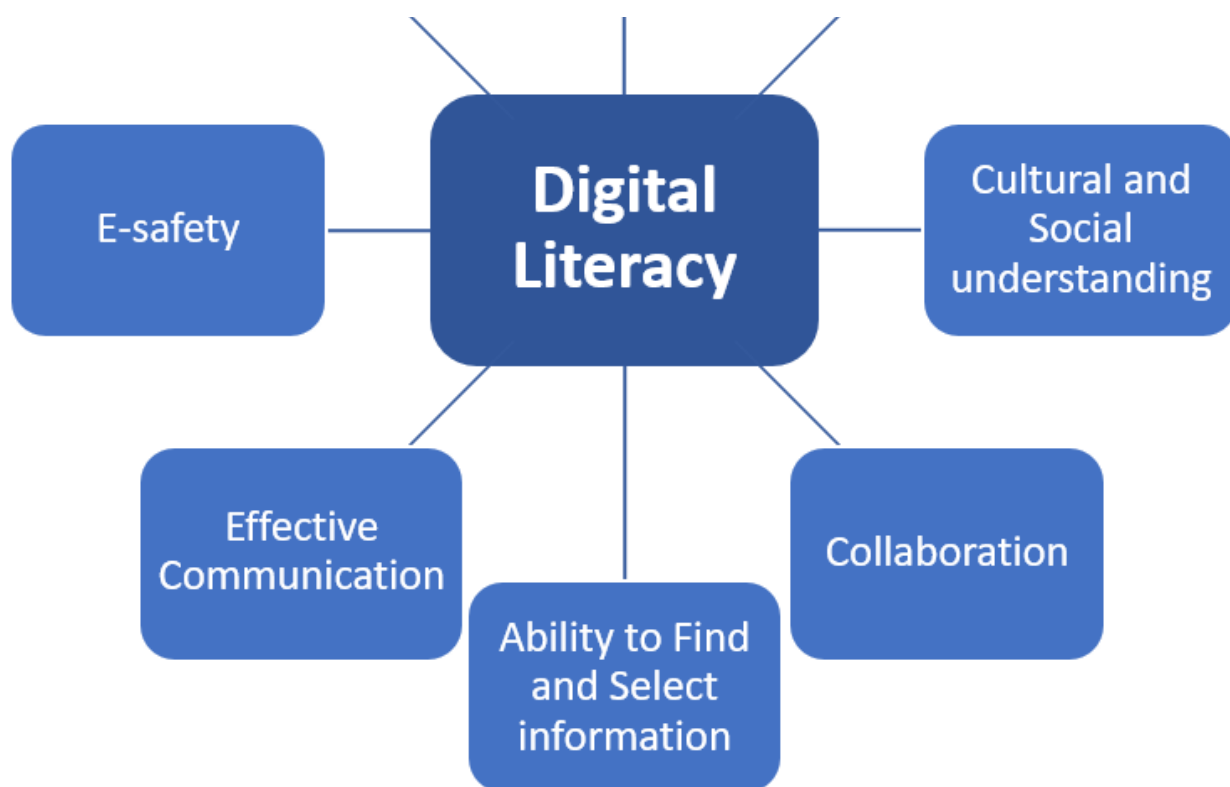


Figure 1: Eight components of Digital Literacy (Payton and Hague, 2010).

Complementing digital literacy, **critical thinking** is an indispensable skill in the digital realm. It empowers individuals to evaluate the reliability of information found online, discern fact from opinion, identify biases, and make informed decisions about what they encounter online (Laar, 2020). The widespread dissemination of information, coupled with the equally widespread prevalence of misinformation, emphasizes the importance of this skill.

Next, **information literacy** is the ability to locate, assess, and utilize digital information effectively. In the age of information overload, being information literate allows individuals to filter through vast quantities of data, identify credible sources, and use the extracted information for problem-solving or decision-making (Bawden, 2001). Information Literacy is also referred as the suite of interconnected competencies that includes the insightful exploration of data, comprehension of the methodologies for information generation and its significance, as well as leveraging such information for the formulation of fresh insights and ethical participation in educational communities (Association of College & Research Libraries, 2000).

Media literacy revolves around understanding the role and influence of media in our lives and the ability to evaluate media content critically. It equips individuals with the ability to discern reliable information from misinformation, to recognize bias or propaganda, and to understand the potential impact or influence of various forms of media on our perceptions and beliefs. In the academic sphere, media literacy is integral to developing informed, critical thinkers who can effectively navigate and contribute to the digital world. (Craft, 2017).

Finally, **data literacy** is the ability to read, understand, create, and communicate data as information (Gummer, & Mandinach, 2015). Much like literacy itself, which is about understanding and making sense of the written word, data literacy involves making sense of data. In our data-

rich world, this skill can help individuals make informed decisions based on the data at their disposal. It involves understanding where to find relevant data, how to interpret it, how to analyse it, and how to communicate findings effectively. This skill is particularly relevant for students and researchers who frequently need to work with and interpret data in their work.

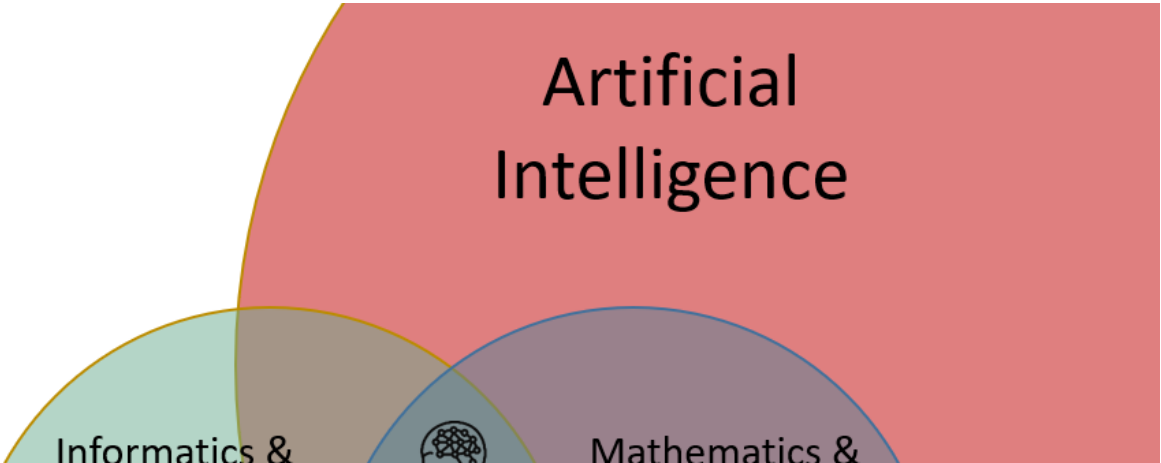
Developing these skills is a multifaceted process that should be embedded in education and training. Digital skills can be nurtured by incorporating digital tools and resources into teaching and learning. This includes using online platforms for assignments, utilizing digital resources for research, and implementing project-based learning that requires students to engage with digital tools.

Moreover, the development of critical thinking, information literacy, and media literacy should be interwoven into the core of the curriculum. This can be achieved by fostering an educational environment that encourages inquiry, debate, and reflection. For example, students could be tasked with researching topics online, evaluating the credibility of sources, and discussing their findings in class. Preparing individuals for the digital world necessitates a comprehensive approach that focuses on fostering digital literacy and complementary skills such as critical thinking, information literacy, and media literacy. By embedding these skills into education and training, we can equip individuals with the tools they need to navigate the digital landscape effectively and responsibly.

The Role of Artificial Intelligence and Machine Learning in Digital Transformation

Artificial Intelligence (AI) and Machine Learning (ML) are reshaping the contours of the digital landscape, becoming transformative forces in education and research. As integral parts of digital transformation, AI and ML unleash new capabilities and possibilities, from personalizing learning to empowering research and enhancing decision-making. The overview between the relations of field of Artificial Intelligence, Machine Learning and other related field is depicted in Figure 2.

AI is a broad field that includes any computer program or system that exhibits traits we associate with human intelligence—understanding complex ideas, learning from experience, making decisions, and adapting to new situations. Machine Learning, on the other hand, is a subset of AI that focuses on the development of computer algorithms that can learn and improve from experience (Hastie, 2009).



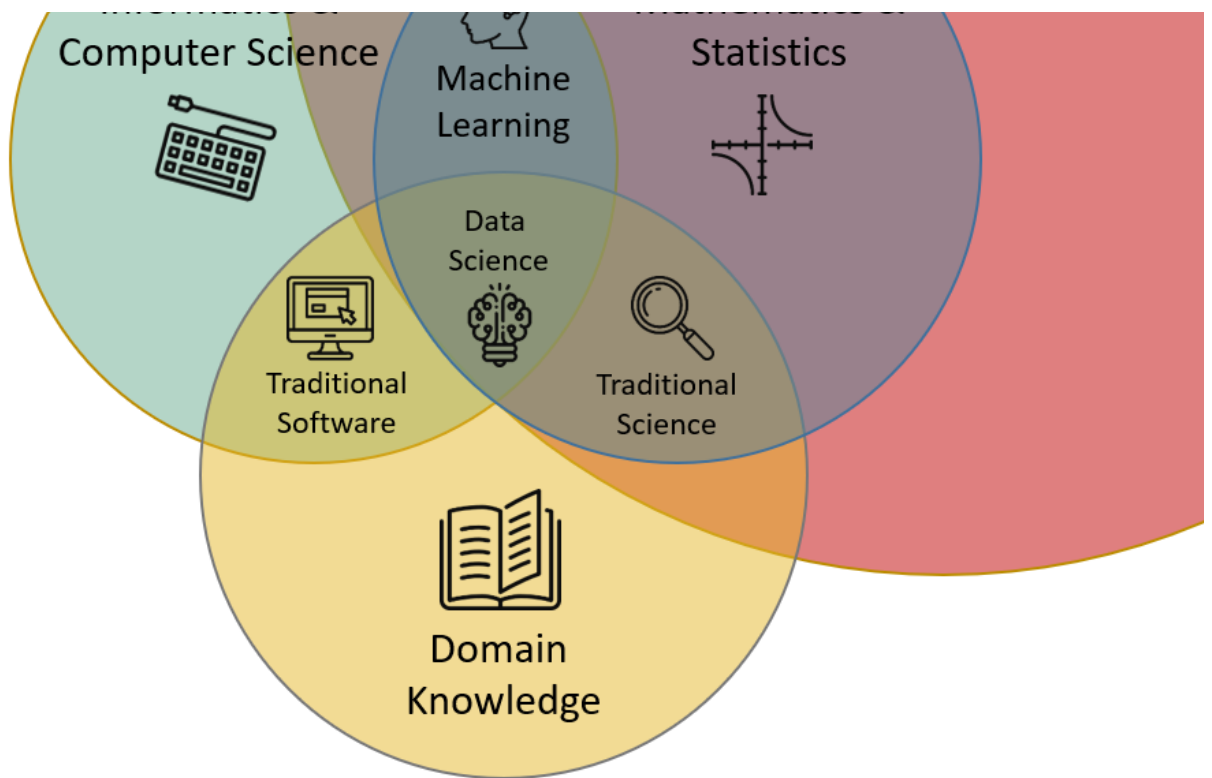


Figure 2: Relations between Artificial Intelligence, Machine learning, Data Science, and other fields.

In terms of education, AI and ML can help create adaptive learning environments tailored to individual needs and capabilities. As it reacts to each learner's progress, this personalization can challenge learners at the right level, ensuring they continuously push their boundaries (Bozkurt, 2021)—a process that fosters grit and resilience. As learners engage with AI-driven educational platforms, they are not just gaining knowledge. Nevertheless, they are also developing perseverance as they traverse through various levels of learning experiences designed to match their individual pace and understanding (Bozkurt, 2021). In the realm of pedagogy, AI and ML offer promising prospects. They provide tools for developing sophisticated tutoring systems, automating grading tasks, and even identifying potential gaps in course materials or curricula. AI can analyse a student's engagement and comprehension levels in real-time, allowing for immediate feedback and adjustment in teaching methods. This level of individualized attention can effectively support a student's learning journey, fostering resilience as they experience tailored teaching that responds to their unique challenges and strengths.

In research, AI and ML can analyze massive datasets swiftly and accurately, uncovering patterns and insights that might be challenging and time-consuming for humans to identify. The application of these technologies encourages researchers to display grit by enabling them to grapple with complex problems and large data sets. They continuously learn and adapt to effectively leverage AI and ML tools, thereby persisting through challenges and committing to long-term goals.

Furthermore, AI and ML can enhance decision-making processes in academia. By predicting trends and outcomes based on data, they provide valuable insights that inform administrative and educational decisions. Here too, grit comes into play. The continuous learning required to

understand and interpret AI and ML outputs, the patience needed to wait for computational results, and the perseverance to make decisions based on sometimes complex findings—all these require and build grit among academics and administrators alike (Hariri, 2019).

AI and ML are also transforming research methodologies across a range of disciplines. In social sciences, machine learning models can help identify patterns and trends in vast datasets, providing new insights into human behaviour and societal trends. In the natural sciences, AI applications can aid in simulation creation and hypothesis testing, accelerating the research process and yielding more accurate results. In both cases, researchers must exhibit grit in learning to use these new tools effectively and in persisting through the complexities of these new research methodologies.

In sum, the roles of AI and ML in digital transformation extend far beyond mere functional enhancements. They also offer a platform for developing and exhibiting grit in the face of digital-era challenges, thereby playing a pivotal role in the broader journey of digital readiness. As we embrace the benefits of AI and ML in education and research, it's also essential to consider the challenges and ethical implications these technologies present. From concerns over data privacy and security to the potential for algorithmic bias and the digital divide that could widen with AI's use, there's a necessity for informed, ethical stewardship of these technologies. Here again, the need for grit is evident—as educators, administrators, and students grapple with these complexities, their resilience and persistence are put to the test. Balancing the potential benefits of AI and ML with these considerations is a vital aspect of digital transformation.

The Ethical Implications of Digital Transformation

As digital transformation progresses, it brings a host of ethical implications that demand our attention and action. These issues, encompassing privacy concerns, the digital divide, misinformation, and cyberbullying, call for an ethical framework that guides our use and development of digital technologies.

The **digital divide**, referring to the gap between those with access to digital technologies and those without, is another major ethical concern (Dijk, 2006). Digital literacy and access are increasingly becoming prerequisites for participation in society, yet many people, often in marginalized communities, lack these necessities. This disparity can lead to social, educational, and economic inequalities that exacerbate existing social divides.

Privacy has been thrust into the spotlight as more of our lives move online (Bélanger & Crossler, 2011). The digital age has brought about a shift in how we handle data, with large amounts of personal information being collected, stored, and analyzed daily. This raises questions about who has access to this data, how it is used, and how well it is protected. Ensuring data privacy and security is a critical ethical responsibility, especially in an age where data breaches and misuse can have serious consequences.

In the digital era, data has become a significant asset. Every interaction on digital platforms generates data that can be used to glean insights and make decisions. However, this raises critical questions about data ownership. Who **owns this data**, especially when it's been generated by users interacting with digital platforms or learning systems? How is this data being used, and who stands to profit from these insights? Furthermore, how is this data being protected? These ethical

considerations around data ownership are particularly pertinent in an age where personal data can be a highly valuable—and potentially exploitable—commodity (Jones, 2014).

Also, digital platforms and services often require users to provide personal data to offer personalized experiences. However, the methods and clarity with which they obtain user consent for collecting and using this data can vary significantly. Ethical considerations arise when consent is not explicitly sought, when users are not adequately informed about how their data will be used, or when the process to opt-out is made deliberately complex (Cate & Mayer-Schönberger, 2013). In the context of academia, it becomes crucial to ensure that all digital platforms used to teach, learn, and conduct research are transparent about their data practices and seek informed consent from their users. **Consent in the digital age** is not just about legal compliance, but also about building trust and respect for individual privacy.

Even though Artificial Intelligence is revolutionizing many aspects of our lives and academia, it comes with significant ethical implications. Algorithms used in AI are often trained on large datasets that may contain inherent biases, leading to skewed or unfair outcomes when these AI systems are applied. Moreover, as AI systems become more autonomous, questions arise about accountability and transparency (Kazim & Koshiyama, 2021). Who is responsible when an AI system makes a decision that causes harm or breaches ethical norms? The **ethical implications of AI** in the digital transformation of academia necessitate careful attention to ensure fairness, accountability, and transparency (Jobin, 2019).

Related, **algorithmic bias** is a significant ethical concern in the application of AI and ML, highlighting the fact that AI systems are not inherently impartial (Baker & Hawn, 2021). These systems are trained on datasets that can carry implicit human biases, resulting in skewed or discriminatory outputs. For instance, an AI system used for grading could exhibit bias if the training data was predominantly based on a particular group of students, potentially leading to unfair assessments for students outside this group. In research, algorithmic bias can skew data analysis, leading to biased conclusions that do not accurately represent the population. Therefore, it's critical to ensure that the data used to train these systems is representative and unbiased, and that there's transparency in how AI and ML algorithms work. Recognizing and addressing algorithmic bias is an essential part of fostering ethical, fair, and inclusive digital transformation in academia.

Misinformation is another significant issue fueled by the ease of sharing information online. It can distort public perception, hinder informed decision-making, and even lead to harmful consequences. This underlines the importance of digital literacy skills to discern reliable information from falsehoods and the need for digital platforms to take proactive steps in combating the spread of misinformation (Kozyreva, 2020).

Cyberbullying is a distressing consequence of our increasingly interconnected world. It poses severe risks to mental health, particularly among young people (Bottino, 2015). Safeguarding digital spaces from cyberbullying is a pressing ethical duty, requiring technical solutions and educational interventions.

Addressing these ethical concerns requires a multifaceted approach. Strengthening data protection legislation, promoting transparency around data use, and implementing stringent cybersecurity measures can protect privacy. Bridging the digital divide will involve initiatives to increase access to digital technology, along with efforts to foster digital literacy in underprivileged communities (Lyles, 2015). Combating misinformation can be done by promoting media literacy,

building critical thinking skills, and improving fact-checking mechanisms on digital platforms. Tackling cyberbullying requires robust online safety measures, user reporting tools, and educating users, especially young people, about responsible digital behavior.

By acknowledging these issues and implementing thoughtful and proactive strategies, we can navigate the digital landscape in a way that respects individual rights, promotes equality, and fosters a healthy digital environment. How effectively we respond to these ethical challenges will shape the digital future.

Building a Digital Culture in Academia

Fostering a digital culture in academia is a multifaceted endeavor centered around the acceptance and active encouragement of digital transformation. A successful digital culture creates an environment where the growth mindset thrives, innovation is celebrated, and leadership in the digital realm is nurtured.

The development of a growth mindset is fundamental to cultivating grit within the academic community. A growth mindset promotes the idea that abilities and intelligence can be developed through dedication, hard work, and resilience—all components of grit. Embracing digital transformation demands this very mindset, as individuals are called to adapt to new technologies, continuously learn, and navigate the challenges that the rapidly evolving digital landscape presents.

Digital innovation in academia acts as a catalyst for the cultivation of grit. By experimenting with new technologies and practices, academics are encouraged to step out of their comfort zones, learn through trial and error, and persist despite setbacks. In the face of both success and failure, this commitment to continuous improvement is a clear demonstration of grit.

Digital leadership is another critical aspect of a thriving digital culture. Influential digital leaders not only adeptly navigate the digital landscape themselves but also inspire others to do so, setting an example of resilience and perseverance in the face of digital challenges. As leaders exhibit grit—continuing to learn, adapt, and innovate despite difficulties—they set a powerful example for others in the academic community to follow.

Digital transformation has a profound influence on the social impact of academia. It provides new avenues for open science, fosters greater public engagement via social media, and unprecedentedly enables social innovation. In each of these areas, the role of grit is pivotal.

Open science is empowered by digital transformation, as research and knowledge are made readily accessible to a broader audience through digital platforms. This democratization of knowledge breaks down barriers and fosters a collaborative, transparent approach to research. As academics navigate this new landscape, grit is required. They must adapt to new ways of disseminating and collaborating on research, persisting through challenges to embrace the openness that digital transformation provides.

Digital transformation also amplifies the **social impact** of academia through enhanced public engagement via social media. Academics and institutions can now connect directly with the public, sharing insights, fostering dialogue, and cultivating a deeper understanding of academic work. Embracing these new modes of communication calls for grit. There may be challenges and

setbacks in learning to navigate these platforms effectively and handling public scrutiny. However, academics can reap the rewards of this broader, more direct engagement by persevering.

Finally, digital transformation fuels **social innovation**. New technologies and digital approaches enable the academic community to develop novel solutions to social challenges. This process, while rewarding, requires substantial grit. It often involves venturing into uncharted territory, experimenting with new methods, and dealing with failures along the way. However, the resilience and persistence fostered by grit can lead to breakthrough innovations that have a significant social impact.

Digital culture does not just change how academia operates—it enhances its ability to impact society positively. Yet, through the embodiment of grit in the face of this transformation, the academic community can genuinely harness the social potential of the digital age.

Grit in the Digital Era: Navigating Challenges and Fostering Resilience

In the context of the ever-evolving digital world, the concept of grit has gained considerable relevance. As we navigate the challenges and harness the opportunities of digital transformation, grit becomes a cardinal attribute for students, researchers, and educators alike.

Digital transformation, while brimming with potential, brings along its own set of trials. Students and academics are often confronted with information overload, a byproduct of the internet's vast repositories of knowledge (Rashid, 2016). Digital distractions, another facet of the digital era, present challenges in maintaining focus and dedication to tasks. Moreover, the pace at which digital landscapes evolve necessitates continuous learning and adaptation—an aspect that could prove to be exhausting for many. It is in dealing with these very challenges that grit becomes crucial. The resilience to persist in the face of information overload, the steadfastness to stay focused despite distractions, and the commitment to continuous learning—all of these are manifestations of grit in the digital era.

However, the digital world is not merely a test of grit—it can also be an incubator that fosters and cultivates it. Online learning communities, for example, can offer supportive environments that encourage persistence. Through interactions and collaborations in these communities, learners can strengthen their resolve to overcome hurdles and continuously improve. Digital mentorship programs can provide guidance and encouragement, helping individuals stay committed to their goals even when the path gets tough. Furthermore, the gamification of learning experiences can motivate learners to push their boundaries, instilling a spirit of resilience as they strive to achieve higher levels in their learning journey.

Dealing with Challenges of Digital Transformation: Role of Grit

In the dynamic universe of digital transformation, grit is emerging as a critical determinant of success. As we delve deeper into the realm of digital academia, the challenges posed by this

transformation become strikingly evident. These challenges, while daunting, also serve as opportunities to demonstrate and develop grit. Information overload, digital distractions, and the necessity of continuous learning and adaptation paint a complex picture of the digital landscape. However, the tenacious spirit of grit enables us to navigate these challenges with resilience. By examining each challenge in detail, we aim to understand the role of grit in mitigating these obstacles, encouraging a more effective and enriching engagement with digital transformation in academia.

The digital age is a double-edged sword, providing an abundance of information at our fingertips but simultaneously presenting the challenge of **information overload** (Edmunds & Morris, 2000). The relentless wave of data from myriad sources can lead to cognitive overload, with the vast influx of information surpassing our brain's processing capacity. This state of overload can often lead to confusion, stress, and a reduction in learning efficiency. Amid this deluge of data, the role of grit becomes paramount. Grit—the unwavering perseverance and passion for long-term goals—empowers individuals to stay focused, sift through the noise, and selectively process information. Grit enables us to stay patient, thoroughly analyze data, and dig deeper until meaningful knowledge is unearthed. In the face of the overwhelming wealth of information that digital technology offers, cultivating grit becomes a vital tool in turning challenges into opportunities.

In the era of digital connectivity, distractions are just a click away. With the proliferation of social media, online entertainment platforms, and a constant stream of notifications, our attention is often fragmented, leading to reduced productivity and focus. These **digital distractions** can interfere with the learning process, creating a constant tug-of-war between immediate gratification and long-term academic and research goals (McCoy, 2016). In addition to affecting concentration, these interruptions can induce stress, disrupt creative thinking, and hamper the depth of learning. However, with grit we can navigate through this landscape of digital distractions. By manifesting grit, we can consciously prioritize our tasks, set boundaries, and resist the urge to succumb to instant gratification. Grit can guide us to develop effective time-management strategies, promote discipline, and maintain focus on the task at hand, regardless of the digital temptations surrounding us. It reinforces our commitment to our learning objectives and allows us to utilize digital tools effectively without being sidetracked, turning the challenge of digital distractions into an opportunity for fostering resilience and focus.

As digital technologies evolve at an unprecedented pace, **continuous learning and adaptation** become essential for survival in the academic realm (Day, 2002). The accelerating rhythm of technological advancements compels us to regularly update our skills, adopt new tools, and stay abreast of the latest digital trends. This relentless need for upskilling and adaptation can seem daunting, posing challenges to both individuals and institutions. It requires not just the acquisition of new knowledge, but also unlearning obsolete practices and adapting to an ever-changing digital environment. In this dynamic scenario, grit acts as the bedrock for continuous learning and adaptation. A gritty approach instills a commitment to lifelong learning, propelling individuals to embrace change and relentlessly pursue skill development. It encourages us to view rapid technological changes not as a threat, but as an opportunity to grow and innovate. Grit guides us to stay curious, resilient, and determined in the face of change. It's the driving force that allows us to keep learning, unlearning, and relearning, enabling us to thrive in the evolving digital landscape.

In the vast and dynamic realm of digital transformation, the challenges of information overload, digital distractions, and continuous learning and adaptation loom large. However, these challenges present opportunities for growth and resilience, demanding an approach anchored in grit. It is through the lens of grit that we can transform the way we interact with the digital world, turning seemingly insurmountable obstacles into surmountable hurdles. Harnessing grit allows us to leverage the vast resources of the digital age effectively, maintain focus amidst constant distractions, and enthusiastically engage in lifelong learning. As we navigate the digital landscape of academia, grit becomes our compass, guiding us towards a more fruitful and empowering digital transformation journey.

Future Outlook

As we gaze toward the future, it becomes apparent that the trajectory of digital transformation in academia, and society at large, is bound to ascend. This transformation promises to bring about both exciting opportunities and complex challenges. In navigating this future landscape, the concept of grit will remain essential.

The progression of technology continues to accelerate at an unprecedented rate, catalyzing innovations in areas such as artificial intelligence, machine learning, big data, and virtual reality. These advancements will undeniably bring about further shifts in how we teach, learn, and conduct research. As academics prepare to adapt to these technologies, their success will hinge on their display of grit.

Beyond technological advancements, societal dynamics are also bound to change. We can anticipate a society that is increasingly digitally connected, where learning extends beyond the traditional classroom and research is deeply intertwined with the community. Successfully maneuvering this landscape requires deep-rooted grit in individuals and academic institutions.

In the face of such change, cultivating a grit mindset will become increasingly critical. Institutions will need to invest in fostering this mindset in their students, staff, and researchers. This investment will not only help individuals succeed in the face of digital transformation but will also ensure that academia is resilient, adaptable, and primed to make the most of the opportunities that lie ahead.

In sum, as we gaze into the future, the journey of digital transformation in academia is far from over. The role of grit in navigating this journey will continue to be paramount, providing the perseverance and resilience needed to successfully adapt to whatever the future may bring.

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1.2.1. Importance of a European common framework for skills development

Introduction

The following chapter introduces and describes different frameworks that provide a shared language and understanding at the European level, around how the education realm is defining the students' required skills for the coming years in the 21st century. These frameworks help to understand the expected role of HEIs and their capacity to develop soft skills in students and how it is awaited from students to be responsible of their own learning process. Developing agency, intrinsic motivation and a commitment to their professional project and societal development are some of the competences described in the frameworks. Thus, the selected frameworks are aligned with the GRIT project and its purpose of improving the development of non-cognitive skills in young researchers and students to support social-awareness, civic commitment and public engagement and increase resilience in the academic communities.

1. Student agency – OECD Learning Compass

With the participation of academic experts, students, teachers, social leaders, and policy makers from around the world, the OECD developed a learning framework to respond to what knowledge, skills, attitudes, and values will students need to thrive and shape their world. The OECD Learning Compass 2030 (OECD, 2018) provides orientation and a common language in terms of what is globally relevant to direct education towards individual and collective well-being. Thus, it focused on what students need to navigate through uncertain contexts and how they can find their direction by themselves in a meaningful and responsible way.

One of the key concepts within the compass is Student Agency, although it is interpreted differently around the world, it is characterized by students' sense of responsibility to take part of society by seeking to influence people and circumstances for the betterment (OECD, 2018). It constitutes an "intentional, purposeful and meaningful learning" (Jääskelä et al., 2020, p. 791). Therefore, Student Agency can only be learned and exercised in social contexts, the interaction with community, peers, and teachers develops students' identity, a sense of belonging that motivates their actions and gives them a sense of purpose (OECD, 2018). Thus, it is claimed that HEIs should broaden their objective of increasing skills and knowledge to make students be engaged purposively with the complexities and uncertainties of the world, including working life (Jääskelä et al., 2016).

For students' agency play an active role in society, it requires a meaningful learning environment and the development of non-cognitive skills for finding a life purpose and deciding for their own what and how they want to learn, as well as defining, motivations, objectives, and a professional identity (OECD, 2018; Vähäsantanen et al., 2016; Jääskelä et al., 2016). It does not mean to act in isolation or in self-interest, on the contrary agency implies reflecting on morality and questioning which is the right action to take; social understanding of society's rights and responsibilities along with relationships with others; an economic perspective on which opportunities could contribute to the local, national or global economy; and finally, developing creative, being innovative for practical or research purposes and add new value to the world (Leadbeater, 2017). Thus, higher education institutions should provide an environment that allows students decision making, structures for equal participation and reciprocal relations between students and teachers (Vähäsantanen et al., 2016). Moreover, agency could be further applied in the professional setting since it helps students to determine their professional identity and be reflective about their mission and work practices (Vähäsantanen et al., 2016)

To improve students' thinking and intentional action toward individual and collective well-being, the Future of Education and Skills 2023 project (OCDE, 2018) recognizes that exercising the transformative competences, knowledge, attitudes, values, and skills are critical to transform society and meeting the 21st-century challenges. The OCDE (OCDE, 2018) has identified three transformative competences:

1) Creating new value, which refers to students acting entrepreneurially, finding new approaches to solve old and new problems. By developing knowledge, strategies ideas, and creating new jobs or business, always addressing global challenges and understanding value in terms of economic, social and cultural (Bentley, 2017; Rychen, 2016). To do so, skills such as critical thinking, risk management, adaptability, open mindset, and creativity are fundamental, their agency is seen as their capacity to be self-reflective and interact in a creative way with the environment and its structures (Inouye et al., 2022).

2) Reconciling tensions and dilemmas, indicates the ability to see issues and solutions from different perspectives, by having a more complex picture and the tensions within, students' approach would be more holistic; and they would consider short- and long-term consequences of their actions. Thus, empathy, respect, tolerance, flexibility, conflict resolution and resilience are skills that students need to develop (OCDE, 2018).

3) Taking responsibility is the last transformative competence but also the one that is transversal to others and to maturing a sense of agency, since it implies "an understanding that actions have consequences and that people have power to affect others" (Leadbeater, 2017, as cited in OCDE, 2018). Acting responsibly requires having a strong moral scope and acknowledgement of whether actions will benefit others, moreover it implies taking the initiative for learning, the learning-to-learning competency which is periodized in European countries as an education goal for lifelong learning (Kikas and Jõgi, 2016; Jääskelä et al., 2016). Besides the skills already mentioned, integrity, self-awareness and reflective thinking are also needed for student's taking responsibility and enhancing agency.

For student agency, the transformative competences and the skills required to develop them are part of the recent Higher Education framework, as it was mentioned there is a current need for students' active participation in shaping a future for the better. Agency is also a tool to deal with uncertainty and the constant changes in the working atmosphere, to be able to act intentionally,

respond to intrinsic motivations, co-construct and be responsible for their identities, sense of meaning, learning and professional purposes (Leadbeater, 2017).

The OECD Learning Compass describes student agency as the key component to achieve its aspirational vision of the skills that today students need to navigate and act towards individual and collective well-being. The following frameworks expose how Europe is approaching this objective and fostering non-cognitive skills within similar student agency objectives on lifelong learning and the connection between higher education and the labor market.

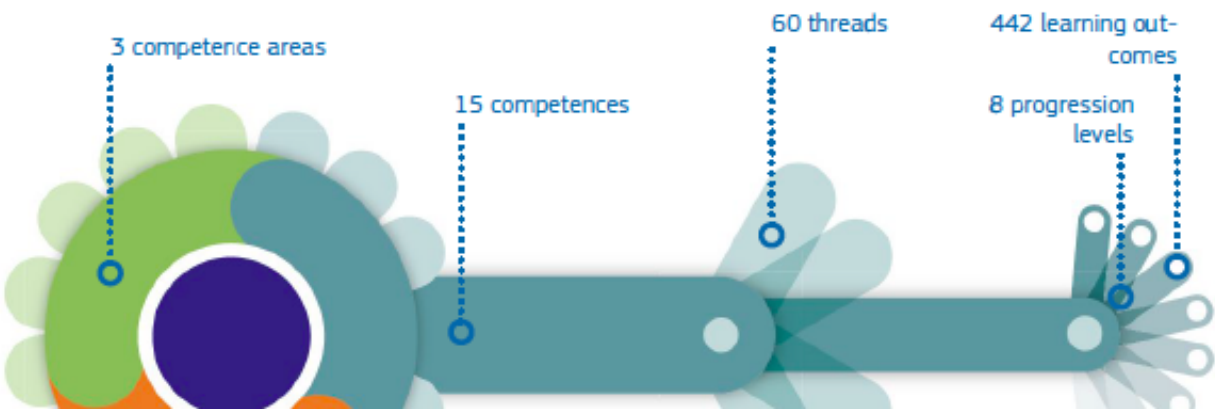
EntreComp into Action

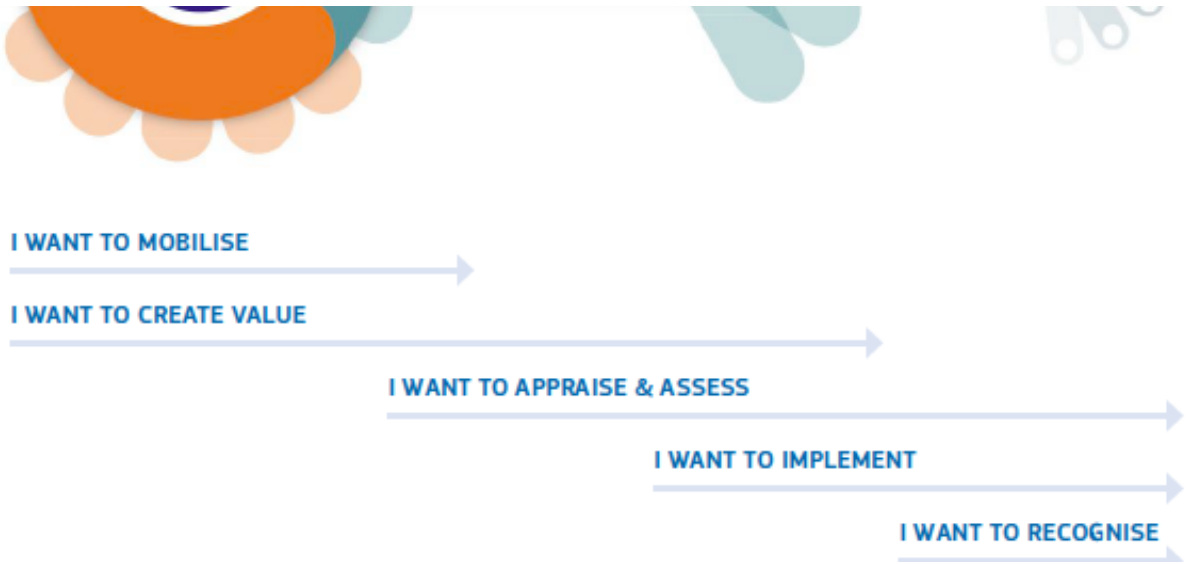
The European Entrepreneurship Competence Framework “EntreComp” was published by the European Commission as a tool to establish entrepreneurship as a competence for life. It aims to be used for lifelong learning in education, communities, work, and enterprise. By understanding entrepreneurship as acting upon opportunities and ideas and transforming them into financial, cultural or social value for others (McCallum et. al., 2018), the framework seeks to improve European citizens' entrepreneurial capability, through creativity, tanking initiative, and putting efforts into actions, building a bridge between education and working life.

As shown in Figure 1 and Table 1, EntreComp is a framework of 15 entrepreneurship competences classified into 3 areas: 1) Ideas and Opportunities 2) Resources 3) Into action. These are broken down further into threads, which are represented across 8 progression levels from beginner to expert. Moreover, the framework also could be applied according to the project or organizational goal: a) mobilize interest in entrepreneurship and inspire action; b) create value by adapting the framework to specific contexts, c) appraise & assess levels of entrepreneurship competence; implement entrepreneurial ideas and projects; d) recognize entrepreneurship skills. According to McCallum et. al. (2018) The framework has been used in education and training to:

- Tailor entrepreneurial learning outcomes to a specific context
- Create new or enhance existing teaching and learning activities to develop entrepreneurial competences
- Design assessment of entrepreneurial learning

Figure 1 Mapping different goals against the elements of EntreCom





Note: Reprinted from “EntreComp into Action: get inspired, make it happen,” by McCallum et al, 2018, Publications Office of the European Union, Luxembourg. Copyright 2018 by European Union

Table 1 EntreComp Competences and threads

Area	Competence	Threads
Ideas and Opportunities	Spotting opportunities	Identify and seize opportunities to create value
		Focus on challenges that need solutions
		Analyze the context and identify personal opportunities to create value
	Creativity	Be curious and open
		Develop ideas that create value to others
		Define and approach open-ended problems
		Be innovative, respond to emerging needs
	Vision	Imagine alone and with others future scenarios

		Think strategically and serve to a convincing vision
		Guide action based on committed vision
	Valuing ideas	Recognize the value of ideas from different perspectives
		Share and protect ideas, considering property rights
	Ethical and sustainable thinking	Behave ethically and act against unethical behavior
		Think sustainably, contribute to the sustainability impact
		Assess impact of my value-creating activity
		Be accountable and responsible to stakeholders
Resources	Self-awareness and self-efficacy	Follow your aspirations and translate my interest into goals
		Identify strengths and weakness
		Believe in your ability to achieve intended goals and make changes for the better
		Shape your future and design professional strategies
	Motivation and perseverance	Stay driven and turning ideas into action
		Be determined and motivated by challenges

		Focus on what keeps you motivated
		Be resilient and coping with aversities
		Don't give up and keep committed to my vision and goals
	Mobilizing resources	Manage resources to turn ideas into action
		Use resources responsibly
		Make the most of your time, effective time management
		Get support and develop a supporting network
	Financial and economic literacy	Understand economic and financial concepts
	Mobilizing others	Inspire and get inspired, and act collectively
		Persuade providing arguments
		Communicate effectively
		Use Media effectively
		Take responsibility
<i>Into action</i>	Taking the initiative	Work independently
		Take action and showing initiative
		Set long, medium-, and short-term goals
	Planning and management	Be flexible and adapt to changes

		Develop emotional intelligence
	Coping with uncertainty ambiguity and risk	Listen actively
		Team up
		Expand your network
		Reflect
	Learning though experience	Learn to learn
		Learn from experience

Note: Adapted from “EntreComp into Action: get inspired, make it happen,” by McCallum et al, 2018, *Publications Office of the European Union, Luxembourg*. Copyright 2018 by European Union

EntreComp offers a European common framework and provides examples on how it has been used as a reference point by diverse institutions and projects in Europe. For the GRIT Project, this approach helps to delimitate the European panorama in terms of the soft skills or competences relevant for the region, how they are aligned to the OCDE learning compass and with the student’s commitment to their purposes and its alignment with society well-being. EntreComp provides a common European framework and understanding of entrepreneurship as the ability to transform ideas into action satisfying citizen need of being active and creating personal and community value. As an example, the following table summarizes how institutions and projects have been used it.

Figure 2 EntreComp application examples

Institution or project	Goals	EntreComp application
DOIT – Horizon project. Entrepreneurial skills for young social innovators in a digital world	● Mobilize partners ● Create value ● Implement the framework ● Recognize entrepreneurship competences	Comprehensive consensus about Entrepreneurship in Europe, used for assessing children’s changes and developments, and impact of the activities.
I-LINC-MOOC MOOC ‘Boosting a Sense of Initiative and	● Implement the framework	Contextualizing the 15 framework competences and mapping them to classroom activities that

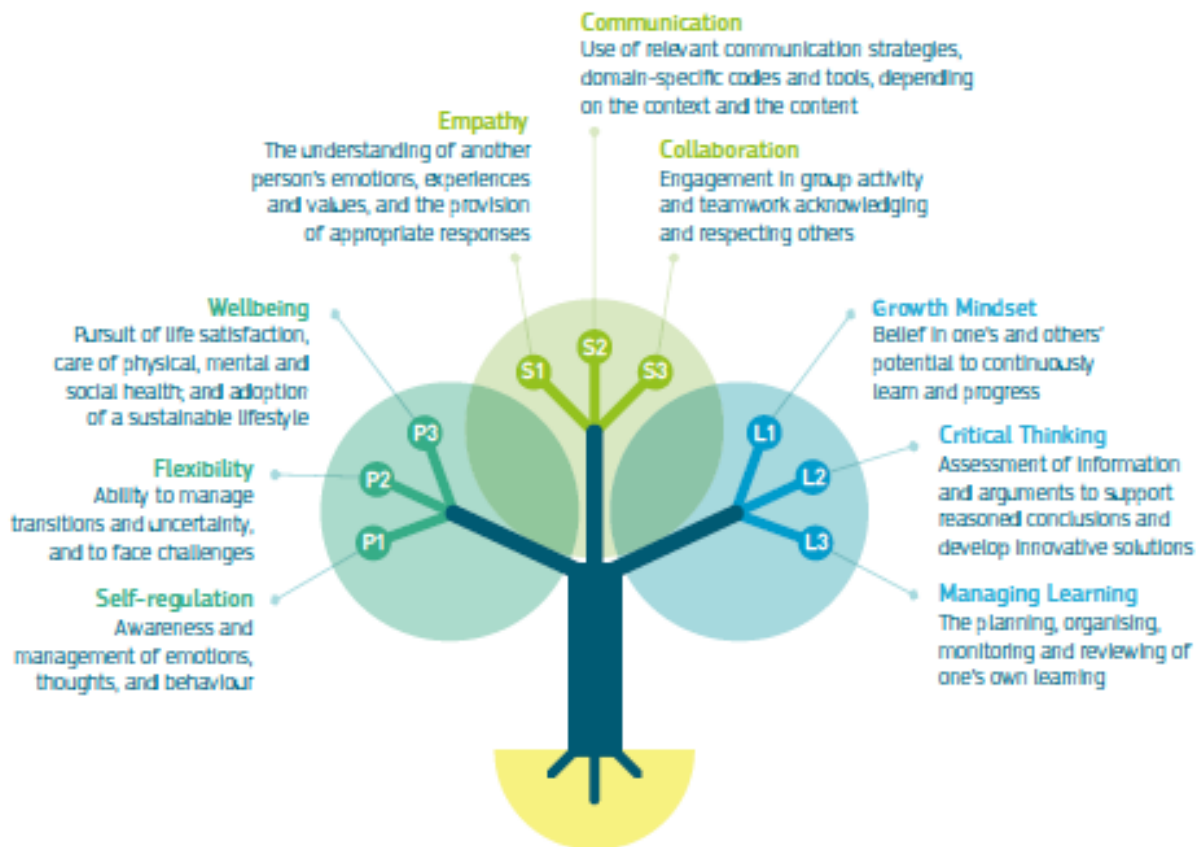
Entrepreneurship in Your Students' for primary and secondary teachers in any subject		enable students to take their future in their hands
University of Turku - Strategy for Entrepreneurship and Entrepreneurship Education- Ensure entrepreneurship education for all degree students	● Mobilize partners ● Appraise and assess.	Define a common language about entrepreneurship among varied stakeholders and integrate entrepreneurial competences into their personal development
SIMULIMPRESA Simulation game to teach entrepreneurial skills	● Appraise and assess	Define the competences and skills, and progression levels that want to foster in learners, according to the learning outcomes. Bridging education and training with the labor world using challenge-based learning.

Note: Adapted from “EntreComp into Action: get inspired, make it happen,” by McCallum et al, 2018, *Publications Office of the European Union, Luxembourg*. Copyright 2018 by European Union

LifeComp - The European Framework for Personal, Social and Learning to Learn Key Competence

Personal, Social and Learning to Learn was set as key competences in 2018 by the Council Recommendation on Key Competences for Lifelong Learning. LifeComp is a European conceptual reference framework for competences that should be developed by citizen, though formal or informal education, to empower them to actively participate in society, responding to a rapid changing global context and the relevance of developing soft skills to manage challenges. In fact, the LifeComp is presented as a tool that supports the development of competences in the personal, social and learning to learn areas within a context. The LifeComp framework is a growing model represented metaphorically by a tree, in where each individual is rooted to a certain sociocultural context, the areas are represented by overlapping branches and buds, flowers and fruits symbolized the coexisting competences at different stages of progression. Each area has three competences that usually follow the model of awareness, understanding and action (Figure 2).

Figure 2 The LifeComp



Note: Reprinted from "LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence" by Sala et al, 2020, *Publications Office of the European Union, Luxembourg*. Copyright 2020 by European Union

Sala et al. (2020) describes the figure as follows: 1) self-regulation, 2) flexibility and 3) well-being are the main competences in the personal area. It refers to personal development, to the "learn to be", the ability to act autonomously, manage one's career, act with an introspective attitude and self-motivation, coping with uncertainty, adopt new approaches and ideas in response to changing contexts, and understanding the personal and collective responsibility aspects of well-being. Personal development happens in the interaction with others, within a social context where these competences help citizens to have a self-understanding, develop a sense of purpose and the ability to make decisions for personal and communal well-being. In the social area, 1) empathy, 2) communication and 3) collaboration are the main competences. Referring to the ability to take other's perspective, understand, and manage interactions and communication in person and digital contexts, cope with conflicts and the willingness to learn with peers and contribute responsibly to a common good. Finally, 1) growth mindset, 2) critical thinking, and 3) managing learning are the belonging competences of the learning-to-learn area. It implies individuals to take responsibility for their own development, this requires them to be conscious of their own capacities but also keeping the motivation to develop their potential, being capable of assessing and evaluating information. Thus, they would improve their learning capacities and strategies to ensure their use and potential transfer. Although LifeComp has not been put into practice, it

complements the EntreComp and the OECD frameworks by including other competences and reinforcing the agency's relevance in the development of life-long learning. The three frames give importance to a self-compass that drives into agency, into action, for personal and others' well-being.

ResearchComp framework - European Competence Framework for Researchers

The last relevant framework for GRIT is the European Competence Framework, it is part of two initiatives, the European Research (and Innovation) Area Skill Agenda need to develop set of skills for researchers and the recent classification update of European Skills, Competences, Qualifications and Occupations (ESCO) which includes a set of skills and occupations for researchers. Thus, ResearchComp formulates a European “shared understanding of competences that researchers need for a successful career, both inside and outside the academia” (European Commision, 2022).

The objective of developing the framework is to have a tool that supports researchers' self-assessment, education and training development of curricula and sustain the labor market and career trajectory for researchers. It responds to the challenges that researchers are facing:

1. Researchers' tendency to stay in the academia realm and the disproportion between the positions offered by the academia and the PhD degrees awarded
2. Clash with the labor market. Employers outside the academia do not have the knowledge to estimate the added value that researchers could bring to their institutions. Lack of a shared taxonomy of occupations for researchers.
3. Lack of acknowledgement about including transferable skills, entrepreneurship, and experiences outside the academia in the researchers training.
4. Large focus on publication records as research outputs.

Like the above-described frameworks, ResearchComp grouped interconnected competences. Each one has four levels of proficiency and shows suggested outcomes thar researchers should demonstrate. It consists of 38 interconnected competences grouped into 7 areas: 1) cognitive abilities, 2) self-management, 3) working with others, 4) doing research, 5) managing research, 6) managing research tools and 7) making an impact.

Figure 3 Research Comp





Note: Reprinted from “ *Knowledge ecosystems in the new ERA : using a competence-based approach for career development in academia and beyond* “ by European Comission, 2022, Publications Office of the European Union, Luxembourg. Copyright 2020 by European Union

Figure 3 depicts the areas and competences; it is not suggested that researchers should reach the highest level of proficiency, but it recommends the development of competences in the 7 areas. The competences were identified from the ESCO update and the list of transversal skills associated with researcher’s occupations.

According to the European Comission (202) ResearchComp is still a work in progress, it is even mentioned that the name is provisional. For them it is advisable to further develop it, among the recommendations there is special attention to optimize training for transferable skills in researchers, to apply the framework in real-life settings. The recommendation is for HEIs to go beyond the core research competences and the inclusion of competences such as engagement with society and entrepreneurship during the entire research career. Transferable competences would facilitate the exchange of knowledge and good practices between researchers, HEIs and industry, facilitating the diversification and shared languages of the diverse research carriers and intersectoral mobility.

Note: Reprinted from “ *Knowledge ecosystems in the new ERA : using a competence-based approach for career development in academia and beyond* “ by European Comission, 2022, Publications Office of the European Union, Luxembourg. Copyright 2020 by European Union

It is noticeable how the different frameworks agreed on the development of skills for long-life learning, which are beyond technical or cognitive skills and are more transferable, dynamic, responding to the complexities of the 21st century. Some skills such as entrepreneurial mindset or spirit; self-regulation, coping with uncertainty, promote transfer knowledge and being able to lead the learning process through a personal and communal purpose are transversal to all of the frameworks. The presented frameworks are relevant to the GRIT project, because they present a common European understanding and language about the competences that the region is requiring and the relevance of fostering soft skills in young students and researchers.

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1.2.2. What does Third Mission of university really mean?

In the 1980s, the changing economic landscape and the increasing importance of knowledge-based industries enabled the academic ecosystem to develop rapidly and worldwide (Nelson, 1994). This turnaround within the Higher Education sector was first investigated by Etzkowitz, who first coined the term "entrepreneurial university" to describe universities as institutions that have become crucial for regional economic development (Etzkowitz, 1983). The idea of an "Entrepreneurial University" emerged to promote technology transfer, commercialization of research, and developing partnerships with industry. Nevertheless, the emphasis on creating new ventures and stimulating economic growth continued to follow the trajectories of the 19th century when the rise of the industrial revolution increased the need for technical skills and the development of technical universities and vocational training.

In the 1990s, Etzkowitz and Leydesdorff (Etzkowitz and Leydesdorff, 1995) posed the thesis that the interaction between university-industry-government improves the conditions for innovation in a knowledge-based society. Consequently, the Triple Helix model posited that the traditional model of innovation, which was based on a linear relationship between science and technology, was no longer adequate to address the complex challenges of the modern economy. Instead, the authors argued that a new model was needed, one that recognized the interdependence and mutual influence of academia, industry, and government. At the time, no one had any idea how complex these challenges of the modern economy would be, and in so far, the relation and interaction between entrepreneurial university and the Triple Helix model have evolved to include a broader set of goals and objectives (Kuhn, 2012). In the 20th century, the novel evolutions to the model did not include only three actors, and the universities did not focus solely on commercialization and economic development; both they focused on social and environmental impact (Gur, 2020). The Quintuple Helix Model provides a framework for universities to engage in open innovation by collaborating with industry, government, civil society, and the natural environment. By embracing this approach, universities co-create innovative solutions that address societal challenges and promote sustainable development in the attempt to continue facing major societal challenges related to the complexity of issues such as climate changes, sustainability, pandemic crisis, challenges of democratic cultures, citizens' well-being, and social justice. More and more, Universities' research and education missions become vital to bridging knowledge and action for the achievement of these goals, but the new societal challenges imply a change of frameworks, cultures, and mind-sets for building a robust collaborative process based on new competencies, values, and critical participation in didactic and research.

These considerations brought to the assumption that social change and the goal of just, equitable, and sustainable development is not achieved by individuals, organizations, communities, or governments acting alone, creating adequate conditions for the implementation of open access to scientific research that should bridge a perceived gap between science and the

broader society ("democratization of science") (Berg and Lidskog, 2018). In this context, professors, researchers, students, and staff in the academic community need to develop behaviours, skills, and competencies related to the quality of growth-mind set, civic commitment, and social awareness because "knowledge is not something objective and removed from our bodies, experiences, and emotions but is created through our experiences of the world as a sensuous and affective activity". Consequently, this process also needs a reflection on the traditional missions of universities – teaching and research – because the new societal challenges imply a change of frameworks, cultures, and mind-sets for building a robust collaborative process based on new competencies, values, and a critical participation in a more inclusive and equitable knowledge-based society.

At the European Union level, in 2015, Commissioner Moedas identified three strategic priorities, described in the book *Open Innovation, Open Science, Open to the World* (the 3Os strategy) (Moedas, 2015), which proposed inter alia that "many more actors will take part in the research process in different ways and the traditional methods of organising and rewarding research will also see many changes". Consequently, one important dimension of open science is becoming citizen science, which is envisioned as "linked with outreach activities, science education or various forms of public engagement with science as a way to promote Responsible Research and Innovation" (EC COM 2016). Giving impetus to this line of activity, citizen science was recently recognised as an open science priority by the Council, and the European Union's interest in social innovation came out as a priority with the adoption of the 17 Sustainable Development Goals (SDGs), by the UN in Agenda for 2030 (GA RES, 2015). After the President of the European Commission (EC), Ursula von der Leyen, laid out the EC's priorities for 2023 in September, the Commission published on 18 October its work programme for next year, providing a detailed overview of upcoming initiatives. In the area of education, research and innovation, the work programme includes a strong focus on digitalization, green dial and civic commitment. They both emphasise the need to put people first in the development of technology, as well as the need to defend and promote European values and rights in the way technology is designed, built and deployed, including in the real economy.

The proposed scenarios towards co-creating of a transitional pathway for a resilient, innovative, sustainable, and digital proximity and social economy ecosystem seem very heterogeneous and capable of involving many sectors and different stakeholders. Civil Society, Educational environment, Public authorities, and Enterprises are in the same ecosystem when they approach the co-creation of common goods and social utility. Consequently, the Tertiary education sector has to demonstrate its commitment to playing its part in meeting the SDGs and sharing best practices. HEIs are called to reflect on the critical role that education and research have in delivering the SDGs. This context has given rise to the concept of a "Transformative University" and quadruple and quintuple helix models (Qureshi, Sutter and Bhattacharya, 2018). The shift from an Entrepreneurial University to a Transformative University has been driven, consequently: by several factors, including changing societal expectations, increasing awareness of global challenges, and a growing recognition of the importance of sustainability and social responsibility. A Transformative University is one that is committed to using its resources and expertise to address the world's most pressing challenges, such as climate change, social inequality, and global health. These universities seek to engage with communities and stakeholders to co-create knowledge and solutions that have a positive impact on society. Many universities worldwide strive to become Transformative Universities, leveraging their research, teaching, and community engagement activities to create positive social and environmental impact. These universities are collaborating with a wide range of stakeholders, including businesses, non-profits, government

agencies, and local communities, to co-create solutions that benefit society as a whole. It is widely recognised that making research results more accessible contributes to better and more efficient science, and to innovation in the public and private sectors. One of the main difficulties faced by the HEIs is how to promote social and academic behaviours while supporting the development of engaged students and researchers who could become active change makers in this process.

HEIs are called to identify synergies, challenge the way of teaching and doing research, and develop new perspectives that in turn enable a transformation. As it is more than ever on the European agenda, regarding the importance of resilience for tomorrow's economy, HEIs should advocate a strong vision: "More social good in university, more university in social good". Consequently, HEIs will have a crucial role when it comes to involving citizens in co-creation activities, such as public dialogues, which provide them with a voice to influence and shape curricula, research and innovation in order to produce socially desirable outcomes. The Academic Missions (didactic and research) needs to focus on the way academic communities interact both internally and with the external context. Moving from an Entrepreneurial University to a Transformative University in a complex society prefigures a changing paradigm of what we call the Academic Third Mission and how universities respond to what society expects from the outcomes of academic activities. Aligning Institutional Third Mission under a shared mind set for educators, staff, researchers, academic students, and stakeholders is pivotal to achieving a Sustainable European Higher Educational System. The definition of principles and concepts for making HEIs more social-oriented represents a challenge to approach exploiting academic education and research. These principles have very wide application and are universally relevant to involve the academic community in the processes affecting human well-being. These principles are also implicit in key areas of contemporary society and are promoted in the SGDs 2030 and in the new European Innovation Agenda (EC COM, 2022).

Nowadays, Social Innovation is magnified by specific or general manifestations of the so-called wicked problems affecting the 21st century, recalled in the introduction of this Special Issue. Collaborative and interactive exchanges between business, governmental, civic, and academic stakeholders may effectively support the realisation of Social Innovation (Domanski, 2019). Nevertheless, there is a permanent lack of understanding, concerning how the collaborations are carried out in multi-actor partnerships. In 2009, during the economic crisis, Professor Emeritus John Goddard wrote "Reinventing the Civic University". He describes and motivates why universities should be more and strongly connected to people and place, why they should be committed to generating prosperity and well-being and balancing economic and cultural values. He express for the "University" the point of view for Social Innovation that claimed to be: the result of an interaction between different societal sectors working towards systemic change (Howaldt, Kaletka and Schröder, 2016). In 2010, Professor Elvira Uyarra (Uyarra, 2010) outlined five archetypes of university societal engagement; distinguishing knowledge factories (focused on technology knowledge for the industry), relational universities (working interactively with industry), entrepreneurial universities (exploiting their knowledge via patents and spin-offs), systemic universities (building collective innovation assets) and engaged universities (improving regional policy frameworks). Moreover, University as a "responsible facilitator" (Gur, 2020), is the element of each orientation of the model based on social innovation; the main changes in the positions covered are due to the different institutional freedom: engaged and entrepreneurial university approaches are potentially supportive of social innovation (at least not indifferent to it), whilst the other models frame university knowledge in ways that potentially makes social innovation invisible. Therefore, a comprehensive, holistic, and multidimensional approach is necessary to

comprehend the complex set of needs and create a Transformative University. Such a solution must provide stakeholders with a broader understanding of overall processes.

Today, a growing number of scholars have acknowledged that the Third Mission is more than promoting the institutionalisation of technology transfer activities, as well as pursuing the commercialisation of research results (McKelvey and Zaring, 2018). Broader and more socially inclusive goals gather within Third Mission boundaries (Arocena, Göransson and Sutz, 2018) and have started to be the object of academic institutionalisation, falling under the fields of "public engagement" and "university community engagement" (Vargiu, 2014). The academic Third Mission refers to the idea that universities have a responsibility not only to produce and disseminate knowledge but also to contribute to the socio-economic development of their communities and the wider society. Nevertheless, defining the civic boundaries of a university remains a complex and often debated issue. In general, a university's civic boundaries can be thought of as the extent to which it engages with and contributes to its community's social, economic, and cultural life. However, there is no one-size-fits-all answer to the question of where a university's civic boundaries lie. The definition of these boundaries may depend on a range of factors, such as the university's mission and values, its relationship with its local community, and the specific needs and challenges of that community. Moreover, while universities may not have a clear-cut definition of their civic boundaries, the EU programme demonstrates that Universities can work with VET providers, industrial sectors, and their local communities to develop mutually beneficial partnerships and contribute to positive social change. Universities can collaborate with civil society organizations to identify societal needs and co-create innovative solutions that meet those needs.

This implies the way how Universities manage knowledge that should be created or (co-created), regulated, and monitored, considering itself as a public good. This means that the Third Mission should promote a policy that guarantees:

- the right to access knowledge and to use it for their own personal development and the advancement of society as a whole, regardless of their cultural, socio-economic, geographic, or gender background;
- the right to access and use information creatively and innovatively, without restrictions or limitations;
- social equality and inclusion through open debate and deliberation (deliberative democracy);
- the diffusion of knowledge compatible with the protection of the environment and with the sustainable management of natural resources.
- Collaboration and knowledge exchange between people and organizations for the creation of new ideas and innovative solutions for the welfare of society as a whole and not just for private profit.

Consequently, there are several issue areas that universities must address when implementing the academic Third Mission, such as partnership and local networks, open innovation, citizen science and public engagement, knowledge management and transfer, impact assessment, ethical conduct, civic and democratic competencies and skills development, multi-level governance and many others. Throughout the centuries, social and economic development impact how universities approached education and research.

In conclusion, the academic Third Mission refers to the idea that universities have a responsibility not only to produce and disseminate knowledge but also to contribute to the socio-economic development of their communities and the wider society. The Third Mission seems to be the attempt to theorize this evolution in contemporary times. There is an increasing call for Higher Education to play a more active role in communities and to develop democratization of the Third Mission of universities, thus not simply as experts providing solutions but as partners and collaborators in relationships with non-governmental organizations, local communities, and citizens. This active role in communities is meant to promote a structured dialogue enabling an open approach (innovation and science), a more effective technological transfer, and a collaborative decision-making process on current issues (e.g., Covid19 and its impact on HEIs environments) (Macq, Tancoigne and Strasser, 2020). Furthermore, the Academic Third Mission seems potentially both the most crucial mission and the one which most needs innovation within the organization of universities because this means that Academia should abandon their ivory towers and address social needs and industrial objectives as well with not only a focus on global perspective but also with careful sight on "glocalization".

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1.2.3 Building the University needed in the next few years

Introduction

Universities have long been recognised as central institutions for knowledge generation, dissemination, and nurturing intellectual growth. The advent of future technologies is set to alter the nature of work and shake the foundation of cultures worldwide. Thus, there is a need for university curricula to be more responsive to the rapidly changing demands of society. Wissema (2009) criticises still existing the supply-driven nature of university curricula, which are often driven by academic traditions or lecturers' interests. While a growing body of artificial intelligence experts believes that if socio-political-economic systems stay the same, and technological acceleration, integration, and globalization continue, then half the world could be unemployed by 2050. It is therefore essential that all sectors work together to adapt to this rapidly changing landscape and ensure a sustainable future (Glenn C. Jerome et al., 2020). Thus, there is a rising call for a revised social contract between universities and society. While rich with historical depth and tradition, universities' traditional role is being challenged to adapt and evolve to address the current crises and serve an increasingly diverse population of learners (McCoy C., 2023). However, universities' long-range strategies to tackle these issues remain elusive (Glenn C. Jerome et al. I, 2020). Thus, the traditional university model should be transformed profoundly in response to the digital age's demands and society's evolving needs. The question arises: How can universities balance their timeless historical depth with timely, regenerative activities that will meet the rapidly changing needs of tomorrow's society?

This report summarises the latest trends in the changing landscape of universities as multifaceted institutions that transcend traditional academic boundaries, redefine the learning and research process, and facilitate a symbiotic relationship with society.

Evolving Learning Process

J.G. Wissema's (2009) outlined three phases of university development, from the medieval university through the Humboldt University to what he refers to as the third-generation university. The third-generation university, as Wissema (2009) described, is characterised by seven key attributes:

1. Exploitation of know-how becomes the third university objective as universities are seen as the cradle of new entrepreneurial activity;
2. Operates in an internationally competitive market;
3. Network universities, collaborating with industry, private research and development (R&D), financiers, professional service providers and other universities via their knowledge carousel;

4. Research is largely interdisciplinary;
5. Multicultural organisations with a wide and diverse range of staff and students;
6. Cosmopolitan. They operate in an international setting. They employ the English language for all courses as the new lingua franca;
7. Becomes less dependent on state regulation.

Wissema (2009) discussed a shift towards a more holistic approach to learning. He predicted strengthening digital learning forms, such as MOOCs (Massive Open Online Courses) and SPOCs (Small Private Online Courses), as well as various kinds of blended learning. The demand for learning becomes more centralised, focusing on problem-based learning at the expense of disciplinary fundamentals. There is a rise in the modularisation of teaching to accommodate the needs and tastes of students who demand multiple modules tailored to their needs rather than whole curricula. This shift towards tailor-made and customised learning, which was expected in 2009, became one of the key transformations in the University 4.0 (Bert van der Zwaan, 2017). University 4.0 incorporates a more holistic approach to learning. In addition to providing specialised education in various disciplines, universities now emphasise the development of cultural competencies, creativity, critical thinking, entrepreneurship, and ethical values. This holistic learning approach equips students with the skills necessary to thrive in a rapidly changing and interconnected world (Bert van der Zwaan, 2017). Also, Glenn C. Jerome et al. (2020) encourage University 4.0 to make Tele-education free everywhere, ubiquitous, and life-long learning systems (Glenn C. Jerome et al., 2020). In parallel to STEM (and/or STEAM -science, technology, engineering, arts, and mathematics), create a hybrid system of self-paced inquiry-based learning for self-actualisation; retrain teachers as coaches using new AI tools with students (Glenn C. Jerome et al., 2020).

The evolving learning process in universities will involve a shift away from the traditional focus on acquiring disciplinary knowledge and towards a more interdisciplinary approach (Bert van der Zwaan, 2017). Glenn C. Jerome et al. (2020) recall it as a shift of education/learning systems more toward mastering skills rather than just mastering a profession.

In a world where the half-life of skills is decreasing rapidly, it's essential to focus on durable competencies. This involves the development of soft skills such as leadership, communication, critical thinking, agency, comfort with uncertainty, and problem-solving, as well as the ability to use knowledge generated from large data systems and expert systems, which remain relevant and valuable regardless of specific job requirements or industry trends. Students must be able to extract knowledge from these systems and apply it to their studies. The future curriculum should also focus on developing strong academic skills, such as asking the right questions and extracting knowledge from data. In addition, universities shall increasingly emphasise the importance of internationalisation, with students encouraged to spend time abroad and develop an understanding of the world beyond their own region. Finally, universities will also focus on developing leadership skills, as this will be essential in the complex society of the future. This will involve the development of the T-shaped professional, with a broad academic base and the ability to take personal responsibility for building a better society (Bert van der Zwaan, 2017). The vertical column of the 'T' represents in-depth knowledge in a particular discipline, while the horizontal bar represents the ability to apply knowledge

across different disciplines, indicating a more holistic approach to learning (Wissema, 2009).

Glenn C. Jerome et al. (2020) also emphasise the increased focus on developing creativity, critical thinking, and entrepreneurship (individual and teams), but also increased demand for such skills as human relations, philosophy, art, self-employment, social harmony, ethics, and values, to know thyself to build and lead a meaningful working life with self-assessment of progress on one's own goals and objectives. Include futures as history is included in the curriculum. Alternative visions of the future, foresight, and the ability to assess potential futures should be taught (Glenn C. Jerome et al., 2020) to develop future-oriented consciousness.

Project-based Learning

Project-based learning has emerged as a prominent methodology within this new learning paradigm. Students engage in real-world projects that require interdisciplinary collaboration, problem-solving, and innovation. This approach fosters practical application of knowledge, enhances teamwork, and cultivates entrepreneurship, preparing students for the challenges of the modern workplace (Bert van der Zwaan, 2017).

A significant aspect of project-based learning is its focus on entrepreneurship. Wissema (2009) acknowledges the compatibility of teaching entrepreneurship within scientific education, highlighting that this integrated approach prepares students for the modern workplace's challenges. By engaging in entrepreneurship, students gain firsthand experience in navigating the complexities of innovation, from the initial idea stage to implementation.

Furthermore, Wissema (2009) discusses the importance of partnerships in innovation. This aligns with the emphasis on teamwork within project-based learning, where students learn to collaborate with various stakeholders to bring their innovative ideas to life. As the masterclass projects are conducted in an open learning environment, and participants receive the information they need through MOOCs and a range of other activities such as workshops and news from teachers and entrepreneurs, training, group learning exchange sessions (using Virtual Reality teleconferences with other teams from abroad), through self-reflection, site visits, participation in competitions, internships or employment (some implement the project as part of their work), as well as cultural competency skills, which have been validated as part of the student's global competency portfolio (Bert van der Zwaan, 2017).

Through project work, students are mentored by lecturers, entrepreneurs and co-working professionals who are pursuing a higher level of excellence, such as an industrial PhD or a DBA in entrepreneurship combined with research and commercialisation, or individuals who are enrolled in accelerated micro-courses to complement or extend their skills or to upgrade their career path (Bert van der Zwaan, 2017).

Indeed, education should not be viewed as a finite game where students graduate with fixed skills and knowledge. Instead, it should be seen as an infinite game where new skills and knowledge are continuously acquired and updated throughout one's life.

This shift in perspective necessitates the use of emerging technologies, such as blockchain, which can be used to verify credentials earned outside of formal degrees. For example, students' project progress and results could be evaluated every six months using a 360-degree evaluation system, which also assesses soft and networking skills, emotional intelligence and autonomy competencies (Bert van der Zwaan, 2017). This approach would validate and incentivise continuous learning, further solidifying the role of universities as facilitators of lifelong education (McCoy C., 2023).

McCoy C. (2023) highlights the constraints in the current education system: rigid credit hour structure. This system, which forms the bedrock of traditional university education, places unnecessary limitations on the flexibility of educational design. If universities are to serve the diverse needs of learners, they must move away from such constraints and towards a model that values and supports lifelong learning.

Innovation in higher education should aim for efficiency and strive to sustain existing offerings while disrupting traditional education with new delivery models. These new models should cater to non-traditional learners, who often find the current system inaccessible or irrelevant. This disruption, while challenging, is essential for the evolution of higher education and its ability to serve all learners (McCoy C., 2023).

Restructuring universities to align with this new vision is not an easy task. It requires a baseline understanding of equity issues, leadership development, clear problem definition, and thoughtful technology utilisation. Only with this foundation can universities begin to implement tools such as modality matrices, learning taxonomies, and formative assessments, which can help shape education's future (McCoy C., 2023).

Transformative Research Process

In University 4.0, research is pivotal in bridging the gap between academia and society. Wissema (2009) delves into the evolution of industrial research, outlining the emergence of four regimes: trial and error, technology-push, market-pull, and strategy-steer. This shift reflects the changing nature of university research, moving from a solitary endeavour to a collaborative exercise involving multiple stakeholders. Research is a key link in the value chain, transforming ideas into tangible innovations. There, faculty, students, companies, and government agencies come together to create and commercialise knowledge. Wissema (2009) notes that these collaborations form patterns that shape the university's research and commercialisation efforts. He highlights the significance of technology in the research process. Moreover, he discusses the shift in the approach towards technology, moving from a need to have all essential technologies in-house to a recognition that access to technology can be sufficient. This transformation foresees the integration of research into value chains, such as innovation and sales of technical services. A clear example of this is the use of artificial intelligence and data analysis tools to streamline and enhance the research process. Furthermore, the concept of open sourcing-in research has gained prominence, acknowledging that no single entity can master all required technologies. This has led to an increased emphasis on collaboration and knowledge sharing facilitated by digital platforms like MOOCs.

University 4.0 should embrace digital tools and technologies to enhance research. Massive Open Online Courses (MOOCs) and artificial intelligence (AI) provide avenues for

knowledge sharing, remote collaboration, and data analysis. This infusion of technology into research broadens access to knowledge and accelerates the pace of discovery (Bert van der Zwaan, 2017).

Overall, challenge-oriented institutes need to become dominant players in research and interdisciplinary co-creation research centres, where faculty members from different faculties can work with representatives of companies, students, government agencies and other stakeholders. Qualified corporate employees would be invited to spend their sabbaticals here, while academics would be encouraged to spend their sabbaticals in business or public sector institutions. Research institutes would provide access to advanced testing equipment and other resources necessary for advanced research, as well as access to laboratory services. These institutes would provide an important part of large companies' innovation and community-oriented solutions. Supporting university technologies, promising student start-ups, university spin-offs, and university start-ups would make an important contribution to regional development (Bert van der Zwaan, 2017).

Glenn C. Jerome et al. (2020) emphasise that directors of national science labs and other leaders in the S&T community should devote more effort to making current science and future technology understandable to the general public. Create national policies and standards for the IoT that stress future cyber security systems, forecast synergies among the full range of new technologies and their potential impacts (e.g., artificial intelligence, robotics, synthetic biology, nanotechnology, quantum computing, 3D/4D printing, IoT, drones (and other autonomous vehicles), VR and AR, cloud analytics, conscious-technology, semantic web, holographic communications, blockchain, and telepresence). National S&T leaders should be part of the national team that creates, regularly updates, and implements their country's national S&T strategy. S&T and legal communities should collaborate nationally and internationally to establish legal frameworks and treaties that anticipate future liability requirements to deter technological hazards and encourage technology befitting humanity.

Conclusions

All authors agree that the transformation of universities in the University 4.0 era brings about new opportunities and challenges. By leveraging interdisciplinary collaboration, project-based learning, digital tools, and a commitment to lifelong learning, universities can better prepare individuals to navigate a complex and interconnected world. As the lines between knowledge creation, transfer, and application continue to blur, universities will play a pivotal role in shaping the future of education and advancing society as a whole.

The consensus is that the future dynamics of work and technology necessitate a global and long-term perspective. The global aspect is essential because even if a country successfully transitions to the new economy, mass migration from neighbouring countries that do not adapt as well is a likely consequence. A long-term view is crucial because it compels us to consider cultural changes that may stem initially from artificial narrow intelligence, robotics, and drones, and later from more advanced technologies like artificial general intelligence, quantum computing, and synthetic biology.

Educational change is undeniably vital, but so too are changes in government, business, scientific and technological research, and our understanding of the purpose of work. It's important to devote equal attention to the challenges the higher education system faces in this transition and to identify actions that can facilitate a smoother transition.

Generally, technological capacities improve faster than we anticipate, but their application usually takes longer than seems reasonable. However, this may change as the Internet and artificial intelligence applications are spreading rapidly, making it easier to share and apply new technological capacities worldwide much faster than in the past. Consequently, we have less time to adjust to change. By looking further into the future, we can create more time to adapt.

As the world becomes increasingly complex, so too are the actions needed to navigate this transition. Various people and institutions with different interests and skills will need to carry out many actions. While it's not necessary to implement all the actions suggested in this report, we need to do more than just incorporate STEM into more educational systems.

Annex: Examples of Best Practices

The UTS Animal Logic Academy: A Model for University-Industry Collaboration (The Future of Universities – Lessons from Hollywood, 2023). In an innovative move, the University of Technology Sydney (UTS) and Animal Logic, a renowned Australian animation studio, have created the UTS Animal Logic Academy. This collaborative endeavour aims to develop graduates who are ready to take on the industry with their skills and knowledge. The Academy was established in response to a clear need within the animation industry: the demand for graduates with strong technical skills and the ability to collaborate effectively on large projects. With this in mind, the program was designed to provide students with the necessary expertise and experiences to meet these industry demands.

The UTS Animal Logic Academy stands out for its innovative approach to learning. The program is based on a project-based learning model, where students work on practical assignments that mirror real-world industry projects. Complementing this hands-on approach is a condensed 1-year structure and an industry-like schedule, immersing students in a realistic studio environment from day one. Developing such an unconventional model required a substantial commitment from the university. Breaking from tradition and working closely with industry experts to design the program was a challenging process, but one that ultimately resulted in a unique and effective educational experience for the students. While the initial setup of the program was costly, the benefits are manifold. The Academy provides an alternative learning pathway with a strong focus on employability, benefiting not only the students but also the university and industry partners. The return on investment is evident in the form of well-prepared graduates ready to contribute to the industry from their first day on the job.

Replicating this co-created model in other contexts, however, is not a straightforward task. It requires significant financial commitment, trust in industry advice, and a delicate balance between maintaining the partnership and preserving the value of a traditional university education. Yet, the potential benefits suggest that exploring such models is a worthwhile endeavor.

Programs like the UTS Animal Logic Academy demonstrate the value of university-industry collaborations. They offer to diverse learners alternative pathways to education and career success, showcasing how such collaborations can transform the educational landscape and prepare students for the challenges of the 21st century.

Noodle Partners: Adapting Universities for the Future (<https://higher.noodle.com/>)

Noodle Partners is an organisation that assists universities in their journey of adaptation and modernisation. It provides a suite of services encompassing marketing, enrollment, learning design, and technology integration, helping universities navigate the complex landscape of modern higher education.

One of the key challenges universities face today is the commodification of degrees. Increasingly, students are focused on the bottom-line costs of their education, often prioritising this over the brand and quality of the institution. This shift in focus has left many universities struggling to define and communicate their unique value proposition.

In this environment, it becomes critical for universities to develop a clear identity and articulate clear outcomes for their programs. This goes beyond merely meeting credential requirements; it involves differentiating these programs in a way that resonates with prospective students and provides them with clear, tangible benefits.

Balancing quality and value is a challenging task, but it is not impossible. Universities need to identify their niche strengths and excel in these areas rather than trying to be everything to everyone. By specializing and focusing on what they do best, universities can provide a high-quality education that also delivers value for money.

Agility is another key factor in the success of modern universities. Agile campuses are those that seamlessly support students, regardless of their modality of learning. Rather than treating online learning as a separate, parallel universe, these campuses integrate online and offline learning experiences to provide a comprehensive educational experience.

Looking to the future, it is clear that services and systems must be designed with flexibility in mind. They should be able to support students and faculty regardless of their location, providing them with the tools and resources they need to succeed in an increasingly global and digital educational landscape.

One way to provide value and differentiation is to focus programs around regional needs, faculty expertise, or target students. This approach allows universities to tailor their offerings to their student's specific needs and interests, providing a more personalised and relevant education.

Finally, in an increasingly commoditised market, it is important for universities to prioritise quality experiences and student support over simply chasing low costs. By doing so, they can ensure that their students receive a high-quality education that prepares them for success in their chosen careers.

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1.2.4. How university faces new challenges.

Stake-holders

While students and professors are the most visible, they are only two of the many stakeholders in higher education. Alumni, donors, parents, other institutions or providers, accrediting bodies, providers and suppliers, researchers, employers, taxpayers, NGOs, government and academic personnel, whether individually or collectively, are also important stakeholders. There are as well other organized groups and participants, such as trade unions and advocacy groups considered to be part of what influences university life and benefits of it (Marshall, 2018a).

Regardless of which category they fall into, the changes our society needs are made by people. In this chapter, we describe the main tasks that students, teachers, researchers, staff, employers and policymakers need to accomplish in order to bring about real change in university life.

To bring about meaningful change in education, each stakeholder must set clear and measurable goals. Students, teachers, researchers, staff, employers and policymakers need to work together to identify specific goals that can bring about meaningful and beneficial change. This target-setting process should be data-informed and evidence-based, using research and data to identify the most effective reform targets. It is important that all stakeholders are involved in the process to ensure that the goals of reform are realistic, achievable and beneficial to all stakeholders. Ultimately, this will significantly improve the quality of education.

Facing challenges in education requires the sustained efforts of all involved, from students and teachers to researchers, staff, employers and policymakers. Students and teachers need to work together to set and achieve clear goals, while researchers and staff should work to better understand learning dynamics and outcomes. Policymakers must work to drive positive reforms while adapting the system to the changing needs of students and teachers. Ultimately, a collaborative approach must be adopted, leveraging the collective expertise of all stakeholders to improve educational outcomes.

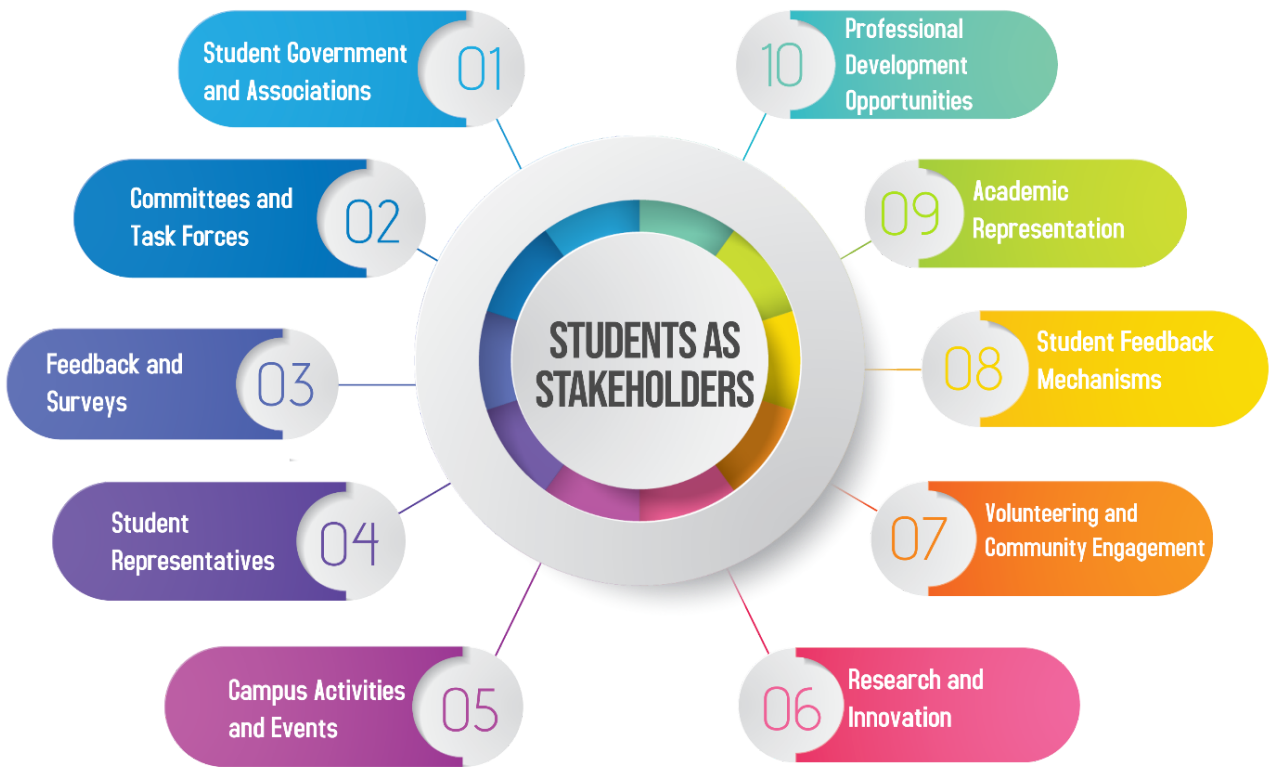
Each stakeholder can help university faces new challenges. In the next part we will illustrate how students, teachers, researchers, staff, employers and policymakers can engage in this process in the benefit of all.

Students

The best way for students to contribute in a helpful way is for them to participate actively in the learning process, seek out new opportunities for growth and development, and provide feedback to teachers and administrators.

Figure 1. presents how, at a macro level students can participate as stakeholders and help universities face new challenges (Cheng et al., 2021; Yin et al., 2021, Mainardes, 2012; Marshall, 2018b; Wagner et al., 2010)

Figure 1. Students as stakeholders in helping university face new challenges



- Getting involved in student government or associations that represent student interests and concerns. These organizations provide a platform for students to voice their opinions, organize events, and advocate for their needs.
- Joining committees and working groups set up by University management to work on or make decisions on specific topics. This may include committees focused on curriculum development, campus policy, diversity and inclusion, or sustainability initiatives. By participating in these groups, students can directly influence college decisions.
- Providing feedback to university management, faculty and staff through surveys, focus groups or public forums. Sharing experiences, concerns, and suggestions helps shape policies, programs, and services to better meet the needs of students.
- Serving as a student representative on faculty meetings, departmental committees, or advisory committees. These positions facilitate the expression of the views and interests of fellow students directly to decision makers.
- Participating in campus events, events and seminars organized by the university. This engagement provides an opportunity to network, foster relationships and socialize with faculty, staff and other students.
- Engaging in a university research project, innovation initiative or entrepreneurship initiative. This enables students to contribute to the advancement of knowledge and have a tangible

impact on the university community and beyond.

- Taking part in volunteer programs or community engagement initiatives facilitated by the university. This involvement demonstrates social responsibility and allows students to positively impact the local community.
- Advocating for the establishment or improvement of student feedback mechanisms within the university. Encourage the development of channels where students can express their concerns, provide suggestions, or report issues.
- Participating in academic committees and boards that oversee curriculum development, assessment methods, and academic policies. Contribute to discussions on how to enhance the quality of education and ensure the curriculum aligns with student needs.
- Take advantage of professional development programs, career fairs, and networking events provided by the university. This helps students gain valuable skills, explore career paths, and establish connections with potential employers.

The micro level of participation is also important when talking about students as stakeholders with the indirect focus to help universities face new challenges (Baik et al., 2019; Jones et al., 2021; Tough, 2006). Every day, every interaction is an opportunity to participate in this direction. Students can help by engaging in class discussions and by being an active participant in classroom discussions by asking questions, sharing ideas, and contributing to the conversation. This demonstrates genuine interest and helps for a better understanding on all subject matters. Also, by taking initiative or taking responsibility for one's own learning, by actively seeking out resources and opportunities for growth. Looking for additional readings, online courses, workshops, or seminars related to their field of interest. Explore different perspectives and ideas to broaden understanding.

Setting goals and establishing specific learning goals is another micro action that students can take in order to indirectly, but significantly contribute to bringing freshness into university's perspective that will further help facing challenges to come. Identify areas to improve in and create a plan to achieve goals.

Getting used to collaborating with peers, is another way. Engaging in group projects, study groups, or peer learning sessions. Collaborating with classmates allows to learn from one another, share ideas, and gain different perspectives. Also, taking time to reflect on what is learned and how it relates to one's own experiences and future goals. Regularly review notes, summarize key points, and consider how can what is learned apply in real-life situations.

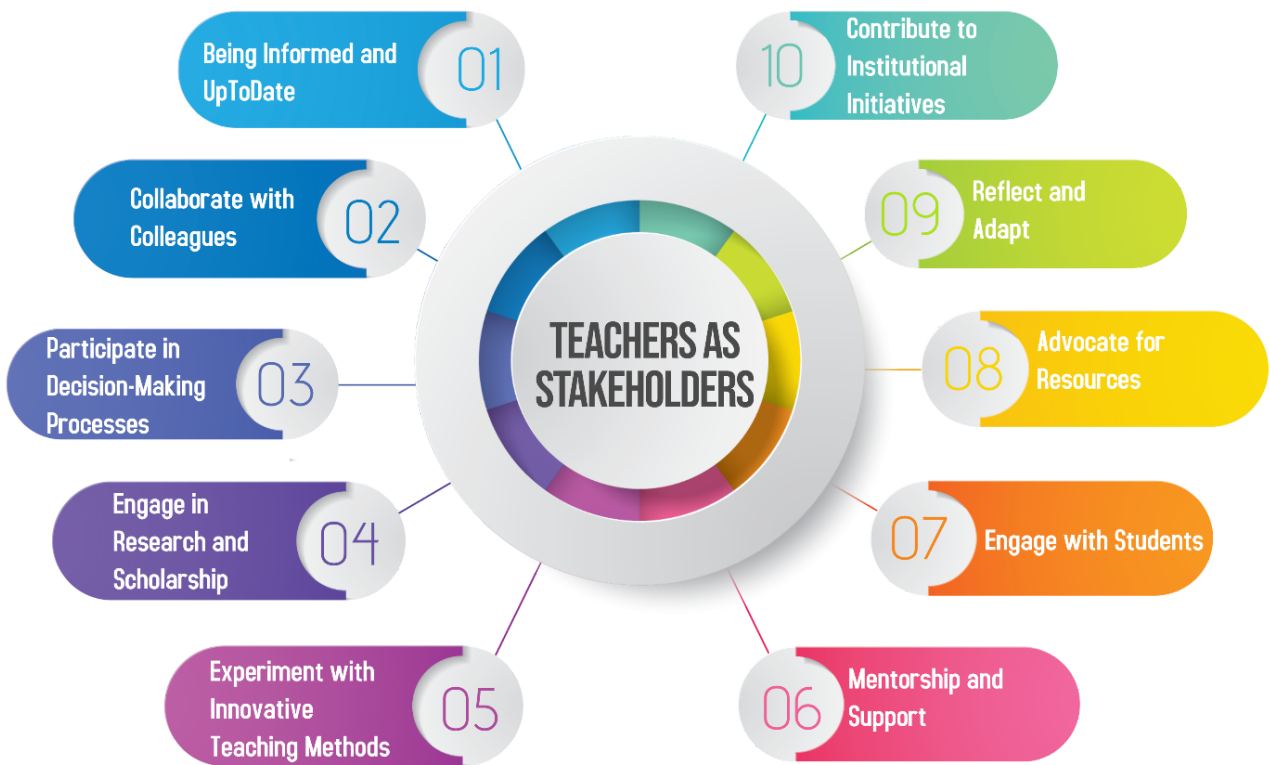
Students can actively seek feedback from teachers and administrators. Ask for clarification when needed and take advantage of office hours or extra help sessions. This shows dedication to understanding the material and willingness to improve. Providing constructive feedback if there are suggestions or feedback regarding the teaching methods or course content, communicate it respectfully and constructively to teachers or administrators. Sharing insights can contribute to improvements in the learning experience for oneself and others.

Students may be the first ones to embrace challenges. Being willing to step outside comfort zone and embrace challenging tasks or assignments. Pushing to overcome difficulties helps foster growth and development. Also, students can be the ones cultivating a growth mindset that views challenges as opportunities for growth and believes in the ability to improve. Embrace mistakes as learning experiences and use them as stepping stones to success.

Teachers

Obviously participating as stakeholders and with direct an subtle participation, teachers can help universities face the new challenges by continuously update their knowledge and skills, implement evidence-based teaching practices, and foster a positive learning environment that supports student success (Aleixo et al., 2018; Leal Filho, Shiel, et al., 2019; Leal Filho, Skanavis, et al., 2019; Lozano et al., 2015; Pereira et al., 2020; Sharma et al., 2023).

Figure 2. Teachers as stakeholders in helping university face new challenges



If they want to help the university keeping thing on a good track, teachers need to stay updated on emerging trends, developments, and challenges in higher education. They need to really engage in professional development activities, attend conferences, and read relevant literature to stay informed about the changing landscape.

Foster collaboration and communication with fellow teachers and faculty members is a must. Engage in discussions, share insights, and collaborate on innovative approaches to address challenges collectively. Teachers nowadays need to seek opportunities to participate in decision-making processes at the department, program, or university level. Offer input and perspectives on policies, curriculum development, and institutional strategies that address new challenges.

Conducting research and contributing to the scholarship of teaching and learning is also presented as mandatory. Explore pedagogical approaches, assessment methods, and curriculum design that address emerging challenges and promote effective teaching and learning practices. In this process, embracing innovative teaching methods and technologies that can help address

new challenges. Explore blended learning, flipped classrooms, online learning platforms, and other tools to enhance student engagement and learning outcomes.

Teachers need to open up and offer mentorship and support to colleagues, especially early-career teachers. Share experiences, insights, and strategies to help navigate the challenges they may face. Also, foster meaningful relationships with students by actively engaging with them inside and outside the classroom. Encouraging open dialogue, provide feedback, and create opportunities for student input in the learning process.

Without getting tired, teachers need to advocate for necessary resources, such as funding, technology, and professional development opportunities, that can support teachers in addressing new challenges effectively. Regularly reflect on teaching practices, assess student feedback, and adapt instructional strategies to meet evolving needs. Embracing a growth mindset and be willing to adapt and improve teaching approaches as necessary.

In order for teachers to contribute to institutional initiatives that aim to address new challenges, they need to participate in task forces, committees, or working groups focused on specific areas such as digital transformation, student support services, or diversity and inclusion.

Researchers

Researchers carry on a more prestigious impact on understanding the process and augmenting decision in the university life. They conduct rigorous studies to identify effective education policies and practices, and disseminate their findings to educators and policy makers.

Educational research has become an increasingly valuable educational asset. By understanding the past, present, and future of educational practices, institutions, and policies, researchers gain insight into the most effective and beneficial strategies for student success. Through in-depth research, education practitioners are able to identify and implement the most effective methods of teaching, assessing and supporting students of all ages. For example, research has shown that technology-based instruction can be used to personalize the learning experience for students and help them grasp difficult concept. Additionally, research on effective classroom management techniques can be beneficial in helping teachers create and maintain a positive learning environment in the classroom. Ultimately, research in the field of education can lead to meaningful changes in the way that students learn and achieve their goals.

Penuel and Fishman (2007) argue that implementation is a critical part of the research process and must be addressed through effective strategies. They recommend that the strategy should include a comprehensive action plan that considers all necessary elements, including resources and human resources, required to implement the plan.

In addition, they stress the importance of setting clear actions, goals, objectives and expectations for intervention, as well as setting timelines and monitoring the progress. Furthermore, they suggest that all stakeholders should be aware of the possibility of resistance to change and be prepared to address these issues to ensure successful implementation. In conclusion, Penuel and Fishman believe that it is important to evaluate the research results and use the results as a basis for future research and implementation. The authors stress that successful implementation

requires a thoughtful and well-designed strategy that takes into account all potential issues and concerns.

Figure 3. Researchers as stakeholders in helping university face new challenges



Researchers can undertake research projects that address the emerging challenges faced by universities. Focus on areas such as educational technology, pedagogical innovations, organizational change, student success, diversity and inclusion, or sustainability. They can generate evidence-based insights and recommendations to inform decision-making and policy development.

This is not possible without collaborating with university administrators and leaders to identify research needs and areas where research can support strategic initiatives (Leal Filho, Skanavis, et al., 2019). Engaging in discussions, provide input, and aligning research efforts with the university's priorities. Also, fostering collaborations with colleagues across disciplines and departments to tackle complex challenges. Establishing interdisciplinary research teams to bring together diverse perspectives and expertise.

Taking an active role in securing external funding by contributing to grant proposals that address pressing challenges is a must if researchers want to help. Engage in collaborative grant writing efforts and leverage research networks to access funding opportunities. Researchers need to disseminate research outputs to relevant stakeholders, including university administrators, policymakers, and practitioners, to inform evidence-based decision-making.

Engaging with practitioners within and beyond the university to bridge the gap between research and practice, will keep the researchers grounded. Collaborate with faculty, staff, and

administrators to apply research findings and develop practical strategies for addressing challenges.

Engaging with policymakers and advocate for evidence-based policies and practices that address emerging challenges in higher education is a challenge for researchers. But participating in policy forums, contribute to policy briefs, and engage in discussions to influence decision-making at the institutional and governmental levels is almost mandatory if they keep the intention to help (Lozano et al., 2015).

Staff members

The staff of the university is also a key stakeholder. They directly benefit from the fact that a university is adapting to changes and overcoming challenges. The key point regarding them is actually to make all staff members be aware of their role in the process.

Here are four main ways staff members can contribute (Chapman et al., 2014; Gappa et al., 2007; Glazer et al., 2019; Jongbloed et al., 2008; Lane, 2011; Pedro et al., 2020; Ramalho Luz et al., 2018; Singh & Gupta, 2015):

- Staff members should stay informed about the latest developments and trends in higher education. They can actively participate in professional development events, attend conferences, and participate in seminars related to their area of expertise. This will help them gain knowledge and insights that they can apply when tackling new challenges. Effective communication and collaboration are critical in times of change. Employees should encourage open communication with colleagues, administrators and students.
- Universities face challenges such as technological advances, changing student demographics or evolving teaching methods. Staff should be open to new technologies, innovative teaching methods, and management practices to enhance the overall learning experience. You can actively participate in pilot projects or programs to test and implement new approaches. Staff who interact directly with students, tutors and support services play a vital role in helping students overcome challenges. They can provide students with advice, resources and guidance to help with academic, personal or financial difficulties.
- Employees should be actively involved in problem solving activities. They can contribute by sharing expertise, conducting research, or participating in working groups or committees working on specific challenges. Collaborative problem solving can help find creative solutions and foster a sense of ownership and engagement among employees.
- Employees can actively participate in data collection, analysis, and reporting. By collecting and analyzing relevant data, they can provide university administrations with valuable insights for informed decision-making. This data-driven approach can help identify emerging challenges and develop evidence-based strategies to address them.

In general, Universities should invest in the professional development of their staff. By offering training programs, workshops and seminars on relevant topics, employees can acquire the skills and knowledge needed to deal effectively with new challenges.

Figure 4 illustrates five ways for staff members to be actively involved in the university life, helping it face challenges.

Figure 4. Staff members as stakeholders in helping university face new challenges



Employers

Employers can play a key role in helping universities meet new challenges. Employers can partner and collaborate with universities to address specific challenges (Leisyte & Westerheijden, 2014). These could be joint research projects, internship and co-op programmes, industry advisory boards or mentorship programmes. By actively engaging with universities, employers can contribute their expertise, resources and real-world insights to help address the challenges facing their institutions.

By being actively involved in the development of courses and programs, employers can help universities to the changing needs of the labor market. They can provide advice on the skills and competencies required in different industries and offer placements, apprenticeships or traineeships. By working closely with universities, employers can help bridge the gap between academia and industry and ensure graduates are well prepared for the job market (Coll et al., 2002; Kinash et al., 2017).

Employers can provide professional development opportunities for university faculty and staff. This can include workshops, workshops or conferences on industry trends, new technologies or best practices. By sharing knowledge and providing training, employers can enhance the skills and expertise of university staff and help them better meet new challenges (Leisyte & Westerheijden, 2014).

Employers can support the university's research and innovation activities (Barrie, 2004). This may include funding research projects, providing access to industry data or facilities, or collaborating on applied research. By investing in research, employers can contribute to the advancement of knowledge and support universities in overcoming complex challenges with innovative solutions.

Providing feedback and assessment on graduate readiness and skills is an important feedback employers can offer to universities. This can help universities assess the relevance of their courses and make necessary adjustments to meet industry needs (Barnett, 2009; Boud, 2000). Employers can actively participate in advisory committees or provide feedback through surveys or interviews to ensure that the university's educational offerings are aligned with market needs.

Employers can actively participate in campus recruiting activities, attending job fairs or career events. You can offer internships, co-op positions or work opportunities for students and graduates (Bai, 2006). By building strong recruitment and placement pipelines, employers can help students make a successful transition from academia to the workplace.

Also, employers may join or establish industry advisory committees at the university. These institutions provide a platform for employers to share insights, consult and collaborate with university administrators, faculty and staff.

Policy makers

Policymakers have the power to shape the environment in which universities operate. Here is how (Avci et al., 2016; Hayduk, 2022; Patatas et al., 2020; Turner et al., 2017):

- providing funding,
- developing flexible regulations,
- fostering partnerships,
- ensuring curriculum relevance,
- encouraging innovation,
- addressing accessibility and affordability,
- collecting data,
- ensuring quality assurance and
- supporting lifelong learning

Policymakers can allocate appropriate funds and resources to universities. Increased funding could help universities invest in infrastructure, technology, research, faculty development and student support services. By providing adequate resources, policymakers can enable universities to respond effectively to new challenges (Hayduk, 2022).

Policymakers can create a regulatory environment that allows universities to adapt to new challenges and introduce innovation. They can review and modify existing regulations to increase flexibility and responsiveness, and enable universities to introduce new teaching methods, develop interdisciplinary projects or engage in collaborative research programmes.

This category of stakeholders can encourage partnerships and collaboration among universities, industry, and other stakeholders (Avci et al., 2016). You can create policies that encourage universities to work with business, government agencies and community organizations to

address challenges. Such partnerships can provide opportunities for applied research, experiential learning and knowledge sharing.

Policymakers can work with universities to ensure that curricula remain relevant to the changing needs of society and the labor market. You can establish mechanisms for ongoing dialogue among policymakers, industry representatives and university faculty to identify new skills and areas of knowledge (Turner et al., 2017). This collaboration can help shape course development and ensure graduates have the skills they need. Also, policymakers can develop incentives and funding programs to encourage universities to embrace innovation and address new challenges. These incentives may include research and development grants, funding for interdisciplinary programs or recognition for innovative teaching practices. By fostering a culture of innovation, policymakers can inspire universities to respond proactively to emerging challenges.

Policymakers can support the collection and analysis of higher education-related data. This may include gathering information on research findings, employment rates, graduation rates and demographic trends. With access to accurate and comprehensive data, policymakers can make informed decisions and develop policies to address the specific challenges universities face.

Establishing quality assurance mechanisms is an important task for policy makers in order to ensure the excellence and integrity of higher education institutions. These mechanisms may include accreditation processes, program reviews, and institutional reviews. By maintaining high standards, policymakers can foster accountability and trust in education systems, which are critical in the face of new challenges (Moraru, 2012).

Policymakers can promote lifelong learning programs and programs that encourage individuals to upskill and reskill throughout their careers. You can support the University in providing flexible study options, online education and professional development opportunities for those already in work. By prioritizing lifelong learning, policymakers can help universities adapt to the changing needs of the workforce and encourage continuous learning.

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2.1. Beyond technical skills

Socio-emotional competences for knowledge transfer

Universities began to take an interest in knowledge transfer more than 30 years ago (Geuna & Muscio, 2009). However, it is only nowadays that governance models focused on knowledge transfer have been adopted, either as a source of funding for university research or as a political tool for economic development (Geuna & Muscio, 2009). The higher education environment demands that we go beyond the internal and external bondries of organisations and commit to leadership practices that generate synergies (Prysor & Henley, 2018). This establishes the need to promote leadership skills, training and self-reflection within the group (Prysor & Henley, 2018).

In the field in question, knowledge transfer is mainly carried out through two actions: a) personalisation and b) codification (Joia & Lemos, 2010). Codification refers to the structuring and storage in repositories to make this knowledge accessible (Tangaraja et al. 2016). For example, open repository measures of universities with the research of their professors or professional profiles in social networks. In other words, it is the channel or space where knowledge is stored. Personalisation, on the other hand, refers to those practices that enable one professional to transfer their knowledge to another through personal contact (Tangaraja et al. 2016). It is at this point where socio-emotional competences become vitally important. A clear example is the research developed by Chimusa et al. (2015), where socio-emotional difficulties such as: lack of mentoring of students participating in field studies, an alarming decrease in experts to whom wish collaborate with other universities, use of inefficient evaluation systems and a lack of platforms to record information.

On the other hand, civic engagement (Checkoway, 2013) should not be overlooked, e.g. the process by which people become actively involved in the work of organisations with the aim of enhancing knowledge that targets society. In this way, an institutional strategy is called for in order to reenforce student learning, involving teachers to a greater extent, etc. (Checkoway, 2013).

In this way, positive and personality psychology allows us to identify which socio-emotional skills are key to making knowledge transfer happen. In this sense, the use of consistent evaluation systems would greatly benefit personal knowledge and responsible decision-making. The lack of mentoring and monitoring of foreign experts could be improved by reinforcing emotional self-management, social awareness and resilience. Declining synergies between experts could be reinforced relationship skills, so that quality relationships based on cooperation could be established and maintained.

Collaborative for Academic, Social and Emotional Learning (CASEL)

Continuous teacher training is a key factor for the professional preparation and education of future generations. This involves the development of models for well-being and resilience as critical educational values for the preparation of productive and efficient citizens. The educational aim to turn universities into dynamic and resilient institutions capable of facing the current challenges of society implements a preparation of the agents involved (student, researcher and academic staff)

Given them socio-emotional competences that enable them to understand, regulate emotions, adequately face social demands and thus achieve academic, professional and employment success.

The CASEL (2019) educational approach based on socioemotional learning is interpreted in this work as a model of higher education that requires the development of competences that enable participants to relate the knowledge acquired and its social transfer, through the work of educational values and human values. Enhancing the lifelong learning skills of students, researchers and academic staff should involve: learning to establish trusting relationships, recognising and regulating emotions, possess empathy, collaborating and communicate effectively, listening actively, managing time, resolving conflicts, appreciating diversity and developing a commitment to improve performance and job satisfaction through this approach (Paolini, 2020).

In accordance with the socio-educational characteristics that define it, this approach integrates cognitive regulation competences, emotional processes, as well as social and interpersonal competencies (Jones et al., 2017), in which we will study in greater depth throughout this chapter (Figure 1).

Figure 1. CASEL Model



Self-Awareness

According to various authors (Bisquerra, 2016; Delgado, 2014; Maslow, 2009), personal knowledge is an essential aspect of achieving a full and satisfying life. It is the ability to

accurately assess our feelings, interests, values and strengths. Enabling us to have a deep understanding of ourselves, as well as developing social and emotional skills. This understanding gives us the opportunity to know our weaknesses and strengths in order to develop strategies to improve and maximise our potential. A clear understanding of our values and principles allows us to make decisions that are ethical and consistent with our identity. By knowing our interests and motivations, we can steer our professional and personal careers in a direction that brings us satisfaction and fulfilment. Thus, personal knowledge implies a connection of strengths, passions and skills, oriented towards self-fulfilment (Maslow, 2009).

The pedagogical view associated with the mental representation that the educator makes of their performance provides a critical view of their method and intervention based on personal knowledge and knowledge of education. Having knowledge of teaching, research and academic management of knowledge are all duties of the university teacher that pass on personal knowledge, subject knowledge and recipient knowledge. The development of personal knowledge is influenced by will, beliefs, as well as the reception of stimuli and the context in which they occur. Self-knowledge applied to the transfer of knowledge involves creativity and its implementation in decision-making. This is determined by rational, emotional and contextual factors such as ethical values, interests and feelings, including confidence and self-esteem.

The third mission of the university regarding the transfer of knowledge to society from the culture of innovation is a key to create a feeling of satisfaction in accordance to the social need that involves each institution working together on the *ethical and social values* to maintain their own culture of innovation (Bermejo, 2018; Ramos, 2019; Touriñán, 2016). These values harbour a series of knowledge, skills and attitudes on which each person builds their own interpretation of life and help to develop personal and professional identity. Understood as socially accepted guidelines for behaviour and action that help us to intervene in the right way at any given moment. Although they may change between study and research communities. The main personal knowledge values recognised are: respect, honesty, responsibility, fairness and justice, care, unity and integrity. The degree to which our values match our way of living determines our self-esteem.

Personal knowledge allows us to identify and work on our *interests* in a motivated way as they are values that produce satisfaction. Identifying and working on interests that lead to the application and transfer of knowledge to society implies assuming a positive and significant responsibility and commitment by recognising the usefulness of the knowledge generated. Values such as confidence and self-esteem are personal capacities that influence our knowledge and the way we act. Confidence as a personal value enables one to face challenges and achieve goals when one has a clear understanding of one's feelings, interests, values and strengths. Therefore, acting effectively in different situations. Self-esteem is a key element for emotional health based on "the esteem that an individual feels towards their person for his or her vital development, psychological health and attitude towards oneself and others" (Roa, 2013, p. 242). Optimal or healthy self-esteem is a fundamental aspect of personal knowledge that is characterised by being realistic and flexible. Helping the individual to recognise both their own strengths and weaknesses and to adapt to changes and adverse situations without losing self-confidence.

In short, personal knowledge is a fundamental aspect of achieving a full, confident and satisfying life. The development of personal knowledge reinforces confidence and optimal self-esteem, which is fundamental for making decisions consistent with our values and principles in order to find satisfaction and fulfilment in our personal and professional lives. In the field of teaching, personal knowledge and the development of confidence and self-esteem in particular, are values that determine the quality of teaching, personal and professional identity.

Self-confidence enables teachers to be confident in their ability to teach and transmit knowledge effectively. A confident teacher is more likely to communicate effectively with their students, have a positive presence in the classroom and have the ability to motivate and inspire their students. Positive self-esteem enables teachers to work with security and confidence, in which promotes student motivation and success. A teacher with good self-esteem is more likely to make positive decisions, be more flexible and better able to adapt to new or challenging situations.

The relationship between confidence and self-esteem is circular, as positive self-esteem can increase confidence, while strong confidence can strengthen self-esteem. When a teacher has confidence in their abilities, they feel more valuable and worthy, which increases self-esteem. Similarly, when teachers have positive self-esteem, they feel more confident in themselves and their abilities, which increases their confidence. In teaching, teachers who are confident in their ability and value themselves are more likely to have a positive impact on their students and foster a positive learning environment.

Confidence and self-esteem are important in teaching because they influence how teachers see themselves and how they transmit knowledge to their students. These values help teachers to have a positive presence in the classroom, to communicate effectively with their students, to motivate them and to have a positive impact on their learning. Therefore, it is important for teachers to work on their personal knowledge and to strengthen their confidence and self-esteem. A combination of positive self-confidence and self-esteem can increase students' motivation and success and help to improve the quality of teaching in general.

Self-management

Self-management or emotional self-regulation is defined as the successful and constructive regulation of one's own emotions, thoughts and behaviours. Doing so without censorship, but avoiding impulsive reaction. It includes the management of stress, anger and frustration, the generation of self-motivation and the postponement of gratification in order to achieve long and medium-term personal, academic and professional goals according to the CASEL model (Collaborative for Academic, Social and Emotional Learning, 2019). This is one of the models that has been widely disseminated globally and especially in the Anglo-Saxon sphere. It is related to self-discipline, perseverance and determination.

Another widespread definition of emotional self-regulation is offered by Bisquerra (2016) as the ability to manage emotions appropriately. It involves becoming aware of the relationship between emotion, cognition and behaviour; having good coping strategies;

the ability to self-generate positive emotions, etc. This capacity involves the development of the following skills:

- *Becoming aware of the interaction between emotion, cognition and behaviour.* Emotional states affect behaviour and behaviour affects emotion; both can be regulated by cognition (reasoning, awareness).
- *Emotional expression.* Ability to express emotions appropriately. Ability to understand that one's internal emotional state need not be matched by external expression, both in oneself and in others. At higher levels of maturity, understanding that one's own emotional expression can impact on others, and taking this into account in how one presents oneself and others.
- *Capacity for emotional regulation.* One's own feelings and emotions must be regulated. This includes self-control of impulsivity (anger, violence, risk-taking behaviour) and frustration tolerance to prevent negative emotional states (stress, anxiety, depression), among others, and to persevere in achieving goals despite difficulties; ability to defer immediate rewards in favour of longer-term, but higher-order rewards, etc.
- *Coping skills.* Ability to cope with negative emotions by using self-regulation strategies that improve the intensity and duration of such emotional states.
- *Competence to self-generate positive emotions.* Ability to voluntarily and consciously experience positive emotions (joy, love, humour, flow) and enjoy life. Ability to self-manage one's own subjective well-being for a better quality of life.

There is ample evidence in the literature that emotional regulation plays an important role in the psychological well-being and optimal socialisation of students and teachers. In fact, students who have greater difficulty regulating their emotions (Kokkinos & Voulgaridou, 2017) are more likely to resort to aggression as a means of problem solving. Also, among the dimensions that determine the profile of the research teacher is emotional intelligence in addition to the pedagogical, academic-professional, ethical, publication, permanence and visibility dimensions (Vásquez Villanueva et al., 2020). Like personal knowledge, emotional self-regulation allows for a full, confident and satisfying life. The development of emotional self-regulation strengthens decision-making and has positive effects on work engagement (Levitats and Vigoda-Gadot, 2020) and thus on research engagement and knowledge transfer. The work of research teachers is complex. The challenges they face on a daily basis require them to be aware of their emotions in order to achieve individual well-being, happiness and stress management (Hernández-Herrera and Ramos-Mendoza, 2018). Research work requires time, dedication, and perseverance. This leads to stress and emotional exhaustion. Therefore, it is recommended to have a series of actions that help to strengthen self-esteem, confidence, optimism and hope. According to Tschannen-Moran et al., 2016, researchers can withstand periods of frustration and emotional exhaustion, as long as they have the appropriate training, including emotional self-regulation that helps them to generate feelings of well-being and increase their self-esteem.

Relationship skills

Relationship skills are defined in the CASEL Model (2019) as: "the ability to establish and maintain healthy and supportive relationships and to manage effectively in environments with individuals and groups. This includes the abilities to communicate clearly, listen actively, cooperate, work collaboratively to solve problems and negotiate conflicts constructively, navigate in environments with different social and cultural demands and opportunities, provide leadership, and seek or offer help when needed".

The university should provide learning environments and experiences that foster trusting and collaborative relationships, a meaningful curriculum, and continuous assessment. The university stage not only provides the opportunity for students to connect and interact with peers, forming friendships and connections that can be long-lasting, but also to learn those competencies related to relationship skills that are required for the workplace. This include: communicating effectively; developing positive relationships; acquiring cultural competence; problem solving in teams; managing conflict and disagreement; exercising positive leadership; and being able to advocate and defend the rights of self and others.

The implementation of activities that promote interpersonal relationships can facilitate the development of lifelong interactive skills, enabling the establishment of close relationships, adequate communication processes, mechanisms for the resolution of problems or conflicts and means for the improvement of confidence, both in oneself and in others (Londoño & Mejias, 2021).

In relationship skills, the achievement of effective communication encompasses both verbal communication in terms of sending, receiving and regulating messages and the complex skills of interpreting social situations, understanding subtle social norms, responding to social cues, adhering to social scripts and regulating one's own social behaviour (Riggio & Tan, 2014).

In order to develop positive relationships, the university provides opportunities for students to acquire the emotional sensitivity necessary to pay attention to the emotions of others and to non-verbal signals. Educating in social expressiveness and social control skills is a defining factor in helping a person to know how to act in different social situations. Acquiring social sensitivity involves attention to signals and situations, and an awareness of how one's own behaviour affects others. As a result, training in expressiveness, control and social sensitivity is important for building good interpersonal relationships (Riggio & Tan, 2014).

In an increasingly globalised and diverse society it is necessary to incorporate, in the classroom, activities of self-exploration, acquisition of awareness and knowledge, and the skills necessary to demonstrate cultural competence. Relationship skills also integrate the acquisition of cultural competence by demonstrating mastery of strategies, techniques and approaches to communicate and interact with people from different cultures. This competence includes: knowing how to communicate in an interculturally effective manner; showing an ability to seek information about the economic, political and social tensions of the different cultures with which one interacts; acquiring a certain cultural sensitivity; maintaining a positive attitude starting with attentive listening and personal reflection.

University education trains professionals to face a changing labour market in which creativity, flexibility and a positive attitude towards lifelong learning are essential. In this context, it is essential to foster students' own skills, autonomy and responsibility (Lizitza and Sheepshanks, 2020). Learning activities in which teamwork takes place offer good opportunities for the development of creative capacity, adaptability, problem-solving skills and decision-making. On the other hand, personal experience is very important in competence development. In classrooms, as in other centres of social life, human relationships and ways of living together are determined by interactions and the ways in which they arise and manifest themselves, and being aware of them and making the necessary adjustments in the relationship is a valuable form of learning (Razo and Cabrero, 2016).

Relationship skills are also essential for effective leadership. Leadership is a complex capability that involves leading, encouraging and guiding others to achieve shared goals. In other words, a good leader needs to understand others and the relationships between individual and group goals. Three dimensions have been recognised in the effective leadership of an organisation: task-oriented leadership, human relations leadership and change-oriented leadership (Dávila-Quintana et al., 2015). Leadership in human relations is directly related to relational skills, so developing these skills during university education is essential.

Among social skills is emotional expressiveness defined as the ability to accurately convey non-verbal signals of emotions to others (Riggio and Tan, 2014). This quality is a key element of 'personal charisma' (Friedman et al., 1988; Riggio et al., 2003), and this connection has important implications for charismatic leadership.

Students who develop these skills to a greater extent during their training are more likely to be able to exercise leadership roles in the world of work (Dávila-Quintana et al., 2015).

Relationship skills include the ability to stand up for one's own and others' rights. This skill requires knowledge and awareness of personal rights and the rights of others. The skills of respecting, defending, promoting and exercising fundamental rights when these may be violated by one's own actions or those of others come into play. The university seeks to contribute to the development of competences that are conducive to students exercising their right to act as active and constructive agents in society and thus participate responsibly in collective decisions based on consensus and democracy (Ortega Rojas, 2021).

Finally, for the development of relational skills in the classroom, Aranguren (2022) recommends the use of interactive strategies in order to allow and facilitate students to interact and communicate as they learn. These strategies are based on cooperation, interaction, communication and socialisation with teamwork activities in team games, accelerated team teaching, integrated cooperative reading and writing, group research, experiential learning, flipped classroom, case studies, project-based learning and debates among others.

Responsible decision-making

The decision-making process is very complex because, at the psycho-physiological level, it involves in an integrated way: executive functions, unconscious brain activity, limbic system (emotional brain) and memory. However, it is also a process that must deal with various value dimensions, the socio-cultural system and potential ethical conflicts. Win-win solutions are very rare and, most commonly, trade-offs or sacrifices are anticipated when making a decision, which will involve the system as a whole or part of it (McShane *et al.*, 2011).

In the context of universities and research, academics are aware of the ethical dimension associated with their work, and of the fact that their work may be perceived differently depending on the map of demands and priorities expressed by different social strata. Hence, the clarification of criteria for making systemic and ethical decisions is key. Traditionally, the rationale for decision-making originates in philosophical perspectives that have generated divergent, rather than complementary, moralities. For example, scientific anthropocentrism (Jonas, 1995) has placed human welfare at the centre of the criteria, according to which only human beings are valuable in themselves. On the other hand, biocentric, life-centred morality builds a bridge between the biological sciences and what Agar (2006) calls "folk" morality to arrive at a viable environmental ethic and a new spectrum, a new hierarchy, of living organisms. With biocentrism, centuries of philosophical speculation about the exclusive moral significance of humans comes to an end. We are living in historical moments in which we are recognising the finite nature of our planet and its resources, which is generating a certain level of awareness that human activity endangers ecological balances (Des Jardin, 2001). An ethic of research and knowledge transfer that is detached from the ecological and environmental dimension is unsustainable. Philosophical reflection must be recovered, in the sense of intellectual attention to human problems and in intimate connection with scientific knowledge; but science, the daughter of philosophy, cannot be orphaned in its alliance with progress (Guzmán-Díaz, 2013).

In this complex context, it is valuable to have a tool designed to assist in decision-making by providing a transparent and structured framework of the ethically relevant aspects involved: the Ethical Matrix (EM). It is a mapping tool that guides questioning, allows hidden value judgements to emerge and, if necessary, even those that are not hidden. Another purpose is to anticipate conflicts and classify their severity. To estimate the impact of different courses of action on different stakeholders. All this, in turn, allows, on the one hand, to establish better communication and help transparency in decision-making and, on the other hand, to design mitigating strategies and possible fair trade-offs, helping to foster social acceptance of the project. The cells in the first column on the left list the stakeholders involved. The cells in the first-row list the general ethical principles that are agreed to be adopted. Thus, every other cell in the MS contains value claims as stakeholders present them on the basis of the general ethical principles (Beauchamp and Childress, 1999). This means that its analysis is not structured around a single influential ethical theory. Instead, the MA attempts to account for the moral complexity of the real world by adopting three general ethical principles as cornerstones. These principles are well-being, autonomy and equity.

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2.2 GRIT infused of civic engagement

1. Conceptualisation of intelligence

Academic success has often been linked to intelligence. Meanwhile, conceptualisations of intelligence have a long history of debate. The first controversial issue is whether intelligence has a singular character or whether there are several relatively independent intellectual faculties. The "purists" - from Charles Spearman to his current disciples Herrnstein and Murray - have defended the notion of a single "general intelligence". Since Binet's time, intelligence tests have tended to mainly measure verbal memory, verbal reasoning, numerical reasoning, recognition of logical sequences and the ability to express how everyday problems can be solved. Based on his research, Binet published the first intelligence test in 1905. This test, which is still used today, has a cognitive conceptualisation of intelligence.

Subsequently, other authors have expanded this concept of intelligence. Goleman believes that a hugely significant set of skills and abilities have largely been ignored: those related to people and emotions. In particular, Goleman talks about the importance of recognising one's own emotional life, of regulating one's own feelings, of understanding the emotions of others and of being able to work with and empathise with others. In turn, he proposes strategies to strengthen these capacities, especially in children. He even suggests that the world could be a more welcoming place if we fostered emotional intelligence as diligently as we have fostered cognitive aspects. Along the same lines, other authors advocate the need to combine intelligence and morality to create a world in which we all want to live. In this sense, in his book *Frames of Mind: The Theory of Multiple Intelligences* (2011), Howard Gardner proposes the existence of seven separate intelligences in human beings (Figure 1). The first two (linguistic and logical-mathematical) are the ones that have usually been assessed in traditional schools. Linguistic intelligence involves a special sensitivity to spoken and written language, the ability to learn languages and to use language to achieve certain goals. Logical-mathematical intelligence involves the ability to analyse problems in a logical manner, to carry out mathematical operations and to conduct research in a scientific manner. Musical intelligence involves the ability to interpret, compose and appreciate musical patterns. Bodily-kinesthetic intelligence involves the ability to use parts of one's own body (such as the hand or mouth) or the whole body to solve problems or create products. Spatial intelligence involves the ability to recognise and act in large spaces (as, for example, sailors and pilots do) and in smaller spaces (as sculptors or surgeons do). Interpersonal intelligence is linked to a person's ability to understand the intentions, motivations and desires of others, and thus their ability to work effectively with others.

Salespeople and actors need high interpersonal intelligence. Finally, intrapersonal intelligence involves the ability to understand oneself, to have a useful and effective model of oneself - including one's own desires, fears and capabilities - and to use this information effectively in regulating one's own behaviour. Naturalistic intelligence is the most recent addition to Gardner's theory and has been met with more resistance than his original seven intelligences. According to Gardner, individuals who are high in this type of intelligence are more in tune with nature and are often interested in nurturing, exploring the environment, and learning about other species. These individuals are said to be highly aware of even subtle changes to their environments. Intelligences are entirely amoral and any of them can be employed in a constructive or destructive manner.

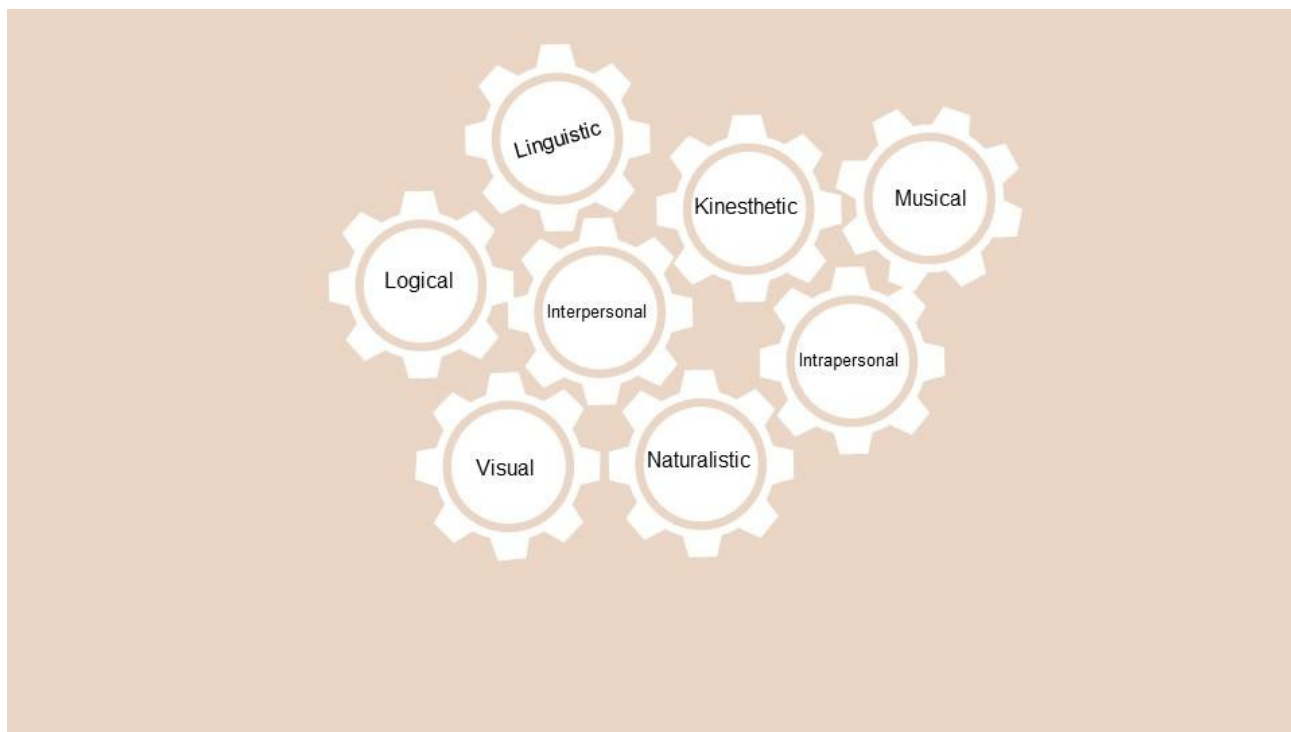


Figure 1. Multiple intelligences (Gardner, 2011)

This is why we should promote the use not only intelligences, but also morality and, as far as possible, combine them in the form of virtues. At the same time, we must be clear that constructive and positive uses of the intelligences do not happen by accident. Deciding how to make use of one's intelligences is a matter of values, not of mere capacity. In recent years, the conceptualisation of the so-called "existential intelligence" has been gaining a great deal of interest. This type of intelligence can be defined as the ability to position oneself before certain existential milestones of the human condition, such as the meaning of life and death, the final destiny of the physical and psychological worlds, and certain experiences such as feeling deep love or being absorbed by a work of art.

Once moral intelligence has been conceptualised, studies have focused on identifying the typical characteristics of people who stand out for their moral intelligence. Among the most important of these are:

- Facility to respect life in its various facets.

- Ease of mastering symbolic representations and encodings traditional ones that deal with issues related to respect.
- A lasting and thoughtful engagement on these issues.
- The potential to go beyond conventional approaches to create new forms or processes to regulate respect in human interactions.

In all likelihood, the environment in which the person develops will play a determining role. There is a broad consensus that a certain cognitive development is necessary for morality to emerge.

Another aspect to consider relates to leadership. The leader's art is to create and refine a narrative that captures the attention and engages the followers, thereby changing their convictions about who they are, what they are committed to and what they want to achieve and why. Effective leaders pay close attention to how audiences react to their speeches and continually modify them based on that feedback. Well-known figures such as Franklin Roosevelt, Ronald Reagan or Bill Clinton learned to do this during their early political careers. However, it is risky to create a narrative just to satisfy an audience. Leaders who do so often come across as inauthentic or, worse, hypocritical. Despite the rise of consultants, pollsters and propagandists, the appeal of authenticity to the public determines a leader's long-term effectiveness. At this point we can ask ourselves what kind of intelligence these leaders use. Firstly, they have a strong command of language in that they can tell effective stories, and they can often write very well too. Secondly, they have strong interpersonal skills. They are able to understand other people's aspirations and fears. This knowledge gives them the ability to influence public. Thirdly, they have a good intrapersonal sense, i.e. a clear awareness of their goals and their own strengths and weaknesses. This type of intelligence allows them to reflect frequently on their own personal journey. Finally, the most effective leaders can address existential questions, help the audience to understand their own place in life, clarify their goals and feel committed to something meaningful to them. We can also find these types of intelligences in creators. Both groups seek to influence other people's thoughts and behaviours and consequently employ persuasion. In addition, each leader or creator has a narrative to tell. A creator contributes to the narrative within a set framework while a leader creates a narrative about his or her group. Although intelligences, in themselves, are not morally good or bad, people can use their intelligences in a pro-social or anti-social way.

Schools are an area where it is necessary to encourage the development of multiple intelligences with the aim of training competent citizens in all spheres of the human being. This requires a positive disposition. These centres must put in place the methods and processes that make the development of multiple intelligences possible. However, in order to achieve this, it is necessary that both teachers and parents understand the need for the development of these intelligences. This awareness-raising process can be an arduous journey. This is why teaching based on the development of multiple intelligences is more likely to thrive in contexts that encourage student diversity and serious and consistent work. Collaboration and openness of schools are also essential. Opportunities should be provided for formal and informal contacts, both within and outside school, with people who share similar experiences and concerns. These contacts play an essential role when change processes have already started, as they will be enriching.

We cannot forget that schools must offer alternatives in terms of the curriculum and the assessment of their students' development and learning. These options must make sense both for the students and for the wider community. Finally, multiple intelligences should be used as a means to foster in students a taste for quality in their work. Ultimately, it is the students' work and their understanding of it that characterises good teaching.

2. Forming committed citizen

Another decisive aspect relates to the purpose of education: to create a more just, humane and sustainable future. For this reason, an education that aspires to excellence in the 21st century must create more than a quality curriculum. Excellence in education must also include structures and processes used in an ethical manner, with ethical models and experiences that are personally engaging for students and teachers (Gardner, Csikszentmihalyi and Damon, 2001; Gardner, 2011). Therefore, excellent education is high quality, discipline-based and cross-disciplinary, ethically conducted, and meaningful to those involved. How can schools achieve this goal? By reframing their purpose: to develop learning citizens.

Citizen-learners recognise the complexities and uncertainties of the world in which they live. They are able to develop and share knowledge, make connections with their community and begin meaningful actions to support their own well-being and that of others. They are prepared to work with others to explore pressing issues of personal and community importance, such as environmental sustainability, global migration or the digital revolution. Pupil-citizens act boldly, but carefully and thoughtfully, with the goal of improving their own lives and the lives of others.

On many occasions, we find that the objective that a school sets itself is to achieve academic excellence. It is not uncommon to find that schools overlook the need to include among their objectives the need to contribute to building a better society. This is why we must promote the overlapping processes of becoming a citizen and a learner inside and outside school. We cannot forget that children are citizens both in the present and in the future; that learning is a continuous activity that takes place throughout life; and that educational institutions such as schools must have the community in mind from the outset. Schools are ideal places for children to learn the fundamental human skills necessary for participating in democratic society: how to offer, receive and modify ideas; how to understand and accept different points of view; and how to listen. Learning does not stop once schooling is over. Especially in a digitally connected world, with multiple sources of knowledge at hand, learning must be seen as a lifelong activity. Learners need to develop the skills, knowledge and dispositions to lead ethical and meaningful lives, and to make mistakes and overcome challenges along the way. These learners need to be active and reflective members of a community, learning from their successes and mistakes in order to progress in the future. We must teach more than content; we must teach them to learn in a way that fits the kind of people they want to become and the world they want to live in. In order to do this, it is essential to teach them the right way to relate to others as this will enhance their own learning and that of others. They need to learn to recognise and understand their own and others' emotions, and to respect and exchange different points of view. They also need to learn to rethink and reflect on their

own and others' learning. We seek to empower students to participate in society, to share their concerns, to seek social welfare and to uphold positive values for society at large. Teachers should be guides who facilitate the development of these competences within the educational framework of their subjects. Figure 2 presents these ideas in schematic form.

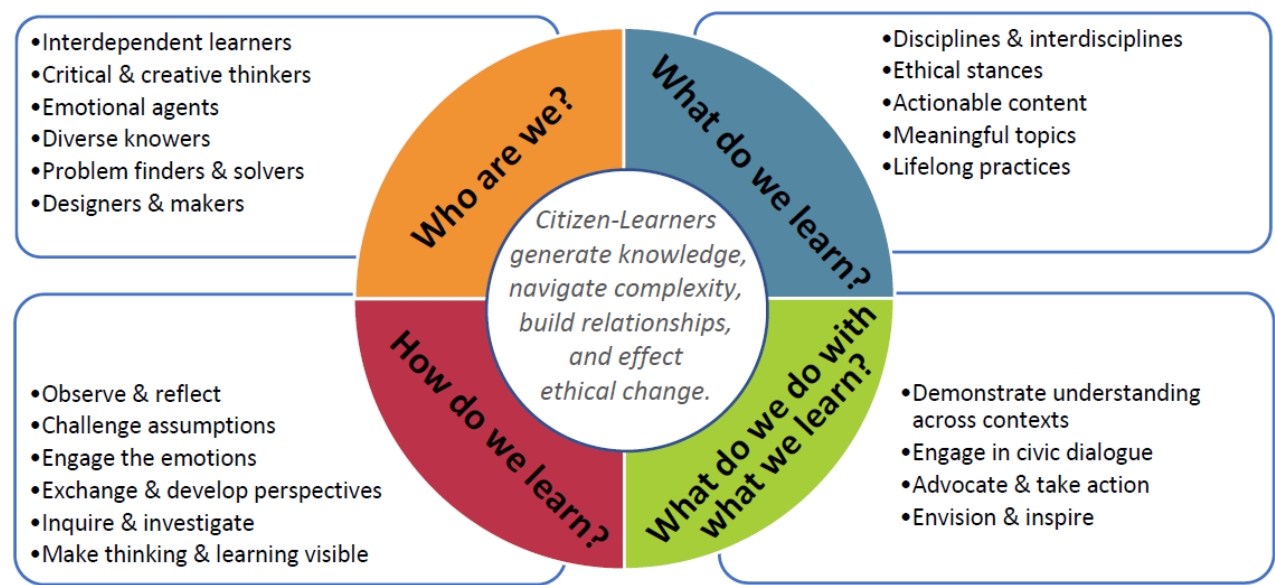


Figure 2. Model proposed by Allen

In this conception, the learner becomes the centre of the teaching-learning process. Teachers must involve students in their own learning by encouraging opportunities to communicate and to apply the knowledge learned in a meaningful way. The learner is no longer a passive agent, but now actively constructs his or her reality. Work is interconnected, recognising one's own individuality along with the need to be part of society. Motivation, attitude and values play a fundamental role in the promotion of critical and creative thinking. In turn, they must be able to recognise, accept, and understand their emotions, while being able to pay attention to the feelings of others. Emotions act as drivers for their engagement and enable them to enhance their learning.

In short, educational environments must promote not only cognitive intelligence, but also other multiple intelligences that, together with moral intelligence, enable them to become engaged citizens.

Mindset for change

The changes needed in our society have to be brought about through a new approach. To do this we must use a hitherto unknown way of managing knowledge. That is why we propose to use what Gardner calls the "minds" needed in our future if we are to prosper and meet the challenges present in our society today. The minds needed will be:

- Disciplined mind
- Synthetic mind

- Creative mind
- Respectful mind
- Ethical mind

These minds use the various intelligences that were described above. We must change the way we do things as current practices are not really functional according to Gardner. Moreover, the world around us is changing significantly. This is why the present goals, capacities and practices are not useful in the context we are discussing. We need to reconsider which ways of thinking are essential, which need to be prioritised and how to combine them. The changes we are undergoing today require new educational forms and processes. We must conduct an analysis of what our world needs today. For Gardner "education is inherently and inevitably a matter of goals and values". We must be aware of what knowledge, skills and abilities are needed. We must also know what kind of individuals we want to have as a result. Today's education still prepares for the world of the past and not for the possible worlds of the future. We have not worked out how we should prepare young people to survive and thrive in a world that will be different from the one we know.

In this new context, individuals who do not show respect will not be worthy of the respect of others and will end up polluting the workplace. Unethical professionals will create a world devoid of decent workers and responsible citizens. Therefore, we need people who are disciplined, able to synthesise information, creative, respectful and ethical. The following is a brief description of the different types of minds as outlined by Gardner.

Disciplined mind

We always carry with us those ideas or ways of doing things that have been useful in the past. However, when we take on a new job, we must eliminate habits we have used in the past that are no longer useful and gradually consolidate the new habits that are useful in the current job. We must eradicate erroneous ways of thinking and acting and replace them with those appropriate to a disciplined professional. We must clearly differentiate between subject and discipline. Nowadays, people study subjects, which involve a great deal of memorising. Disciplines, however, have a different purpose. A discipline implies a characteristic way of thinking about the world. I do not teach how to do, I teach how to be. This is why mastery of basic skills will be necessary, but will no longer be sufficient. To use a simile, we can say that discipline would be the Christmas tree on which the ornaments (theoretical knowledge) are to be hung. But how can we get learn to develop a disciplined mind?

First, we need to identify the really important topics or concepts within that discipline. Subsequently, we need to devote a significant amount of time to that topic. In turn, it is necessary to approach the same topic in different ways. However, we must always make use of the diversity of ways in which each of our students learns. This way of working will make it possible for the contents to be meaningful and for them to learn better. Based on the different multiple intelligences, we will adjust the activities to the characteristics of each student, with some we will use stories, with others debates, among other activities.

We must set up "comprehension situations" that allow them to put into practice what they have understood. In the end, we obtain a subject who continues to learn because he or she has come to enjoy, is passionate about the process of learning about the world. As Plato said: "It is necessary to contribute through education so that the disciples find pleasure in what they have to learn".

The synthetic mind

In today's world it is essential to be able to bring together information from different sources into a coherent whole. We have many and very disparate sources of information. It is therefore necessary to be able to synthesise this knowledge. Any attempt at synthesis has 4 components:

- A goal
- A starting point
- A strategy, method or approach
- An evaluation or feedback

The process of synthesis involves the composition of a whole by joining its parts or elements. This construction can be carried out by joining the parts, merging them or organising them in different ways (Macizo and Bajo, 2004). The ability to synthesise allows us to gain a deeper understanding of the realities we face, to simplify their description, to discover apparently hidden relationships and to construct new knowledge from other knowledge we already possess. For all these reasons, it has a generic nature and is related to several competences (critical thinking, problem solving, organisation and planning or decision making, to give some examples).

The creative mind

In recent years, creativity has been given an increasingly prominent place in formal learning. The creative process has often been seen as a path that only those who were genetically endowed with this quality could follow. Nowadays, however, we consider that the creative person will have to put to work various intelligences, skills and discipline in order to achieve his or her creative goal. For this reason, teachers must face the challenge of keeping their students' curiosity and sensitivity alive. These teachers will have to develop multiple and diverse representations of the same entity. They will also have to encourage criticism as a constructive process.

The respectful mind

In an increasingly pluralistic world, it is necessary to know how to coexist with those who are different from me and to learn to value them. This learning must be supported by the environment throughout the developmental process. If we want to model people capable of respecting differences, we have to provide models and lessons that encourage this attitude. Respect for others should be present in every school environment and permeate our lives.

The ethical mind

Ethics refers to the ability to reflect explicitly on how one does or does not fulfil a certain role. It is easier to acquire an ethical mind when one has grown up in an environment where a job well done is the norm. Ethical orientation starts at home and is also influenced by the people around the child during childhood and adolescence. We cannot forget that in today's society, peers will also have a significant degree of influence on a person's ethical development. From the time we are children, we spend a lot of time with our peers. That is why the qualities of peers will be crucial, especially in adolescence. When it comes to education, teachers act as role models and can pave the way towards an ethical mind. Students need to understand why they study what they study and how they can use that knowledge constructively. For this reason, community service should be an important part of any school's curriculum. As students see that knowledge can be put to constructive use, they are more likely to enjoy schoolwork and find it important for its own sake, thus achieving the ethical facets of the good.

3. Ethical and moral development

Every society has a set of norms about desirable and undesirable behaviour that individuals can engage in. Some actions are considered good and valuable, while others are considered harmful and should be avoided. No society is without these norms, which constitute what are called morals or ethics.

It could be said that morality is made up of the set of more general rules that regulate behaviour between individuals. Given that individuals live in society and have interests that may not coincide with those of other individuals, it is easy for conflicts to arise and it is therefore necessary to establish regulations to organise coexistence. However, some authors consider that there are innate regulations and others originating from the freedom that intelligence provides man. Morality thus has at its base innate components that are highly significant, since they have been moulded by culture and by the form of society.

Most work up to the 1960s used the term moral development to refer to the process of internalisation of social norms. However, the studies carried out from this perspective find a lack of consistency between the knowledge of social rules and their compliance, so that they may be strongly influenced by the situation. It should be borne in mind that there are conventional rules that regulate certain social practices such as dress or greetings. Others refer to the practices that are carried out, such as childcare. Nor should we forget customs, bearing in mind that these may vary from one group to another. In another group, we find moral norms that refer to more general aspects of relations with others and those that deal with justice, integrity and respect.

From a cognitive and evolutionary perspective, moral development is understood as an active construction that the subject carries out in interaction with the environment and that leads to higher levels of autonomy. From this point of view, moral consistency would be a consequence of development. In this line, there are also authors who consider morality as the sum of a set of personality traits that are the object of social approval or sanction.

Before children can develop their morality, they have to acquire logical development, have had contact with society and have felt affection. Logical development is a necessary

but not sufficient condition for the development of moral judgement.

Social perspective-taking and moral conflict can act as drivers of development. It is well known that the environment influences moral development by providing opportunities for children to adopt different social and reciprocal perspectives. Moral conflict, on the other hand, is closely related to the adoption of different perspectives. Moral conflict can occur through exposure to decision-making situations that generate internal contradictions in the structure of one's own reasoning or through exposure to significant others whose reasoning disagrees with one's own. Affect also plays a crucial role in the development of morality. We should encourage the understanding of emotions as this will help the child's moral development. From the cognitive-evolutionary perspective, these authors consider that there is a structure of moral reasoning, a structure that depends on the reformulations about the meaning that the subject gives to the world. These reformulations make possible the emergence of higher forms of justice.

Kohlberg's studies are some of the most relevant in this field. Kohlberg and his collaborators (1983) proposed three different stages experienced during moral development: preconventional, conventional and postconventional. At the preconventional level, morality is determined by external norms dictated by adults. The conventional level is characterised by conformity. At this stage, social norms are accepted as they serve to maintain order. For this reason, they consider that they should not be violated, as this would lead to worse consequences. Most adolescents and adults are at this level. The conventional level is divided into two stages: interpersonal normative morality and social system morality. From the perspective of interpersonal normative morality, appropriate behaviour is behaviour that pleases or helps others and is approved by them. Here we find an orientation towards normal behaviour, stereotypical behaviour and the "good person". Good intentions are very important and the approval of others is sought.

If we are governed by a morality of the social system, we must take into account not only the perspective of two persons but also that of social laws. Right conduct consists in doing one's duty, showing respect for authority and the social order established for one's own good. Morality transcends personal ties. In this case, morality is linked to respect for laws, which cannot be disobeyed, or else the social order will be disrupted.

Finally, we come to the post-conventional level, where only a minority of adults are found and generally from the age of 25 onwards. The subject distinguishes the "I" from normative roles. At this level, the subject defines values on the basis of self-constructed principles. These self-constructed principles are considered as fundamental for the construction of a moral society. In this case, morality is determined by universal principles and values. There are two stages: the stage of human rights morality and the stage of social welfare.

The morality stage of human rights is characterised by establishing criteria for building a better society based on respect for universal rights and building a hierarchy of priorities among them. In the social welfare stage, right action is based on self-chosen ethical principles that are comprehensive, rational and universally applicable. These are abstract moral principles that transcend laws, such as the equality of human beings and respect for the dignity of every person.

Maslow's renowned work on motivation also makes an important conceptualisation of morality and ethics. For Maslow, human behaviour is explained through five levels of needs. These needs are arranged in hierarchical order, from the most primal and immature (in view of the type of behaviour they stimulate) to the most civilised and mature. At the base of the pyramid is the group of needs that Maslow considers to be the most basic and reflexive of physiological and survival interests. This is the level of physiological needs and includes behaviours such as thirst or hunger. The second level of the hierarchy includes a series of security requirements. Once physiological needs are satisfied, the natural tendency of human beings will be preservation. Subsequently, when security is achieved, there is a need for group formation, association with other people, e.g., to be equal to others. These needs are known as social or associative. The next step on the scale of needs is that of esteem. At this point, the needs for prominence, recognition and admiration by the group are manifested by actions that seek distinction. At the last level we find self-actualisation. Here we find the motivation to realise the full potential of the self, e.g., the individual seeks to become what he or she can be by exploring his or her possibilities. This can be considered as the highest motivational achievement for human nature.

When dealing with concepts linked to existential meaning, we cannot forget the work of Viktor Frankl (1946), a Jewish neuropsychiatrist who was imprisoned in Auschwitz during the Second World War. For this author, human beings are mainly motivated by the desire to give meaning to life. For this reason, man tends to participate in the realisation of values in the form of creations, experiences and attitudes.

As we can see, knowledge is not something abstract or objective, but is created through our experiences and our relationship with the world around us. In this chapter we have been able to see that not only cognitive learning is necessary. The analysis of the main contributions from cognitive intelligence to moral intelligence has led us to such an existential aspect as the search for meaning in human beings.

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2.3 Grit, civic engagement and academic success

1. Personality traits

The idea of personality traits is very old. Aristotle (384–322 BC), in his book *Ethics*, written in the fourth century BC, saw dispositions such as “vanity, modesty and cowardice as key determinants of moral and immoral behaviour”.

There are two key assumptions in everyday conceptions of personality traits. Firstly, traits are stable over time. Secondly, it is generally believed that traits directly influence behaviour. Our personality can predict our behaviour in the future. Brody (1994) considered that personality traits are causal. They are genotypically influenced by latent characteristics of people that determine the way individuals respond to the social world they encounter.

Allport (1937) saw traits as organised mental structures that vary from person to person, and that initiate and guide behaviour. The existence of a trait predisposes people to act and react in certain ways that become apparent over time. Situational factors are essential in moderating the impact of characteristics on behaviour. Therefore, it seems reasonable to enquire to what extent individual differences in personality traits are caused by genetic and environmental factors.

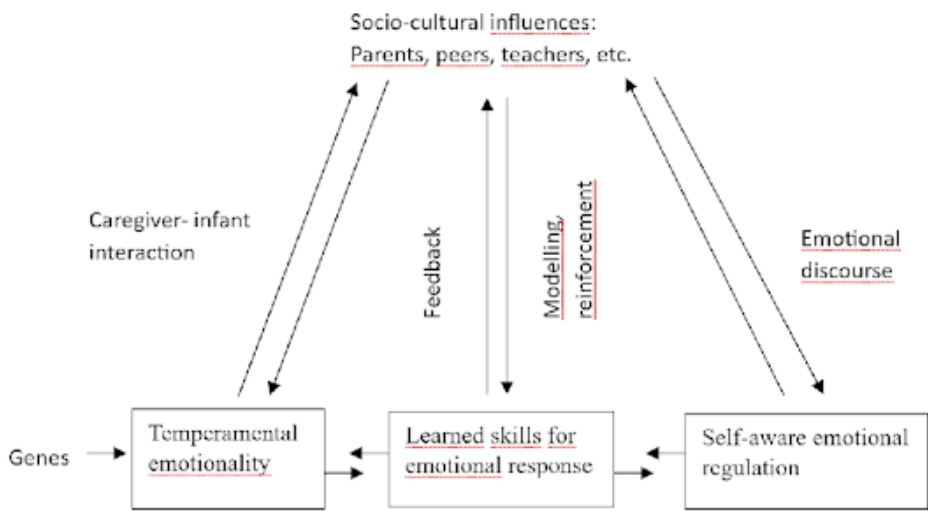
Suppose we focus on the interactions of personality and culture. In that case, further work on cross-cultural studies of traits and cultures also suggests that there are typical personality traits and dispositions of cultures that affect individuals' development within that culture (Hofstede and McCrae, 2004). Hofstede (2001) identified four dimensions that differentiate cultures: power distance (acceptance of social inequality), individualism–collectivism, uncertainty avoidance (discomfort in ambiguous situations), and masculinity–femininity. Such findings raise a ‘chicken-and-egg’ question. Does culture affect personality, or does personality affect culture? Nowadays, there isn’t a clear response.

As mentioned before, a trait must have a degree of stability over time for it to be valid. However, many authors have found differences according to age. McCrae et al. (2000) have reported that between the ages of 18 and 30, mean trait levels of neuroticism, extraversion, and openness have been found to decrease slightly, whereas agreeableness and conscientiousness increase slightly. In addition, the same pattern of change over time was observed after the age of thirty, but to a lesser extent. Their data seemed to suggest that average levels of personality traits change very little after the age of 30.

Another important aspect is considering the possible link between personality and social behaviour. Bandura's modelling studies (Bandura and Walter, 1963) showed how social learning processes can produce dispositions, such as tendencies towards aggression. Moreover, Mischel (1999) considered individuals may display consistent behaviours in specific situations. The studies conducted by Matthews and colleagues have shown correlations between traits such as extraversion and

neuroticism and indices of cognitive appraisal, self-efficacy and self-reflective cognition (Matthews et al., 2000). It is well known that people represent social knowledge in the form of cognitive structures, such as schemas, that guide the individual's processing of the social stimuli provided by other people, and, hence, social interaction. In this way, social cognition is infused by motives, such as seeking consistency between beliefs and perceptions, and seeking explanations for events, as explored in attribution theory. Harré and Gillett (1994) described personality as the outcome of the person's attempt to fashion a coherent psychological life from everyday 'discourses': symbolic interactions within a framework of conventions and relationships. According to this point of view, the personality of the individual appears to vary dynamically according to the cues provided by others. Multiple levels of interaction between the child and their social environment, which become increasingly sophisticated as the child develops, appear to be involved in the development of emotional competence (Figure 1) (Zeidner et al., 2003).

Figure 1. Levels of emotional personality development (Zeidner et al., 2003)



In conclusion, both trait theories and social-psychological accounts of personality seek to explain individual differences in social behaviours such as forming friendships, acting aggressively and conforming to social and cultural standards. Stable knowledge structures, like the 'self-schema', encode beliefs and procedural skills. Both the content of stable knowledge (availability) and the extent to which social cues activate knowledge in the situation (accessibility) determine the extent to which items of social knowledge control behaviour in a given situation. A growing body of evidence suggests that some elements of social knowledge may be accessible across different situations, supporting behavioural consistency that may be related to traits. However, most social psychologists emphasise the contextual nature of social knowledge. Studies have shown that the interaction between the personality with which an individual is born and the social environment they develop shapes the person. From this perspective, it is important that children develop in environments that facilitate social engagement and foster perseverance in achieving their goals.

2.Engagement and purpose

In the previous section, we discussed how personality factors can make us more likely to be more persistent, more sociable or more committed to our society. But these personality traits do not only have a biological origin. The social environment in which a person develops will also have a

certain influence on the personality traits he or she eventually manifests. We should not forget that one of the functions of education is to enable the creation of a meaningful life. Going to university should involve immersion in a world of ideas so extensive and deep that it allows young people to broaden their vision. It should also equip them with the intellectual tools necessary to be able to solve complex problems facing our society at this time (Deresiewicz, 2014). This university environment must aim to make students think deeply about their social responsibilities, the value system they want to live by and the role they want to play in contributing to society. At the end of their university education, students should not only have found a meaningful life, they should have discovered a purposeful life. Thus, the university environment can offer the student a new perspective on the world and various opportunities to develop new skills.

The term "purpose" is considered an aspect of psychological well-being and is akin to having meaning in one's life or having goals and objectives (Damon, 2008). Based on these concepts, Damon et al. (2003) define purpose as "a stable and generalised intention to achieve something that is both meaningful to oneself and relevant to the community". From this perspective, the purpose is a multidimensional construct composed of the meaningful intention to which they aspire, the motivation that drives them beyond themselves, and the actions they take to commit to the stated goal.

University changes students' lives, not only in terms of teaching them a profession but also in terms of identifying purpose. In a study conducted by Malin (2022) he found that students with a social agenda, a clear goal orientation and prosocial motivation had a clearly defined purpose. This is why we must work on the emergence of purpose, as it will push us to develop our full cognitive, emotional and social potential.

3.Purpose, commitment and positive effect as predictors of grit

The importance of intellectual talent for success in all professional fields is well established. However, less is known about other individual differences that predict success. As discussed in section 2 of this chapter, psychologists have focused on understanding and measuring certain cognitive processes, such as intelligence. However, they have not focused on other qualities that may be determining for personal development. It should be stressed that a high level of intelligence is not always synonymous with success. Moreover, we know comparatively little about why most individuals use only a small part of their resources. In contrast, while a few exceptional individuals put all their resources to work to the limit to achieve their goals. In terms of identifying the people who tend to succeed, the most obvious candidates are the ones who are passionate about their long-term goals and persevere in their pursuit even in the face of obstacles. Researchers have defined this combination of passion and perseverance as 'grit'. Grit is considered to be a personality disposition that enables one to achieve goals, which is less dependent on the cognitive level of the learner (Duckworth, 2016). Grit, defined as the passion and perseverance to achieve one's goals, has been shown repeatedly to be an adaptive resource across multiple domains. However, the factors that influence grit are poorly understood. It has been shown that students with higher levels of grit have higher educational outcomes than others. That is, there is a positive relationship between grit and academic success. Positive affect and commitment to an objective seem to be two factors that determine the emergence of grit. Furthermore, having a life goal may help more than the positivity effect when predicting who is likely to become grittier.

Engagement is helpful as it helps them strive to achieve their life goals. On the other hand, positive emotionality should better prepare individuals to develop skills and abilities that promote motivation and subsequent success.

4. Spiritual intelligence

We begin this section with a definition of Spiritual Intelligence. Parks (2000) describes it as "the personal search for meaning, transcendence, wholeness and purpose and the realisation of spirit as the animating essence at the centre of life". (Parks, 2000). Gardner (2011) referred to it as existential or transcendental intelligence. Although he acknowledged its existence, he did not develop a definition or describe its characteristics. According to Zohar and Marshall (2001), this intelligence is the necessary basis for the effective functioning of both Intellectual Intelligence and Emotional Intelligence. These authors believe that our brains are designed so that our three intelligences work together and complement each other.

From this point of view, spirituality is thus a complex and multidimensional part of the human experience. The main effect of the development of spiritual intelligence is that it will produce a transformation in the person. This transformation will be global, as it includes *cognitive, emotional and behavioural* aspects. The *cognitive* aspect includes the search for meaning, purpose and truth in life, as well as the beliefs and values by which an individual lives. The *emotional aspect* involves feelings of hope, love, respect, inner peace, comfort and support. The *behavioural* aspect involves how a person outwardly manifests their beliefs and inner spiritual state.

Spiritual intelligence is considered to be a higher system of understanding reality. Emotional intelligence makes us aware of our own and others' feelings, enables us to recognise the situation we are in and allows us to respond appropriately to pain and pleasure. However, spiritual intelligence gives us the ability to decide whether we want to be in that situation or whether we want to change it.

Positive psychology focuses on human potential by emphasising positive experiences and positive personal traits, which are seen as human virtues and strengths. In positive psychology, spirituality can be seen as a human strength that is related to full and mature development. In order to reach this fullness, it is necessary to develop virtues and strengths that will allow us to reach positive states such as joy, hope, confidence or personal serenity (Carr, 2007). We can improve our spiritual intelligence by increasing our tendency to ask why, to look for connections between things, to be more reflective, to be more self-aware, more honest and even courageous.

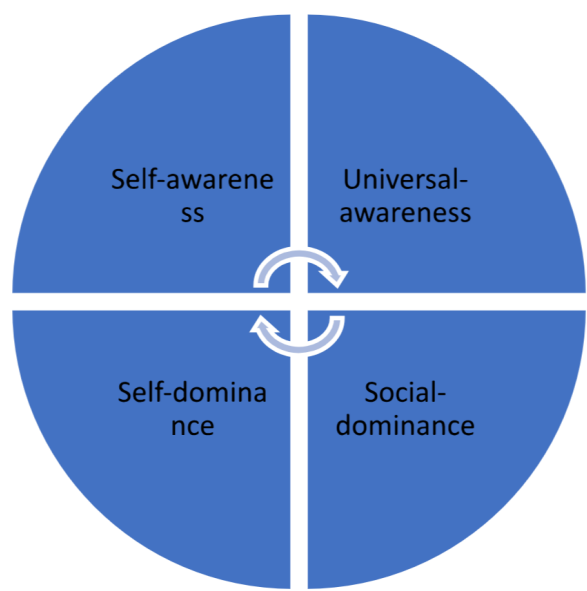
From this perspective, the virtues and strengths that would need to be worked on are:

- *Wisdom and knowledge*: creativity, curiosity, openness, love of learning and perspective.
- *Courage*: bravery, persistence, vitality and authenticity.
- *Humanity*: kindness or goodness, social intelligence and love.
- *Justice*: equity, leadership and teamwork.
- *Temperance or self-restraint*: capacity for forgiveness, self-regulation, prudence and modesty.
- *Transcendence*: appreciation for beauty and excellence, gratitude, hope, humour and

spirituality.

Different models of spiritual intelligence have been proposed in recent years. Wigglesworth (2014) describes a model of spiritual intelligence as the ability to act with wisdom and compassion. This author identifies four competencies that would make up spiritual intelligence (Figure 2).

Figure 2. Spiritual Intelligence Competencies according to Wigglesworth (2014)



On the other hand, the model proposed by Arias and Lemos (2015) is composed of three dimensions: cognitive, emotional and behavioural. Each dimension is composed of six aspects (Figure 3).

Figure 3. Model proposed by Arias and Lemos (2015)

Spiritual Intelligence		
Cognitive Moral reasoning Meditation practice Search for meaning Self-knowledge Self-transcendence Attitude towards pain	Emotional Enthusiasm Sensitivity Empathy Inner peace Happiness	Conductual Impulse control Simplicity Leisure management Health care Resilience Solidarity

5.Values, passion and goal setting

Having a purpose in life is one of the existential needs of human beings. However, it is not always easy to find our purpose in life. This search for meaning becomes more complex in specific evolutionary periods of the human being, such as adolescence and early adulthood. Another aspect that makes it difficult to find meaning in our lives is letting ourselves be guided by what others think and becoming what others want us to be. This is especially evident in first-year university students. When I ask my first-year students why they chose to study, only 5% are intrinsically motivated. For the rest, it is because their parents have decided so since they didn't get the grades to enter another course, because they will have a comfortable and well-paid job, etc. However, studies that have addressed this issue tell us that students who have been guided by their autonomous goals will show greater well-being (Ryan & Deci, 2001).

Self-determination and intrinsic motivation become two fundamental pillars for achieving well-being and happiness. Studies indicate that the alignment of values and passions provides us with greater subjective well-being (Sheldon, 2002), greater vitality (Nix et al., 1999), higher levels of meaning (McGregor & Little, 1998) and a reduction in symptoms of depression (Sheldon & Kasser, 1998). The achievement of self-imposed goals satisfies the basic psychological needs of autonomy, competence and relatedness (Ryan & Deci, 2001). These assumptions are not only effective in our society, but have also been found to be present in many other cultures (Sheldon et al., 2004). This search for subjective well-being where university students feel fulfilled is of particular importance in the current context. It could help us to reduce the number of young people with mental health problems. The search for life purpose is closely related to subjective well-being and reduces the level of stress, depression, anxiety and other psychological problems (Freedland, 2019). Thus, it seems that there are many benefits to be gained by enhancing meaning and purpose in life. But even if people recognise that they need purpose, the search for meaning does not automatically lead to its presence. On certain occasions, we may find that people search for meaning in life without finding it. This is most evident in adolescence. For this reason, several authors consider it necessary to include this search for meaning in university studies (Schippers et al., 2015). Another vital determinant for university students is that their goals are congruent. Studies indicate that well-being increases when students' goals are congruent (Sheldon & Kasser, 1998). Therefore, it is important to ensure that individuals reflect on and align their values with their competencies (Locke & Schippers, 2018). If people have not formulated their own goals, there is a chance that they will lose touch with their core values and passions" (Seto & Schlegel, 2018). Schippers (2017) argues that having a purpose in life is fundamental and has a ripple effect on all areas of life, including health, longevity, self-regulation, engagement, happiness and academic work performance.

Life decisions are difficult to determine and can be considered crucial turning points in a person's existence. This is why decision-making becomes an event dominated by stress and uncertainty. Young adults, in particular, are faced with making important decisions in a very short period of time (Sloan, 2018). These decisions will have a decisive influence on the future of these young people. Therefore, without the necessary strategies and competences to deal with them, many of these decisions will be wrong and will lead to failure for the young person who has made them. Young people should be accompanied at these crucial moments. They need to be helped to determine their goals clearly and be guided in achieving them. It seems to be proven that being clear about the goals we want to achieve makes us more resilient. Evidence shows that having a

sense of purpose provides greater centrality to a person's identity (McKnight & Kashdan, 2009). Studies have shown that when people pursue goals that align with their values and interests, instead of being pushed by others, their happiness increases (Sheldon & Houser-Marko, 2001). The development of life skills, such as the ability to set goals and make plans to achieve them (i.e., goal setting), increases students' resilience, well-being and success in their studies (Schippers et al., 2015; Locke & Schippers, 2018). Therefore, people must start thinking about their purpose in life as early as possible and repeat this process at all stages of life. Questioning our purpose is especially relevant when we feel we need to rethink our goals, such as going to university, starting a new job, etc.

Throughout this chapter, we have analysed factors that directly and indirectly affect the performance of university students. In the first part, we describe the soft skills and their implication in academic performance through the CASEL model. Subsequently, in the following sections, we analyse the influence of other factors such as purpose, commitment, personality traits and the three types of intelligence and how these influence the performance of university students. These variables must be considered for the university to successfully fulfil one of its most important missions, knowledge transfer. This transfer has to be carried out by people committed to their own personal development, to the development of the institution and to the development of society. Only in this way will we be able to successfully address the challenges facing our society.

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Find out more on: www.gritproject.eu

The grit model

In this chapter we would like to introduce the Grit Model. This model identifies the key competences that our students and young researchers need to have in order to face the challenges of today's society.

In our model, social skills, soft skills, ethics, commitment and perseverance play an important role. In this chapter, we will describe the elements of the Grit Model and how the different elements relate to each other (Figure 1).

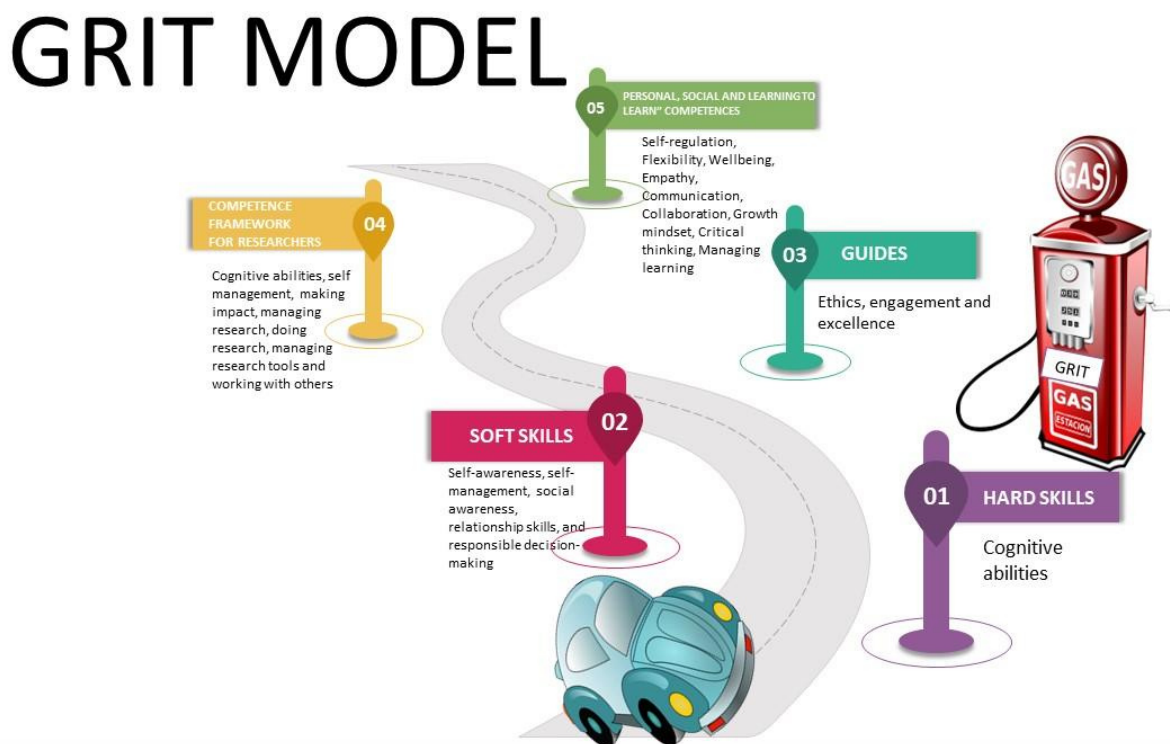


Figure 1. Grit Model

Firstly, we need to make a brief distinction between what are considered hard skills and soft skills, as both concepts are central to our conception of the educational model.

The previous competence of 'learning to learn' has been underpinned by a broader scope that also focuses on personal and social development. Therefore, we will analyse the proposed new competence. We cannot forget the fundamental aspects of the SEL model,

as they will serve as a framework for the development of the competences to be promoted by young researchers.

As we have said in previous chapters, it is commitment, perseverance and passion that will drive and mobilise us on this arduous journey.

Important skills and competences nowadays

Soft skills are those personal attributes and characteristics that enable effective interaction with the environment (Vallejos, 2019). From this perspective, soft skills are a combination of emotional, social, communication and interpersonal skills that allow them to achieve their goals. These soft skills are closely linked to personality and respond to Gardner's (2011) approach to The Theory of Multiple Intelligences, previously mentioned. In contrast, hard skills are competences linked to the technical skills acquired in the performance of certain tasks or functions (De Los Heros, 2017). In order to cope effectively with the demands of our environment, we need to develop both hard skills and soft skills.

Competency-based learning is a pedagogical model in the teaching-learning process that focuses on the competences acquired by the students, on their specific needs and motivations, promoting their autonomy and responsibility, where the students have to go at the same pace in the same subject together with the rest of their class group. This model allows students to recognise their abilities, dispositions, ingenuity or certain aptitudes by going at their own pace. From the European Union's perspective, competency-based learning is essential to meet the challenges of today's society as *"in a rapidly changing and highly interconnected world, each individual will need a wide range of skills and competences and will need to develop them continuously throughout life"*. From this perspective, skills development is key to personal development, employability, social inclusion, civic participation and democracy.

The European Council (2018) defines eight key competences for lifelong learning. These competences are: Literacy, Multilingualism, Mathematical competence and competence in science, technology and engineering, Digital, personal, social and learning to learn citizenship, Entrepreneurship and Cultural awareness and expression. In addition, the old "learning to learn" competence has been reformulated. It is no longer only lifelong learning that is important; personal and social development is also essential. This is why the core competence now focuses on the development of "personal, social and learning to learn". Underlying the reformulation of this competence is a positive attitude towards one's own personal, social and physical well-being. Within this conceptual framework,

collaboration, assertiveness and integrity are crucial aspects. Therefore, the individual must be competent to identify and set his or her own goals, overcome adversity, be motivated, be resilient, seek support when needed, be resilient and confident. All these competences should be developed in the framework of formal and informal education. Social and emotional education proves to be a very useful strategy that will enable us to acquire these competences described above. In addition, social and emotional education will contribute to promoting students' mental health, academic performance and employability over time, increasing pro-social behaviours and reducing disruptive behaviours (Sorrenti et al., 2020; Cefai et al., 2018).

The 2030 Agenda for Sustainable Development, adopted by the UN General Assembly in September 2015, sets out a transformative vision for economic, social and environmental sustainability. The competency approach described above is perfectly aligned with the goals proposed in the 2030 Agenda: *"the knowledge and skills needed to promote sustainable development, including, inter alia, education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and the contribution of culture to sustainable development"* (Calza et al., 2023).

As mentioned above, the core competence is based on three closely related areas: (1) Personal, (2) Social and (3) Learning to learn (Figure 2). Each of these areas is characterised by a series of competences that need to be acquired in order to achieve them. In turn, each of these competences is composed of a set of descriptors that define it (European Commission, 2017; 2018; European Parliament and Council of Europe, 2006).

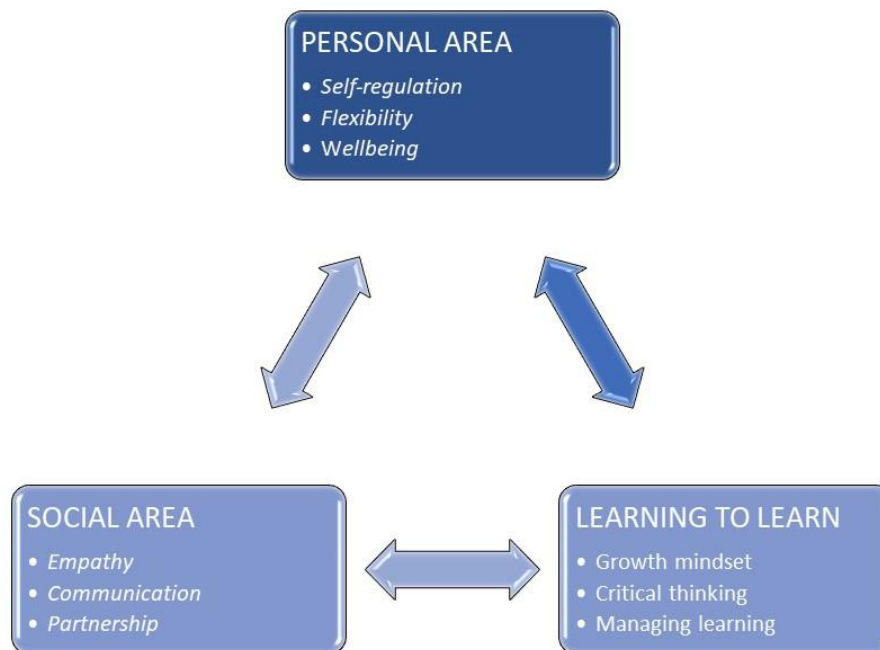


Figure 2. The European Framework for Personal, Social and Learning to Learn Key Competence

Personal area

Within the personal area we must develop the competences of Self-regulation, Flexibility and Well-being.

Self-regulation

From this perspective, Self-regulation is understood as the ability to be aware of our emotions, thoughts and behaviours, in order to be competent to regulate them. For this, it is necessary that the person can:

- Being aware of and able to express personal emotions, thoughts, values and behaviours.
- Understand and regulate personal emotions, thoughts and behaviours, including responses to stress.
- Have optimism, hope, resilience, self-efficacy and a sense of purpose to support learning and action.

Flexibility

In a rapidly changing society, flexibility is a competence that must be acquired in a substantial way. This flexibility will enable us to develop optimism, hope, resilience, self-efficacy and a sense of purpose that will result in greater support for learning and action. Being flexible will equip us with the ability to proactively seek out opportunities. But to achieve this goal we must:

- Be positively disposed to review opinions and courses of action in the face of new evidence.
- Understand and adopt new ideas, approaches, tools and actions in response to changing contexts.
- Managing transitions in personal life, social participation, work and learning pathways, while making conscious decisions and setting goals.

Wellbeing

In order to develop our full potential, we must have a wellbeing that acts as a driving force in the search for life satisfaction and the care of our physical, mental and social health, and allows us to adopt a sustainable lifestyle. As mentioned in previous chapters, personal satisfaction, the search for the meaning of our existence and happiness are central aspects that must be properly developed. The concept of well-being should be understood as the dynamic integration of physical, cognitive, emotional, social, existential and environmental aspects. To optimise our well-being, we must:

- Be aware that individual behaviour, personal characteristics and social and environmental factors influence our health and well-being.
- Understand potential risks to well-being and use reliable information and services for health and social protection.
- Adopting a sustainable lifestyle that respects the environment and the physical and mental well-being of ourselves and others, while seeking and offering social support.

Social area

In order to be socially competent, we must develop an attitude of collaboration, respect for human diversity, overcoming prejudices and commitment to participate in society.

From this perspective, it is essential to learn to live together by developing the ability and willingness to interact, communicate and collaborate with others in a constructive way. Within the social area, we must develop the skills of empathy, communication and collaboration.

Empathy

Empathy is fundamental for the acquisition of other social and emotional competences that allow us to establish relationships with others in a positive way. Empathy is the basis for the acquisition of pro-social behaviour. This competence is composed of:

- Awareness of another person's emotions, experiences and values
- An understanding of another person's emotions and experiences, and the ability to proactively adopt their perspective.
- Receptiveness to the emotions and experiences of another person, being aware that belonging to a group influences one's own attitude.

Communication

Use of relevant communication strategies, domain-specific codes and tools, according to context and content. To achieve effective communication, we must:

- Be aware of the need for a variety of communication strategies, linguistic registers and tools adapted to the context and content.
- Understand and manage interactions and conversations in different sociocultural contexts and domain-specific situations.
- Listen to others and participate in conversations with confidence, assertiveness, clarity and reciprocity, both in personal and social contexts.

Partnership

Collaboration can be defined as participating in group activities and teamwork while recognising and respecting others. A collaborative person is characterised by developing the ability to co-participate in collective activities and undertakings, and to encourage others to collaborate, pooling their knowledge, skills and resources, in order to achieve a common goal. To do this we must:

- Intend to contribute to the common good and be aware that others may have different cultural affiliations, backgrounds, beliefs, values, opinions or personal

circumstances.

- Understand the importance of trust, respect for human dignity and equality, conflict resolution and negotiation of disagreements in establishing and maintaining fair and respectful relationships.
- Equitable sharing of tasks, resources and responsibilities within a group, taking into account its specific purpose. The expression of different points of view and the adoption of a systemic approach are characteristic aspects of collaboration.

Learning to learn

Digitalisation is changing the way people live, interact, study and work. The incorporation of digital technologies aims to facilitate and enhance learning. Learning to learn is a competence that can be acquired throughout life. It is an important driver of change in adulthood, fostering employability and competitiveness. The complexity and interconnectedness of the challenges we face and the unpredictability of the opportunities and threats arising from them can be addressed from the perspective of lifelong learning. This capacity to learn to learn has as its ultimate goal to pursue and persist in learning. From this perspective, aspects such as the organisation of one's own learning, effective time and information management and individual and group work become particularly relevant. In the development of the Learning to Learn competence, it is necessary to enhance the potential for change of individuals and communities, contributing to the common good of society and enabling them to flourish. To do this, we need to develop a growth mindset, critical thinking and learning management.

In terms of growth mindset, we must foster a belief in the potential of oneself and others to continuously learn and progress. The development of this competence is possible if we encourage:

- Awareness and confidence in one's own and others' abilities to learn, improve and achieve with hard work and dedication.
- The understanding that learning is a lifelong process that requires openness, curiosity and determination.
- Reflection on feedback from others and on positive and negative experiences to further develop one's own potential.

When we emphasise the need for the development of critical thinking, we refer to the ability we must develop to carry out an evaluation of information and arguments in support of reasoned conclusions and to develop innovative solutions. As prerequisites for achieving this development we must:

- Be aware of and confident in one's own and others' abilities to learn, improve and achieve with hard work and dedication.
- Understand that learning is a lifelong process that requires openness, curiosity and determination.
- Reflect on feedback from others and on positive and negative experiences to further develop one's own potential.

We cannot forget the importance of promoting effective learning management that allows us to plan, organise and monitor our own learning.

Soft skills for students and young researchers

Recent political and social challenges in Europe have drawn much attention to the role education can play in promoting democratic values among the younger generation. Civic and citizenship education have become part of the curricula in an increasing number of countries.

This implies a growing need not only to improve students' cognitive knowledge in the civic and citizenship domain, but also to promote non-cognitive outcomes such as active citizenship, positive attitudes towards democracy and democratic values. This approach has been clearly highlighted in the need for the development of the competence 'Personal, social and learning to learn'.

As we have already pointed out, it is no longer only necessary to develop a series of cognitive skills (attention, memory, problem solving). Now, more than ever, students and young researchers must develop non-cognitive competences (soft skills) that prepare them to face current challenges. Following the SEL model, the main competences to be developed in formal education are: self-awareness, self-management, social awareness, relational skills, and decision-making (Figure 3). These competences were described in chapter 2.



Figure 3. SEL Model

However, young researchers also need to develop a set of competences that will enable them to carry out their work effectively. These competences have been compiled and described extensively in the "Competence Framework for Researchers" (European Union, 2022). The most specific competences to be developed in research are: cognitive abilities, self-management, making impact, managing research, doing research, managing research tools and working with others.

FRAMEWORK FOR RESEARCHERS



Figure 4. Competences Framework for Researchers

But a researcher will not be able to develop these competences if they have not first acquired the hard skills and soft skills described above. As we can deduce from the above, a research career does not only require the acquisition of cognitive skills. Researchers need to acquire other non-cognitive competences to guide their work in order to successfully meet the challenge posed by the demands of today's society. In research work are important ethics, commitment and excellence. These three aspects must accompany the researcher every step of the way. Ethics refers to the fact that the work is done with social responsibility in mind and how the decisions we make affect ourselves and others. Engagement can refer to how committed individuals feel towards their "work, team, and organization." How happy and satisfied someone is at work and in many cases, it has a strong link with a sense of meaning and purpose in work. The commitment a person makes to their work or to their community is intimately related to the ultimate goal of their work, their values and the responsibility they place on what they do. Excellence refers to work that is good and of high quality. These three components of good work are mediated by the values of each of us. Values are ideas or principles that we hold dear. They can guide the choices we make, such as how we spend our time at work and in our personal lives, and are influenced by a variety of factors, such as our families

and communities. Values influence how we react in situations where we don't know what to do.

As we can see, facing the challenges of this society and working as a researcher is not easy and discouragement can often set in. That is why encouraging persistence and passion are fundamental aspects that will give us the energy and motivation we need to continue with this arduous task. From this point of view, the following figure summarises the main aspects needed to better prepare students and researchers to become protagonists of contemporary society.

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The grit game

Gamification

The Center for Educational Research and Innovation (CERI) of the OECD - Organization for Economic Co-operation and Development (2019) has recently drawn attention to a central theme of pedagogical research, which is related to gamification and play. Play undoubtedly represents one of the most explored themes in the pedagogical literature; despite this, as a multiform and multifaceted phenomenon, the play-learning relationship continues to be an object of study and analysis, to explore educators' perspectives and beliefs. Many international works aim to explore educators' perspectives and beliefs regarding this complex combination.

The play has been carefully observed and studied by developmental psychology and pedagogy for a long time with a focus on educational and growth contexts with particular attention to early childhood and the role of play in children's development and learning.

Nowadays, playful experiences and, more generally, playful learning have been placed in a lifelong and life-wide perspective. This is in line with the above-mentioned document by CERI, which points out that “the connection between playful experiences and learning suggests playfulness can be an important complement for education throughout people’s lifetime” (2019, p. 2). Empirical studies and research on the subject have spread incrementally, particularly in the last decade, underlining the value of playful approaches in higher education and, more generally, with adults. The introduction of *gamification* elements in teaching and learning, including within the university setting, is now common (Deterding et al., 2011). Thus, a playful approach is encouraged in the training and professional development paths of many professionals.

In this context, gamification is defined as “the use of game design elements in non-game contexts” (Deterding et al., 2011). It refers to the addition of game-play mechanics in non-game environments with the aim increase of fostering change of behaviour and/or increasing motivation (Kapp 2012; Marczewski 2015; Deterding et al., 2011). According to this definition, the gamified process is based on rules, has a quantifiable outcome, has varying values attached, triggers the players’ effort, creates attachment to the outcome, and entails negotiable (real-life) consequences (Juul, 2003).

Equally widespread is the reference to *serious games*, a term introduced by Sawyer and Rejeski (2002) with reference to games designed and developed according to educational objectives that incorporate a pedagogical and educational dynamic into the gaming experience and which are configured above all as digital games.

The features described highlight that gamification, as a pedagogical approach, encourages the use of active methodologies in learning environments. Active methodologies are aimed to promote students' active participation and involvement. They work to enhance students' learning experience and performance (Bai, Hew, & Huang, 2020; Cechetti et al., 2019) and can play a pivotal role in turning students into active agents of their own education and learning tasks (Vanduhe, Nat, & Hasan, 2020): research shows that they increased motivation, engagement, soft skills and academic performance (Murillo-Zamorano, Sánchez, Godoy-Caballero, & Muñoz, 2021; Zainuddin, Chu, Shujahat, & Perera, 2020). Student-centred learning environment strongly relates to promoting meaningful and in-depth learning experiences as students become active agents of their own learning tasks (Vanduhe, Nat, & Hasan, 2020).

Escape room

Among the realm of gamification techniques, escape rooms represent a popular educational tool, initially originated in a commercial environment. In escape rooms, participants are locked in a specific physical or virtual space and by individually or collaboratively self-managing their knowledge and finding clues to solve puzzles, riddles, enigmas, or meet general challenges, they aim to accomplish specific goals within a set amount of time (Nicholson, 2018; Pitoyo, Sumardi, & Asib, 2020).

Because of their highly reflective and cognitively demanding nature, they have frequently used appeal in higher education. In particular, they have been used in two ways: as serious learning games and as gamified assessment tools. When using Escape Rooms as serious games, social or soft skills can be conveyed such as communication, collaboration, situational awareness, task division and specialisation, and leadership (Warmelink et al. 2017). Especially in disciplines like engineering science, this new method is suggested to have the potential of both conveying learning contents, such as soft skills that are less common to the traditional curriculum and assessing the students' knowledge on specific topics.

Within the GRIT project, gamification is being adopted to promote learning according to the skills framework described in the previous Chapter. A new escape room has been created with the aim of working in parallel on a set of Research Skills and on a set of more transversal skills. Via dedicated challenges, the game will, in parallel, promote learning and specifically assess grit through innovative methodologies based on artificial intelligence (as presented in the next Chapter).

Designing engaging learning challenges

The challenges within the escape room were created following the methodological proposal formulated by career guidance expert Tristram Hooley, who created a practical methodological approach that combines gamification methodologies, active engagement approaches and educational planning within the career education realm. This methodological proposal is valid both for face-to-face and online activities, referred to by the author as e-tivities. Within the GRIT project, the approach was combined with the escape room dynamics and the escape room storyline, which will be described below.

The design of the escape room began with the definition of the storyline and the main task to be solved:

Narrative: Alexander Gray - on the verge of a cure

The game will be based on the interactive dynamics of a classic digital Escape Room where, within a narrative of events that have happened within the story, the researcher will have to investigate and possibly solve a mystery.

The main focus concerns a research laboratory on curing a potentially epidemic disease. The professor leading the team of researchers was found dead. Many open science tools were used in the lab, and the studies focused on the One Health paradigm. Detective Danny Stone, with the help of a researcher, Monica Laurence, will eventually solve all the puzzles and figure out how to get the lost cure back. The app will also make use of a Telegram Bot, which will discover useful open science tools in order to unlock information inside the game.

Psychology

To make the situation more engaging, the game is narrated in the first person by Stone, the detective, who is called to investigate the mysterious death. This is the incipit with the story begins:

The small monitor in the room shows a temperature of 21.5 degrees. Outside in the corridor, the morning news on the corridor television reminds me that it is the hottest October in history, at least since we started taking measurements, that is, since the second half of the nineteenth century. Inside this room, under the neon lights, the skin releases heat and channels the cold.

This morning, at 6:43 a.m., the phone rang while I was struggling with the blankets—too many for this odd weather situation. Gordon from the station was alerting me that Dr. Alexander Gray had been found dead at the Global Institute of Health while he and his research team were busy developing a vital cure to counter a potentially catastrophic outbreak of Disruption.

Therefore, the first scene is set in a laboratory room, where Dr. Alexander Gray's sudden death suddenly halts the research to combat the Disruption epidemic that the group was carrying out under the leadership of the internationally renowned academic through his lime team and many Open Science tools.

So it happens that researchers playing the Escape will have to uncover clues, move through the lab, the closest and most trusted collaborators and try to solve puzzles, collect evidence to find Gray's murder and unearth the potential lost cure, all the while searching for answers to try and save lives.

The detail of the storyline was further developed as presented in the figure below:

Once the storyline's architecture; the focus was on identifying the objectives of each challenge included in the storyline and on a detailed definition of the learning outcomes.

In the GRIT project, the work done in the previous Chapter was considered the shared starting point and the reference in defining the learning objectives.

The gamified activities were then created to promote the development of the chosen learning objectives. Activities must be designed engaging users and, consequently, promoting exploratory, reflective actions and exercise critical skills capable of activating the individual. For the successful completion of an online activity, it is also crucial that its structure is clear not only in terms of resources, engagement, and interaction but also with respect to which tools and digital functionalities.

The GRIT escape room

The initial screen features the laboratory room where Dr. Gray's mysterious death occurred. The researcher will be able to walk around a series of locations that will be represented by as many screens and facts as possible where he can collect clues, discover facts, and meet characters. This first set of information will give access to discover other rooms and other places to investigate or hear about other characters.

Through buttons to be unlocked and frequent use of the Telegram bot where the researcher shares research with his staff, researchers will be able to test various features concerning their personal skills.

Here are some of the central elements of the game mechanics:

- **Engaging Narrative:** The game presents a story that unfolds through a series of quests and challenges. Players must explore mysterious locations, interact with fascinating characters and collect clues to solve the grand puzzle behind each adventure.
- **Interactive Exploration:** Players can explore different locations, such as ancient castles, dark cities, enchanted forests and more. Each location contains details and secrets to discover, and players must carefully examine the environments to find crucial clues.
- **Puzzle Solving:** The game features a variety of riddles and puzzles to solve. Players must use their wits and logic to decipher codes, solve puzzles, open locks and unlock new areas. Each puzzle solved brings players one step closer to the hidden truth.
- **Dialogues and Choices:** During the game, players interact with a series of non-player characters (NPCs) through dialogues and conversations. Players' choices influence the course of the story and can lead to different outcomes and revelations.
- **Collecting Clues:** Players must collect clues scattered around the game world, such as secret documents, hidden objects and cryptic messages. These clues help players connect the dots and solve the mysteries surrounding the game's plot.
- **Open Science Tools:** During the game, the researcher can learn about several Open Science tools that are useful in his or her journey, particularly through the Telegram bot.
- **Engaging AI-driven graphics:** The game offers attractive and detailed graphics, which create a mysterious and evocative atmosphere. Players will feel immersed in the game

world thanks to the quality of the images and animations.

Learning through play is one of the themes of Escape, but through this experience, one can also improve in a number of non-cognitive skills:

- Attention to detail: the aptitude to be accurate, diligent and attentive to what one is doing, paying attention to details and details
- Learning by playing: understanding that playing is also a way of losing stimulation towards new knowledge and that dissemination of research can also pass through formats such as this.
- Achieving goals: to move forward in the game, there are various intermediate steps that allow you to have positive reinforcement and to hold on to the end of the mystery.
- Information management: the ability to effectively acquire, organise, and reformulate data and knowledge from different sources towards a defined goal.
- Self-confidence: the awareness of one's own value, abilities and ideas beyond the opinions of others.
- Time management: Escape also has a time management system that tracks and encourages the player not to waste time solving the mystery.

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The potential of artificial intelligence to promote grit

Natural Language Processing

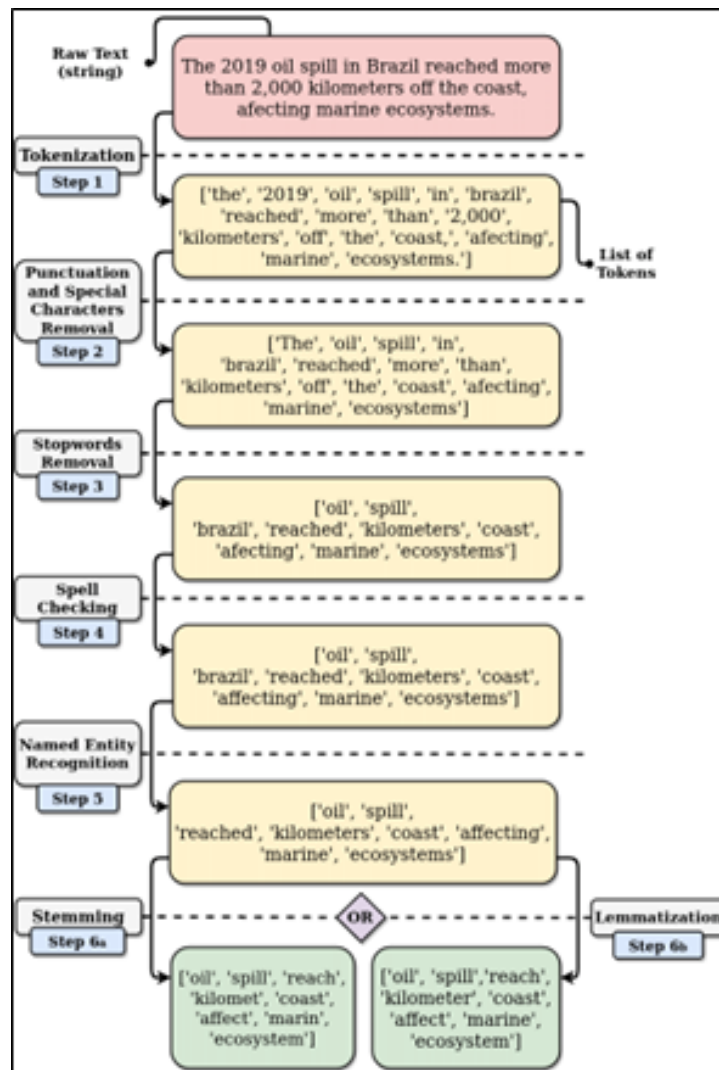
Natural Language Processing (NLP) is a discipline that aims to develop automatic methods for understanding text in human language. This is an expanding area of study and today plays a role of absolute centrality, due to the ever-increasing computerization of activities in today's society. With the advent of the Internet, in fact, it is enormously increasing the availability of information, messages and textual content that is necessary to analyze. Natural Language Processing allows this process to be automated, as well as with many other activities related to text in natural language: the classification of documents, the translation from one language to another, the extraction of information and so on. It is therefore clear that NLP constitutes an extremely useful resource, with wide applications.

Natural Language Processing is one of the most difficult tasks for a computer, due to the ambiguities inherent to human language: many words have different meanings based on the context and often the sentences must be interpreted metaphorically rather than literal. Furthermore, very often the text to be analyzed come from the web, where grammatical errors, improper use of punctuation and the presence of special characters or emoticons or emojis are quite frequent: this only increases the difficulty of the analysis of natural language.

NLP has two main tasks:

- **Natural Language Understanding** (NLU), which focuses, as suggested by the name, on semantic analysis and on understanding the meaning of a text in natural language.
- **Natural Language Generation** (NLG), which instead deals with the generation of natural language by the machine.

Text pre-processing is an important first step that needs to be performed. It consists of various tasks such as: *tokenization* and *splitting* (that is subdividing the text in groups of words called chunks), elimination of punctuations and special characters, elimination of *stop-words*, *named entity recognition* (NER), and finally *stemming* or *lemmatization*. This process is summarized in the figure below.



Source: de Oliveira, N.R., Pisa, P.S., Lopez, M.A., de Medeiros, D.S.V. and Mattos, D.M., 2021. Identifying fake news on social networks based on Natural Language Processing: trends and challenges. Information, 12(1), p.38.

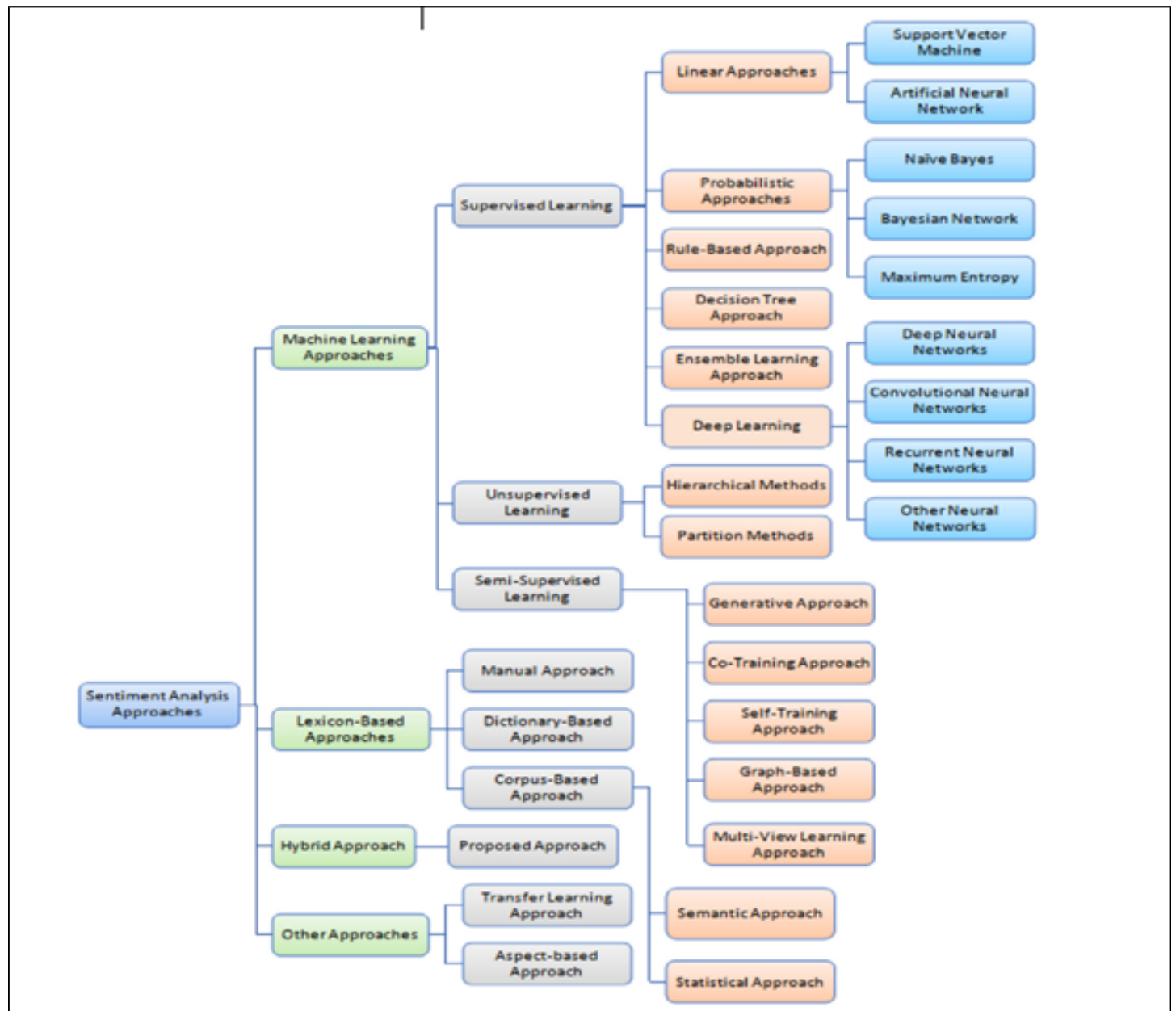
There are many methods and techniques currently used for the fundamental task of text segmentation: among these, an example of great relevance is the Hidden Markov Models. They represent extensions of Markov stochastic processes, in which the sequence of events is not directly knowable. Hidden Markov models were first described in the second half of the 1960s, in statistical studies carried out by the American mathematician Leonard E. Baum.

Sentiment Analysis (SA, also known as opinion mining), is a field in NLP which focuses on identifying and interpreting emotions and opinions expressed in digital texts. The main goal is to analyze whether a certain text expresses a positive, negative, or neutral feeling.

If the labels associated with a text are only positive or negative, we are in the context of binary classification. Otherwise, if labels can assume a greater number of values to better describe the rating scale, we have a multi-class classification problem.

Sentiment Analysis can be seen as an application of text classification, which deals with assigning one or more categories to a given document. The primary task is the categorization of a text. Sentiment Analysis focuses exclusively on reading sentiment and

tone emotional expression. Figure below shows different approaches for Sentiment Analysis.



Source: Birjali, M., Kasri, M. and Beni-Hssane, A., 2021. A comprehensive survey on Sentiment Analysis: Approaches, challenges and trends. Knowledge-Based Systems, 226, p.107134.

Current trends in NLP

In recent years, the field of Natural Language Processing (NLP) has been transformed by the advent of Deep Learning, which has significantly enhanced the capabilities of Sentiment Analysis. Neural networks, particularly Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs), have become key tools in understanding and interpreting human language. RNNs are adept at handling sequences, making them ideal for analyzing the flow and progression of sentiments in texts. CNNs, on the other hand, are effective in extracting features from textual data, aiding in the identification of key sentiment indicators.

These advanced techniques have found applications in various domains, such as monitoring social media sentiment, analyzing customer feedback, and conducting market research. They have enabled businesses and organizations to gain deeper insights into public opinion, customer satisfaction, and market trends.

Moreover, recently neural networks based on models like BERT (Bidirectional Encoder Representations from Transformers) and GPT (Generative Pre-trained Transformer) have enabled bigger jumps in NLU and NLG advancements. These models have significantly advanced the state-of-the-art by offering deeper contextual understanding and generating more coherent, context-aware text outputs. They have revolutionized how machines understand the nuances and complexities of human language by analyzing the context in which words appear. This has profound implications for tasks like Sentiment Analysis, where understanding context is crucial for accurately interpreting the tone and emotion behind text.

Furthermore, the use of GPT models has greatly enhanced the accuracy of Sentiment Analysis. GPT models include the attention mechanisms, which allow models to focus on specific parts of the text that are more relevant for determining sentiment, like how human attention works. For instance, in a product review, the model can learn to pay more attention to adjectives and adverbs, which often carry more sentiment weight. In practice, these advancements have enabled more nuanced and sophisticated Sentiment Analysis applications. For example, in customer service, AI systems can now better understand and respond to customer queries by detecting not just the content but also the sentiment behind the queries. In the media and entertainment industry, Sentiment Analysis is used to gauge audience reactions to movies, TV shows, and advertisements, providing valuable feedback to creators and marketers.

An emerging trend in NLP is the focus on model **interpretability** and **explainability**. As NLP models grow more complex, understanding how they make decisions becomes crucial, especially in sensitive applications like Sentiment Analysis. Efforts are being made to make these models more transparent and understandable, which is crucial for trust and reliability in real-world applications.

Explainability in Sentiment Analysis is pivotal, as it enhances the transparency and trustworthiness of AI models. This concept revolves around elucidating how and why a model arrives at a specific sentiment conclusion from a given text. As Sentiment Analysis models, particularly those based on deep neural networks, become more intricate and less transparent, ensuring their decisions are interpretable becomes essential. The need for explainability is particularly acute in domains where Sentiment Analysis has significant implications, such as in analyzing customer feedback for product improvement, monitoring social media for public sentiment, or even in clinical settings where patient sentiment can inform treatment approaches.

Techniques for enhancing explainability include feature visualization and model-agnostic methods. Feature visualization focuses on identifying key words or phrases within a text that heavily influence the model's sentiment prediction. By highlighting these features, users can visually trace the reasoning behind the model's classification. Model-agnostic methods like LIME and SHAP offer a broader approach, providing insights into how each

feature in the dataset influences the model's prediction, regardless of the model's complexity. These techniques help in demystifying the decision-making process of even the most complex models, making their outputs more comprehensible. Figure below shows some examples of Sentiment Analysis, where major focus words are highlighted with LIME explainability approach.

The plot grinds on with yawn - provoking dullness .

It's not horrible , just horribly mediocre !

The cast is uniformly excellent ... but the film
itself is merely mildly charming !

In real-world applications, explainability can be invaluable. For instance, in customer service, understanding why certain products receive negative feedback can guide improvements. In social media monitoring, explainable Sentiment Analysis can unravel the key drivers behind public opinions or reactions, offering businesses and policymakers insights into the populace's mood and preferences.



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