# EDUCATIONAL FRAMEWORK

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| Summary | This deliverable presents the complete Educational Framework for Project SONET under Work Package 2. It compiles comprehensive country-specific research from the five partner nations including Poland, Spain, France, Germany, and Romania, alongside a comparative analysis that addresses macro-trends and the senior 'Autonomy Gap'. The framework delivers a definitive Skills Map across seven strategic domains and introduces shared geragogical implementation guidelines specifically tailored for senior learners aged 65 and over. Finally, it maps out the joint curriculum architecture across four core modules: General Safety, Cybersecurity, Media Literacy, and Ambient Assisted Living (AAL) Technologies, systematically aligned with the European Digital Competence Framework for Citizens (DigComp) to ensure cross-border validity and long-term impact. |

# Index of Contents

Index of Contents 2
1 4
2 6
3 7
3.1 7
3.1.1 7
3.1.2 8
3.1.3 9
3.1.4 9
3.2 10
3.2.1 10
3.2.2 11
3.2.3 12
The main typology of threats targeting Spanish seniors incorporates: 12
3.2.4 13
3.3 14
3.3.1 14
3.3.2 15
3.3.3 15
3.3.4 16
3.3.5 18
3.4 18
3.4.1 18
3.4.2 19
3.4.3 19
3.4.4 20
3.4.5 21
3.5 22
3.5.1 22
3.5.2 23
3.5.3 24

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3.5.4 25
3.5.5 26
4 28
4.1 28
4.2 28
5 32
5.1 32
6 36
6.1 36
6.2 39
6.3 43
6.4 44
6.5 45
6.6 45
6.7 45
6.8 46
6.9 46
7 47
7.1 47
7.2 47
8 50
9 51

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# 1 EXECUTIVE SUMMARY

European societies are currently undergoing two major, parallel transformations: the rapid digitalisation of public and private services and accelerated demographic ageing. These simultaneous developments create unprecedented challenges for older adults, particularly those aged 65 and over, who increasingly require functional digital skills to access essential healthcare, banking, administrative services, and social communication channels. The SONET project addresses these societal shifts by contributing directly to the well-ageing, digital safety, and social inclusion of seniors through the development of tailored educational resources designed to improve their digital competence, cybersecurity awareness, and ability to navigate digital environments safely. Digital technologies play an increasingly mandatory role in everyday life, specifically regarding communication with family and friends, access to healthcare services, medical scheduling, management of secure financial transactions, online banking, and interaction with public administrations. However, a significant portion of older adults face severe difficulties navigating these digital environments due to limited digital skills, an acute lack of self-confidence, or insufficient institutional support structures. While household internet access and mobile device ownership among older adults have increased significantly across Europe, actual digital competence levels remain highly uneven and insufficient for practical, high-stakes tasks such as online banking, e-government platforms, and digital identity management.

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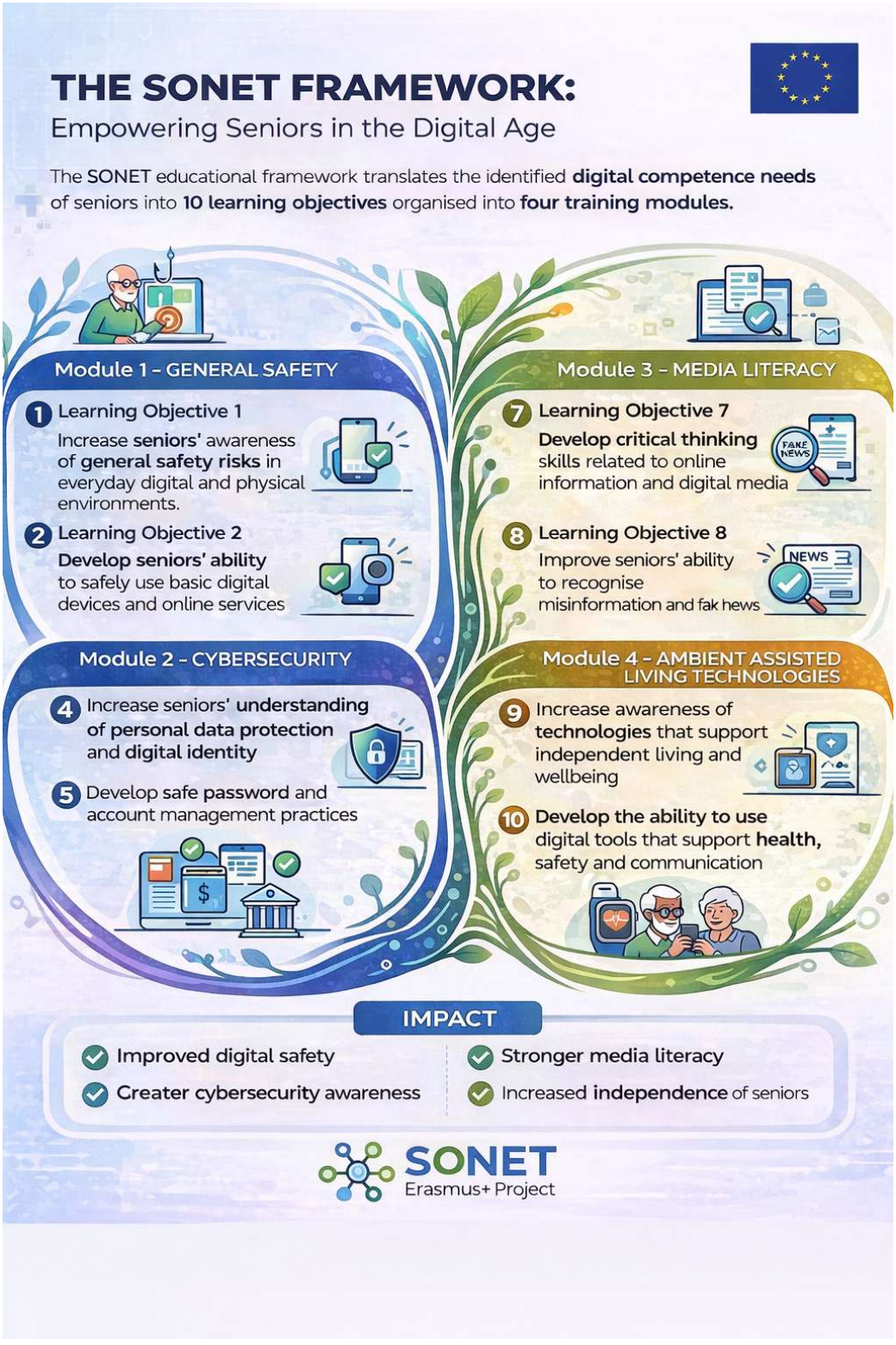


***Figure 1:*** *SONET FRAMEWORK*

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# 2 INTRODUCTION AND MACRO-TRENDS

Across the five European partner countries participating in Project SONET including Poland, Spain, France, Germany, and Romania, the adult education and digital inclusion sectors are currently being reshaped by converging macro-trends. These include rapid demographic ageing, the increasing dematerialisation of public administrations, and the escalating complexity of hybrid digital and physical safety risks. In all five nations, the population segment aged 65 and over has either already exceeded or is rapidly approaching the critical 20% threshold.

While national digital transformation policies universally aim to foster social and civic inclusion, older adults are forced to navigate a complex landscape characterized by sophisticated cybersecurity threats, pervasive financial fraud, and profound social isolation.

National delivery conditions, institutional frameworks, and cultural ecosystems differ structurally across the consortium:

- France prioritises a state-led, human-mediated approach through its nationwide network of digital advisors, alongside structured institutional responses to "abuse of weakness".

- Germany navigates the digital transition with a profound cultural focus on data privacy (Datenschutz) and relies considerably on its deeply rooted social club network (Vereine).

- Spain operates in a context of high mobile device penetration but uneven functional capabilities, countering high volumes of cybercrime with robust institutional frameworks like Plan Mayor Seguridad.

- Poland leverages resilient intergenerational family structures to bridge digital skill gaps, actively deploying grassroots and institutional campaigns to combat widespread social engineering scams.

- Romania faces significant structural challenges, contending with historically low adult lifelong learning participation and a sharp urban-rural divide, relying heavily on NGO-led interventions to mitigate intersecting digital fraud and safety risks.

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# 3 NATIONAL RESEARCH CONTEXTS

## 3.1 Comprehensive National Context: Poland

Poland is undergoing an accelerated process of demographic ageing. According to data from Statistics Poland (GUS), in 2023, individuals aged 65 and over constituted 20.3% of the total national population, representing approximately 7.7 million citizens. Demographic projections indicate a stark trajectory, with this share expected to increase to 23% by 2030 and approach 30% by the year 2050. Notably, the oldest-old segment (aged 80 and over) already represents over 5% of the population and stands as the fastest-growing demographic group in the country. Seniors aged 60 and over currently constitute over 26% of the population.

The adult education sector in Poland operates through a binary system of formal continuing education institutions and non-formal initiatives. The most prominent among the non-formal structures are the Universities of the Third Age (UTW), with over 600 active associations operating nationwide. Despite this institutional presence, systematic participation in lifelong learning among Polish seniors remains marginal. According to Eurostat data, less than 1% of individuals aged 65–74 participated in any formal or non-formal education or training during the four weeks preceding the survey, in contrast to a 7.6% participation rate among the broader adult population aged 25–64.

Digital inclusion represents a major structural bottleneck. Although household internet access reached a near universal level of 96% in 2025, actual functional digital competences among older adults remain severely restricted. Eurostat digital skills indicators show that only 22% of Polish individuals aged 65–74 possess at least basic digital skills. While 68% of people within this age bracket reported using the internet within the last three months, their usage patterns reveal that engagement with advanced services, such as online banking and e-government platforms, remains significantly below national averages.

### 3.1.1 Demographic and Socio-Educational Background

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### 3.1.2 Senior Safety, Typology of Threats, and Crime Statistics

Older adults in Poland face an increasingly complex risk environment where physical, social, and digital threats intersect due to rapid technological shifts. According to institutional data, crimes against property represent most offences targeting seniors, accounting for approximately 69% to 72% of all reported incidents, followed by family-related crimes and domestic violence (~10%), and threats to personal safety.

The typology of prominent safety threats includes:

- Social Engineering and Impersonation Scams:
  Highly prevalent phone- and digital-based threats that rely heavily on psychological pressure, urgency, fear, and the exploitation of trust. The most widespread include the "Grandparent Scam" (oszustwo na wnuczka) and the "Police Officer Scam" (oszustwo na policjanta), where perpetrators impersonate relatives or public officials to extract life savings.

- Hybrid Cyber Threats:
  Fraudsters combine traditional deception with digital tools, manifesting as sophisticated phishing, smishing, and vishing attacks designed to execute identity theft, credential theft, and data misuse.

- Commercial and Retail Exploitation:
  Fraudulent online shops, suspicious financial offers, and deceptive practices during aggressive in-person sales presentations where seniors are manipulated into purchasing overpriced products or signing unfavorable legal agreements.

- Underreporting and Social Barriers:
  A critical systemic challenge is that 17% of older victims do not seek help or report crimes after victimization. This phenomenon is driven by profound psychological barriers, including a deep sense of shame,

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embarrassment, fear of losing autonomy, or the anxiety of being deemed incapable by family members. The report "Informacja o sytuacji osób starszych w Polsce" notes that this underreporting severely skews official data and deepens social exclusion.

### 3.1.3 Lighthouse Approaches and Good Practices

Poland features successful community-based models that offer strong potential for European transferability:

- Digital Development Clubs (Kluby Rozwoju Cyfrowego):
  A strategically coordinated network of locally embedded, publicly funded digital competence centres. Supported by national frameworks and EU structural funds, this multi-level governance model combines national strategic commitment with local implementation via municipalities and NGOs, adapting training directly to small-town and rural contexts.

- Leveraging Trusted Local Social Infrastructure:
  Effectively integrating digital literacy training into the existing activities of public libraries, cultural centres, and the massive network of Universities of the Third Age (UTW). Because seniors already frequent these venues for cultural and social purposes, psychological thresholds to enrollment are significantly lowered.

- Structured Prevention and Educational Campaigns:
  The "e-Senior" Programme, coordinated by the Centre for Digital Poland Project (CPPC), focuses on delivering low-entry practical digital skills close to seniors' residences.

- The national awareness campaign "#Halo! Tu cyberbezpieczny Senior!" delivers targeted cybersecurity education.

- The Ministry of Justice's structured campaign "Nie daj się oszukać – seniorze, broń się wiedzą" along with the "Bezpieczny Senior – Świadomy Senior" educational program focus heavily on legal awareness and fraud defense. A notable pilot program under this framework trained nearly 1,000 seniors across 13 highly structured sessions, yielding a documented post-training satisfaction and perceived utility rate exceeding 97%.

### 3.1.4 Opportunities, Challenges, and Pedagogical Barriers

Poland possesses a highly developed digital infrastructure with nearly universal broadband coverage and high mobile penetration. Culturally, the nation maintains strong intergenerational family structures. Older adults frequently maintain close contact with younger family members who provide ongoing, informal tech support. This unique social capital serves as an excellent pedagogical asset when blending formal training with family-based reinforcement. Furthermore, the rapid

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digitalisation of mandatory daily transactions, such as online banking, e-government access, tax declarations, and electronic medical prescriptions, acts as a powerful functional motivator for seniors to learn.

Systemic Challenges and Barriers:

- The Generational Educational Gap:
  Many citizens aged 65+ concluded formal education long before the integration of computing technologies, leading to very low baseline digital self-efficacy and intense fear of technology.

- Territorial and Socio-Economic Disparities:
  Significant gaps persist between urban centers and rural areas regarding stable, continuous training provision, with rural seniors facing double vulnerability due to isolation and lower educational attainment.

- The Discontinuity of Project Funding:
  A reliance on time-limited EU or national funding cycles threatens the long-term sustainability of training hubs and impedes the systematic professional development of adult educators specializing in geragogics.

- Psychological Resistance:
  Polish seniors frequently associate digital environments with overwhelming technical complexity and a high risk of surveillance, fraud, and error. Consequently, pedagogical strategies must completely eschew abstract computer training in favor of trust-building, highly repetitive pacing, and practical, everyday use cases (e.g., safely contacting a doctor or executing a secure bank transfer).

## 3.2 Comprehensive National Context: Spain

### 3.2.1 Demographic and Socio-Educational Background

As of January 2026, Spain recorded a total resident population of 49,570,725 individuals. Within this population, the segment aged 65 and over comprises 10,438,550 citizens, representing approximately 21.1% of the total population. The "fourth age" demographic, encompassing individuals aged 80 and over, numbers 3,126,594 citizens, accounting for roughly 6.3% of the Spanish population. Long-term demographic projections indicate that population ageing will intensify significantly over the coming decades; by the year 2050, the population aged 65 and over is projected to reach approximately 16.64 million individuals, or 30.3% of the national total, while the segment aged 80 and over will grow to approximately 5.91 million individuals, representing 10.8% of the populace. This strong expansion highlights the growing share of older learners with potential sensory, mobility, or

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cognitive constraints, increasing the objective necessity for accessible pedagogy and supported educational practice.

Adult education in Spain is legally framed as a lifelong learning mechanism for individuals aged 18 and over, spanning formal adult basic education, which includes "initial teachings" (enseñanzas iniciales) and "secondary education for adults" (educación secundaria para personas adultas) delivered via in-person and distance formats, as well as non-formal employability learning, and leisure or cultural provisions. The institutional delivery framework is highly decentralized and varies across autonomous communities, such as specific regulations in the Canary Islands for adult education and distance learning centres. The operational ecosystem relies on a network of senior/community centres, adult education providers, specialized universities for seniors under the Association of University Programs for Seniors (AEPUM), public libraries, the Institute for Older Persons and Social Services (IMSERSO), and non-governmental organizations (NGOs).

National information and communication technology (ICT) indicators are standardly reported for the 16–74 age cohort, meaning detailed functional evidence for older adults relies heavily on data from the 65–74 age bracket. Within this group, a profound divergence exists between basic device access and autonomous functional competence. While 96.3% of individuals aged 65–74 reported utilizing a mobile phone, 85.4% used the internet within the last three months, and 75.0% engage with the internet on a daily basis, only 34.3% are classified as possessing basic or advanced digital skills. Conversely, 51.2% fall into the low or below-low skill categories, and 14.6% reported zero internet use within the last three months. Among active internet users aged 65–74, online activities are highly concentrated in communication services: instant messaging (~93.1%), video calls (~62.9%), and email (~59.9%), alongside social network participation (~37.9%). Service-oriented utilization drops significantly for complex tasks: internet banking is utilised by ~56.2%, searching for health information stands at ~52.2%, booking medical appointments via a web portal or app is at ~44.5%, accessing personal electronic health records drops to ~30.9%, and online commercial purchasing within a three-month window is restricted to 28.6%. Functional participation in structured learning or active citizenship via digital channels remains minimal; online course participation is limited to approximately 5.0% of older internet users.

### 3.2.2 Strategic and Institutional Frameworks

Spain's national digital transformation agenda positions digital skills development as a cross-cutting national priority. The primary strategic frameworks are the "National Digital Skills Plan" (Plan Nacional de Competencias Digitales) and the Recovery, Transformation and Resilience Plan's "Component 19", which explicitly target the performance of everyday digital tasks and interactions with public administrations under an overarching mandate of digital inclusion to "leave no one behind". A core national instrument established under this framework is the Network of Digital Capacity Building Centres (Red de Centros de Capacitación Digital), which serves to expand entry-level training capacity and broaden territorial coverage across the nation. However, these strategic documents address older adults primarily through broad

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macro-level inclusion framing (vulnerable groups and citizens) rather than through senior-specific pedagogical or cognitive requirements. Consequently, operational senior-relevant adaptations, such as instructional pace, specific multi-session practice, accessibility, and security-first trust design, must be integrated at the localized delivery and program level, requiring substantial investment in educator capacity across formal and nonformal structures.

The aggressive digitalisation of public services has established strict electronic identification and authentication gates as a prerequisite for civic autonomy. The primary mechanism is the national electronic identity system (Cl@ve), alongside high-assurance electronic certificates such as the National Mint's Electronic Citizen Certificate (Certificado Electrónico de Ciudadano issued by FNMT-RCM), which enable secure identification and data exchange with public authorities. Functional literacy for older adults now fundamentally requires a practical understanding of multi-step forms, error messages, authentication routines, privacy controls, and consent workflows. While Spain offers extensive online administrative platforms, actual uptake remains moderate: only 37.5% of individuals aged 65–74 reported any online interaction with public authorities in the last 12 months, and only 26.6% reported successfully submitting official forms online. To lower entry barriers, physical Cl@ve Registration Offices (Oficinas de Registro Cl@ve) are deployed across the territory, acting as vital in-person support and onboarding points for seniors when paired with training programs that cover end-to-end credential management and fraud prevention.

### 3.2.3 Senior Safety, Typology of Threats, and Crime Statistics

Older adults in Spain face a multifaceted and severe risk environment where modern digital threats directly intersect with traditional psychological manipulation and physical safety hazards. Crime statistics reveal an immense scale of computer-enabled offences. In 2025, the Ministry of Interior's national crime balance recorded a total of 2,474,156 offences, out of which cybercrime accounted for 489,248 recorded offences, heavily dominated by 430,493 computer fraud offences (estafas informáticas). This escalating threat is corroborated by the National Cybersecurity Institute (INCIBE), which managed 122,223 cybersecurity incidents via INCIBE-CERT in 2025 (marking a 26% increase compared to 2024) and handled 142,767 citizen consultations through the 017 "Tu Ayuda en Ciberseguridad" helpline (a 44.9% surge compared to 2024).

The main typology of threats targeting Spanish seniors incorporates:

- Social Engineering and Sophisticated Impersonation:
  Perpetrators deploy phishing, vishing, and smishing tactics to steal credentials or impersonate banks, utilities, and public bodies. Fraudsters utilise psychological urgency, fear, and deception to manipulate victims, bypassing pure technical hacking.

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- Consumer Payment-Transfer Scams:

  The widespread adoption of real-time mobile payment applications, specifically Bizum, has emerged as a high-volume fraud channel. The Banco de España has explicitly highlighted common Bizum scam patterns targeting consumers, necessitating targeted behavioural countermeasures.

- Traditional and Doorstep Fraud:

  Materials from law enforcement note persistent offline risks in public spaces, street deception, bank branch/ATM credential theft, and doorstep deception where seniors are targeted for their accumulated savings.

- Abuse, Financial Exploitation, and Neglect:

  Data from elder-focused specialized support services, specifically the HelpAge SEAM 2024 report, indicate that 13.1% of all elder consultations nationwide relate directly to instances of abuse, mistreatment, or institutional/familial financial exploitation.

- Physical Safety and Accidental Hazards:

  Physical safety remains a critical determinant of senior autonomy. The National Statistics Institute (INE) reported 4,407 deaths due to accidental falls in 2024 within provisional external-cause mortality data. Furthermore, pedestrian traffic safety is highly skewed; data from the Directorate-General for Traffic (DGT) explicitly document that 66% of all pedestrians run over in cities are aged 65 and over.

- Information Risks:

  Misinformation and fake news (bulos) are recognized as an institutional risk, requiring seniors to learn how to evaluate online sources critically.

### 3.2.4 Opportunities, Challenges, and Pedagogical Barriers

Structural Opportunities:

Technological infrastructure is highly prevalent, with mobile phone use at 96.3% and daily internet use at 75.0% among the 65–74 demographic. The continuous digital shift of essential service gates (banking, e-health booking, and e-government certificates) provides an intrinsic functional motivation for older adults to acquire technical competencies. Furthermore, an established physical ecosystem of potential delivery venues, spanning libraries, senior centres, AEPUM universities, and the expanding network of Centros de Capacitación Digital, is readily available to support scaled, locally anchored provision.

Systemic Challenges and Barriers:

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The primary challenge is that digital exclusion is no longer an access gap, but an autonomy gap; seniors possess the devices but lack the confidence and procedural depth to execute high-stakes authentication workflows independently. Highly realistic impersonation scams and digital tool abuses outpace individual senior vigilance, generating profound anxiety and psychological barriers. Major national surveys cap detailed reporting at age 74, creating an extreme data deficit regarding the specific needs and constraints of the "fourth age" (75+ and 80+ cohorts) despite their massive projected growth. Channels like HelpAge show that 85% of older adults strictly prefer voice telephone channels for assistance, showcasing baseline resistance to digital-only support systems. Learning pathways must be anchored in inperson or blended formats focusing on task-based learning of real services (Cl@ve onboarding, e-health, banking alerts), using high repetition, slow-paced progression, explicit error-recovery mechanisms, and the integration of physical safety apps like AlertCops (utilizing its "Guardián" real-time geolocation feature).

## 3.3 Comprehensive National Context: France

### 3.3.1 Demographic and Socio-Educational Background

The French adult education sector is structured around the principle of lifelong learning, which is coordinated by the Ministry of Labour, Health and Solidarity in conjunction with regional authorities. According to the National Institute of Statistics and Economic Studies (INSEE), people aged 65 and over represented approximately 21% of the French population, or nearly 14 million individuals, in 2023, and this proportion reached 22% on January 1, 2026. Demographic projections show that this proportion will continue to rise steadily over the coming decades, driving a structural transformation with profound implications for accessing increasingly digitalized administrative services. Concerning digital competences, persistent generational disparities remain visible; while internet use is nearly universal among the general population, regular usage declines significantly among people aged 70 and over, as documented by the Digital Barometer published by the Research Center for the Study and Observation of Living Conditions (CREDOC).

The phenomenon of “illectronism”, defined as the inability or important difficulty in using digital tools and services, continues to affect 15% of the French population aged over 15, with older adults disproportionately represented, accounting for 62% of the 75+ age group. Socially, French seniors remain strongly embedded in local associative networks, municipal community centers, and solidarity-based organizations. These structures constitute central environments for social participation and represent strategic entry points for digital inclusion initiatives. However, there has been a steady decline in volunteer work for associations among people aged 65 and over. This situation can be explained by the lack of sufficient funding for associations, the increase in the retirement age, and the individual pursuit of free time activities among seniors.

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### 3.3.2 Strategic and Institutional Frameworks

Digital inclusion has been a public policy priority in France since the launch of the first national strategy for an inclusive digital world in 2018. The second national strategy, "Digital France Together" (France Numérique Ensemble), running from 2023 to 2027, provides a comprehensive framework to fight digital exclusion and strengthen citizens' digital autonomy, explicitly identifying the 65+ age group as a priority target group, mostly in relation to accessing digital public services and healthcare platforms. One of the principal gaps in the French adult education landscape concerns the increasing administrative centrality of digital platforms, as essential public services, including health insurance, taxation, and pension management, are now predominantly accessed online through national portals such as Ameli, Service-public.fr, and Impots.gouv.fr. These platforms require secure authentication procedures, frequently relying on multi-factor verification and the national digital identity system FranceConnect. While these systems enhance security and administrative efficiency, they introduce layers of complexity that can be difficult for older users to navigate independently if not duly accompanied.

France's digital transformation strategy attempts to address these challenges through a territorial and humancentered approach embedded in the France Numérique Ensemble strategy, which is accompanied by the large-scale deployment of digital mediators known as "Conseillers Numériques France Services" (Digital advisors France Services) coordinated by the ANCT. These professionals have the mission to provide individualized support and assist citizens with online administrative procedures. The expansion of France Services centers across the territory reflects a policy recognition that digitalisation must be accompanied by physical, accessible support infrastructures. Nonetheless, tensions persist between the objective of simplifying administrative procedures and the increasing security requirements necessary to protect personal data, while the service expansion often lacks continuity and uniformity between territories. Furthermore, digital skills policy has been centralized under the Minister of National Education and through the PIX certification to standardize and validate digital competence across the national ecosystem.

### 3.3.3 Senior Safety, Typology of Threats, and Crime Statistics

Older adults in France face a multifaceted and complex risk environment where physical, social, and financial threats frequently intersect. The most significant physical risks are health-related and include falls, fainting, and domestic accidents such as slipping, burns, or accidental poisoning. In the financial domain, seniors are particularly exposed to fraud and financial abuse due to accumulated savings, a high level of trust, and, in some cases, social isolation, which reduces opportunities to verify suspicious situations or seek advice. Fraudsters often exploit these factors to obtain personal or banking information or to sell overpriced or nonexistent products. "Abuse of weakness" (abus de faiblesse) is another major concern, involving manipulation to obtain financial or legal advantages, such as signing contracts, modifying wills, or transferring assets without informed consent.

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In 2021, INSEE, in collaboration with a department of the Ministry of the Interior, conducted a study titled "Security and Society", analyzing victimization and feelings of insecurity by age. This study revealed that while younger people represent a larger proportion of overall victims, from the age of 70, scams account for approximately 18% of reported offences, which is significantly higher than in the general population. Older adults are also increasingly affected by the abuse of vulnerability; in 2023, the Paris Public Prosecutor's Office reported a 30% increase in such cases. The Fondation de France estimates that around 800,000 people over the age of 75 are affected by severe isolation each year. These figures are likely severely underestimated, as a consistent trend across France is the phenomenon of underreporting safety incidents due to psychological and social barriers, including feelings of shame, embarrassment, or the fear of losing independence or being deemed incapable by family members.

When navigating online environments, seniors face three main recurring types of scams:

- Phishing:
  Deceptive messages that imitate those typically sent by a bank, a delivery service, or a government agency, with the explicit goal of obtaining personal data or banking information.

- Disguised Commercial Abuse:
  Predatory marketing offers promising a significant discount on equipment, often solar panels or heat pumps, where seniors are pressured into signing a contract that is difficult to cancel, leaving them in debt at exorbitant interest rates.

- Financial and Impersonation Scams:
  Fraudulent schemes designed to manipulate victims into revealing their confidential banking codes by impersonating bank advisors or relatives using AI to replicate their voices.

### 3.3.4 Lighthouse Approaches and Good Practices

France has established a relatively robust institutional framework characterized by successful models that combine localized human mediation, public authority interventions, and community assets:

- Conseillers Numériques France Services:
  This program represents a highly significant development, prioritizing local presence, free access, and individualized accompaniment to emphasize trust-building and relational proximity. Backed by more than 2,000 facilities spread across the country, this model promises every French citizen access to digital assistance within 30 minutes of their home, tailored on an individual or group basis to help them secure connections, safely navigate administrative platforms, and protect against scams.

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- Local Gerontological Information and Coordination Centers (CLIC):
  Managed by departmental authorities, these centers inform seniors about their rights and assist them directly with financial, legal, and housing-related matters.

- Municipal Social Action Centers (CCAS):
  Operating at the municipal level, CCAS aims to combat social exclusion among the elderly by assisting individuals with administrative procedures, distributing financial aid, and organizing face-to-face workshops focused on fraud prevention, personal safety, and awareness of common risks.

- Structured Prevention and Educational Campaigns:
  Public authorities such as the Ministère de l'Intérieur and the Ministère de la Justice regularly implement national prevention campaigns targeting phishing, impersonation, and doorstep fraud. The Police nationale and Gendarmerie nationale run active awareness initiatives, distributing practical guides and organizing local information sessions for older adults.

- Centralized Digital Support Platforms:
  The platform Cybermalveillance.gouv.fr provides accessible tools, advice, and reporting mechanisms to help citizens respond directly to cyber threats. Concurrently, banks and consumer protection bodies support prevention through tailored alerts and personalized guidance.

- Intergenerational Learning and Community Initiatives:
  Social centres and NGOs deliver face-to-face workshops, often implementing intergenerational initiatives that bring together younger volunteers and older adults to facilitate learning in a supportive setting. Practical, scenario-based learning formats have proven particularly effective in reinforcing understanding and confidence.

- Safety Technologies and Technical Countermeasures:
  Teleassistance systems (téléassistance), such as wearable emergency buttons, are widely adopted to allow users to quickly contact emergency services in case of falls or health issues. Smart home technologies (motion sensors, fall detection systems, connected smoke detectors) are increasingly used to prevent domestic accidents, alongside secure banking transaction alerts and simplified digital devices designed with user-friendly interfaces and enhanced security features.

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### 3.3.5 Opportunities, Challenges, and Pedagogical Barriers

The French adult education landscape suffers from discontinuity in ICT instruction, creating a "post-training gap" where software updates dismantle familiar interfaces. closing physical counters forces seniors into digital paths, a massive challenge in rural regions where physical infrastructure is diminishing. Cybersecurity worries, SMS fraud, and identity theft amplify technical anxieties, which are reinforced by a high structural awareness of data privacy rules under CNIL guidelines. Therefore, instructors must integrate specialized pedagogical innovation and age-sensitive educational methodologies grounded in geragogical principles, combining explicit guidance on navigating state platforms and securing digital identity with ongoing psychosocial support. To maximize participation rates, training must actively collaborate with trusted offline channels, local associative networks, and municipal structures like the CCAS.

## 3.4 Comprehensive National Context: Germany

### 3.4.1 Demographic and Socio-Educational Background

Germany's adult education sector is historically and culturally rooted in the foundational concept of Bildung (self-cultivation), with educational opportunities primarily delivered at scale through the comprehensive nationwide Volkshochschule (vhs) network. As of early 2026, Germany has officially reached a critical demographic turning point. According to updated data from the Federal Statistical Office (Statistisches Bundesamt - Destatis), approximately 18.7 million people in Germany are aged 65 or older, currently accounting for 22.4% of the total national population. The long-term demographic outlook is exceptionally stark: by the year 2040, the full transition of the massive "Baby Boomer" generation into retirement is projected to push this proportion toward 28%. The most acute and critical expansion is documented within the 80 and over segment, frequently termed the "Oldest Old", which is projected to expand by 50% over the next two decades, structurally transforming digital access into a matter of public health and long-term social stability.

Data from the D21-Digital-Index 2024/2025 reveal a highly nuanced and bifurcated "Generation Gap" regarding actual technological usage. While 86% of individuals within the 65–74 age cohort are actively online, internet usage drops steeply to just 51% among the 80 and over demographic. Furthermore, actual skill levels among senior internet users are frequently classified as "Functional but Fragile". While many older adults can successfully navigate basic communication applications like WhatsApp or independently search for daily news, they broadly lack systemic digital literacy, experiencing severe limitations when required to manage cloud storage architectures or configure multi-factor authentication protocols.

Socio-culturally, German seniors remain remarkably well-embedded in the country's traditional Vereinskultur (club culture). Statistical records show that over 42% of all retirees are highly active members in registered local clubs (Vereine), spanning a diverse range of activities from sports to community gardening. These

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local clubs represent the primary analog social groups where digital skills are naturally transferred peer-to-peer among seniors. Conversely, older adults' active digital participation in civic citizenship, such as signing online petitions or engaging with municipal digital forums, remains critically low compared to younger national cohorts.

### 3.4.2 Strategic and Institutional Frameworks

Within contemporary national policy, digital inclusion has transitioned from a peripheral educational goal into a central, legally binding pillar of the overarching "Digitalstrategie Deutschland". National digital inclusion policy heavily prioritises the concept of Digitale Teilhabe (digital participation) as a strategic mandate to prevent the emergence of a structurally divided, two-tier society. For the specific 65+ demographic, the "Digital-Pakt Alter" (running from 2021 to 2029) serves as the primary governing policy framework, explicitly aiming to establish localized "Experience Sites" (Erfahrungsorte) to effectively bridge the gap between abstract macro-level policy and grassroots community practice.

Concurrently, the national digital landscape is being rapidly accelerated by the Online Access Act (Onlinezugangsgesetz - OZG 2.0), which has legally mandated that all administrative public services in Germany must be delivered in a digital format. For the senior population, interaction with the digital state is funneled through the national BundID platform and the utilise of the high-security electronic ID (eID) function embedded in physical identity cards. However, this national strategy currently faces a severe, systemic "Security vs. Usability" conflict. The strict technical requirements for utilizing Near Field Communication (NFC)-enabled smartphones combined with mandatory 6-digit PIN verifications for digital identity authentication represent a profound functional barrier that is often entirely too complex for the 75+ demographic to navigate. In response to this barrier, training strategies are actively shifting toward models of "Assisted Digitalisation", wherein adult educators are systematically trained not merely to provide abstract information technology instruction, but to actively operate as local "Digital Pilots" who guide seniors through state-mandated administrative software.

To incentivize and lower the entry threshold for e-government services, the federal government directly funds centralized support initiatives. The most prominent is the "Digital-Kompass" project, which finances more than 100 dedicated physical locations across Germany where seniors can access immediate, manual on-site assistance for e-government and digital administrative tasks. Additionally, an emerging public trend is the deployment of localized "Digital-First-Aid" desks directly within municipal citizen offices (Bürgerämter) to provide emergency technical support for high-security digital platforms.

### 3.4.3 Senior Safety, Typology of Threats, and Cultural Barriers

Older adults in Germany operate within a highly specific safety and threat environment heavily mediated by national cultural traits. The primary psychological and systemic barrier to senior technological adoption is a unique, deeply ingrained cultural fixation on data privacy and data protection (Datenschutz), aligned with

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strict General Data Protection Regulation (GDPR) awareness. German seniors demonstrate an uniquely high level of concern regarding personal data security, and a substantial portion actively refuse to utilise ubiquitous modern tools, such as Google Maps, commercial location services, or mainstream social media platforms, due to a deep-seated, systemic fear of state/corporate surveillance and sophisticated digital scams.

The primary typology of threats targeting German seniors includes:

- The "Post-Course Void" and Support Discontinuity:
  Traditional information and communication technology (ICT) education in Germany typically follows a rigid, semester-based curriculum, such as a standard 10-week Volkshochschule course. This model creates a critical structural gap because older learners require absolute support continuity; when a routine software update abruptly alters a familiar user interface, or when a minor hardware failure occurs post-course, there is no standardized, on-demand support infrastructure available to assist them, causing a rapid loss of digital confidence.

- The Technical Linguistic Gap:
  Senior educational engagement is heavily deterred by a pervasive linguistic barrier, specifically the widespread reliance on English technical vocabulary (e.g., "Cloud", "Update", "Settings") within digital devices and instructional manuals without translation or contextual explanation.

- Sophisticated Social Engineering:
  Older adults are heavily targeted by highly evolved confidence tricks that exploit psychological vulnerability. The most prevalent is the Enkeltrick 2.0 (the evolved grandparent scam), which utilises digital messaging, emergency fabrications, and increasingly sophisticated social engineering tactics to manipulate older adults into transferring large financial sums under intense psychological urgency.

- Lack of Specialized Educator Qualifications:
  A major systemic deficit is the lack of formal geragogical qualifications among active ICT trainers. While instructors are frequently technically proficient, they broadly lack specialized pedagogical training tailored to address the unique cognitive, physical, and emotional needs of non-digital natives.

### 3.4.4 Lighthouse Approaches and Good Practices

Germany features successful, highly organized models that successfully leverage volunteer networks and dense institutional frameworks:

- The "Digital-Botschafter" (Digital Mentors) Project:

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Originating in Rhineland-Palatinate, this highly successful lighthouse model utilises trained volunteers, frequently drawn from the "younger senior" demographic, to deliver completely decentralized, peer-to-peer technical support directly within local community meeting places or inside the seniors' private homes. This model is uniquely effective because it completely neutralizes the Schwellenangst (threshold fear) associated with entering a formal educational institution, focusing instead on building Vertrauen (trust), which serves as the most critical currency in German senior education. Due to its profound positive impact on the isolated 80+ demographic, this volunteer model is actively being replicated across other federal states (Bundesländer).

- Low-Barrier Community Formats:
  The large-scale deployment of informal "Senior Internet Cafés" and localized "Tablet Lending" programs represents a highly effective intervention framework. These initiatives are frequently embedded inside Mehrgenerationenhäuser (Multi-generational Houses), utilizing trusted, multi-functional community spaces to deliver low-stakes tech exposure.

- Unparalleled Institutional Density:
  Germany possesses a massive strategic advantage in its unmatched physical infrastructure. This spans a nationwide network of approximately 900 Volkshochschulen operating as permanent public continuing education centres, coupled with the dense, deeply rooted network of local Vereine.

### 3.4.5 Opportunities, Challenges, and Recommendations for SONET

Systemic Structural Challenges:

The primary structural challenge is the extreme Federal Fragmentation of the German educational and administrative systems. Digital infrastructure development and adult education funding vary significantly across Germany's 16 individual federal states. This fragmentation creates a highly inequitable "postcode lottery" for older citizens; seniors residing in affluent regions possess seamless access to high-tech, state-funded "Experience Sites," whereas older adults living in economically constrained rural or Eastern German regions frequently face a complete absence of localized public digital support. Furthermore, the extreme administrative and cryptographic complexity of German e-government platforms, driven by high security thresholds for data protection, continues to act as an unnavigable barrier for the oldest demographics.

Emerging Technical Opportunities:

The rapid advancement of Voice User Interfaces (VUI), such as voice-controlled conversational assistants (e.g., Alexa or Siri), represents the next major frontier for senior digital inclusion. For older learners experiencing natural age-related motor skill

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decline, tactile limitations, arthritis, or visual impairments, the capacity to execute tasks via natural vocal interaction completely bypasses the physical and cognitive complexity of modern smartphone screens. AI-driven conversational assistants can effectively translate multi-step, confusing ICT workflows into basic, natural language dialogues, rendering independent digital inclusion highly achievable.

Recommendations for Project SONET Curriculum Design:

The curriculum should centre on Digitale Souveränität (Digital Sovereignty), prioritizing privacy configurations and setting adjustments to build trust. Instruction should weave in voice-first interaction to bypass motor/tactile constraints. To ensure high enrolment and course retention, activities must actively integrate with trusted offline spaces and traditional Vereine networks. Finally, professional development programs must train instructors to operate as active "Digital Pilots" focusing entirely on task-based, on-demand troubleshooting of essential electronic workflows.

## 3.5 Comprehensive National Context: Romania

### 3.5.1 Demographic and Socio-Educational Background

Romania is currently experiencing a profound dual transformation characterized by rapid digitalisation of essential services and accelerated demographic ageing. As of early 2025, individuals aged 65 and over make up approximately 20.3% of Romania's population, meaning roughly 1 in 5 citizens falls within this demographic bracket. The long-term demographic trend shows a continuous and irreversible expansion in the 65+ share due to consistently low birth rates, general population decline, and accelerated demographic ageing. Official national forecasts indicate that this proportion is expected to rise further over the coming decades, potentially reaching around 25.5% by the year 2040 and approaching 30% by the year 2060. This rapid expansion highlights that the inclusion of older adults in the digital society is no longer an optional educational goal, but an essential condition for public health and social stability.

Adult education and lifelong learning face extreme structural bottlenecks in Romania, with the country experiencing a significant mismatch between the digital skills level of older adults and the design of available adult education programmes. Currently, a mere 5.4% of adult individuals participate in lifelong learning programs, a rate that sits well below the European Union average. Concurrently, fewer than one-third of Romanian adults possess at least basic digital skills, compared to the broader EU average of 54%. Although broadband internet infrastructure is highly developed, with over 80% of Romanian households having broadband access (reaching 87% in the Western region), actual digital utilization among individuals aged 65–74 remains profoundly low. Historical baseline records reveal that in 2017, nearly 80% of this specific age cohort had never used a computer. By 2019, only 7% of individuals aged 65–74 possessed basic digital skills, and fewer than 4% had ever executed an online purchase. Furthermore, the participation rate in education and training among those aged 65–74 was documented at just 7%, standing as the lowest rate in comparison to the EU average of 16.7%. Empirical research suggests

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that the main barriers preventing senior digital inclusion are not linked to technical infrastructure or financial affordability, but are heavily driven by deep-seated cultural factors and severely limited digital skills among older adults.

In analyzing specific competencies within the 55–74 demographic, these citizens are less digitally integrated and exhibit fewer computer skills than any other national age cohort. While more than 62% use the internet on a daily or almost daily basis, less than a quarter utilise any internet-connected devices other than mobile phones. The clear majority of older internet users restrict their usage to basic communication, such as audio or video calls and social networking platforms. Formal digital communication methods like email and instant messaging are notably less popular; instead, most Romanian seniors use the internet primarily to read digital news and search for health-related information. Commercial online shopping is rarely utilised, with only 33.5% having ever shopped online, while 67.7% do not even perform online queries to search for commercial goods or services. Online banking utilization is also extraordinarily limited, with a mere 5% of seniors reporting its use.

Socially, Romanian seniors are frequently embedded in local community clubs and specialized social spaces designed for them, which offer opportunities to engage in recreational activities, structured workshops, and social interaction, particularly for those who live entirely alone. In rural jurisdictions, community-driven projects and Erasmus+ initiatives have successfully established networks of senior clubs to enhance social participation and minimize isolation. Furthermore, specialized intergenerational frameworks, such as the "Generations Centres" project, actively encourage older adults to connect with younger cohorts through volunteering and community activities, fostering social inclusion and active civic engagement.

### 3.5.2 Strategic and Institutional Frameworks

The recently adopted "2024-2030 National Strategy for Adult Continuing Education" (SNECA) explicitly acknowledges digital skills development as a core component of Romania's broader lifelong learning targets. The strategy formally prioritises digital competence development for adults as one of its core action areas alongside governance, accessibility, and inclusion. However, the framework fails to specifically target older adults (65+) with dedicated, senior-specific programmatic measures. While older adults are implicitly included under the broad umbrella of adult learners, the strategy establishes general competence frameworks and inclusive participation objectives rather than senior-adapted interventions. Similarly, the "Strategic Initiative for the Digitisation of Education" (SMART-Edu 2021-2027) focuses comprehensively on the digital transformation of the national educational ecosystem, covering digital skills development, teacher training in digital pedagogies, and infrastructure improvements. However, older adults are not explicitly identified as strategic beneficiaries within SMART-Edu, as its actions are predominantly oriented toward standard students, teachers, workforce development platforms, and the formal education landscape.

Despite this macro-level strategic deficit, local-level public authorities, frequently operating in direct partnership with non-governmental organizations, provide

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targeted training and support to facilitate seniors' access to digital public services and e-government tools. Notable institutional and regional initiatives include the "Digital Citizen" program developed in Bucharest by ECDL Romania, which combines foundational digital literacy instruction with customized support. In Prahova County, a collaborative initiative during a public crisis provided physical assistance to seniors to help them securely access electronic certificates. The eDigiStars project delivered specialized digital skills workshops for individuals aged 50 and over in Oradea, while Cluj-Napoca supported digital training within municipal day-care centers. Finally, the Tulcea City Hall contracted the Senior Delta Group to provide active aging and digital navigation courses for its beneficiaries.

### 3.5.3 Senior Safety, Typology of Threats, and Crime Statistics

Older adults in Romania navigate an exceptionally precarious safety landscape characterized by severe social isolation, rising digital fraud, and intersecting physical and domestic threats. A primary systemic risk is chronic neglect and profound social isolation; official surveys reveal that 3 in 5 senior citizens residing in Romanian cities actively struggle with loneliness, which dramatically amplifies their vulnerability to exploitation, financial fraud, and physical neglect. Furthermore, data from national helplines document thousands of annual calls from vulnerable seniors explicitly related to acute isolation, lack of familial support, and total inability to access basic services. Reports indicate a significant rise in online fraud and digital risks targeting Romanian citizens, with comprehensive research showing that 61% of individuals residing in urban areas have been directly targeted by online fraud attempts.

The primary typology of threats targeting Romanian seniors incorporates:

- Family, Caregiver, and Institutional Abuse:
  Elders frequently suffer from severe neglect, emotional manipulation, or physical abuse within domestic environments. Documented scenarios include withholding vital care, physical violence, and forcing predatory property transfers. Non-governmental organizations report recurrent cases where trusted helpers or family members have directly exploited elders. This abuse extends to institutional settings, where independent media investigations have exposed severe neglect and mistreatment within private nursing homes.

- Financial Exploitation and Deceptive Scams:
  Pensioners serve as prime targets for sophisticated financial fraudsters. Widespread ruses include fake "grandchild in danger" or "police officer" phone calls, bogus bank or public officials executing social engineering to extract personal data, and manipulative

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romance or fake health scams, often resulting in the total loss of victims' life savings.

- High-Volume Cyber Threats:
  As internet access expands, seniors face explicit online risks, predominantly phishing emails or deceptive messages (accounting for 73% of online fraud channels), social media scams (72%), and fraudulent phone calls (69%). The most common consequences documented among senior victims include the direct infection of their devices with malware or viruses (42%), direct financial loss (30%), and the theft of personal private data (22%).

- Physical Safety Hazards and Accidental Injuries:
  Accidental falls within home environments represent a leading cause of senior mortality and loss of autonomy, frequently caused by poor residential lighting, slippery flooring, or physical clutter. Additionally, traffic safety is a massive concern; European road safety records document that a huge proportion of over-65 citizens are killed as pedestrians on busy national roads.

### 3.5.4 Lighthouse Approaches and Good Practices

Romania possesses several highly effective, volunteer-supported and community-based models that demonstrate strong potential for regional replication:

- The Niciodată Singur (Never Alone) Program:
  Developed in formal partnership with Petits Frères des Pauvres, this highly successful model combines direct social support, community-based activities, and structured intergenerational engagement to mitigate loneliness among isolated older adults through a network of specialized socialization centres and volunteer support structures.

- The "Seniors Active in the Community" Initiative:
  Implemented by CRCE Romania, this program establishes structured networks of rural senior clubs to reinforce the concepts of active aging and civic participation through organized community engagement, offering an exemplary blueprint for European countries with large rural populations and limited formal institutional services.

- The "Generations Centres" Project:
  Coordinated by the Federation of Romanian Mothers' Associations (FRMR), this model establishes specialized intergenerational centres that connect digital inclusion directly with civic engagement and social cohesion, utilizing younger volunteers to manually guide seniors through digital tools and e-government services within a supportive environment.

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- National Cybersecurity Initiation for Seniors:

  Organized by the Romanian Institute for Active Aging (in partnership with ICI Bucharest), this project delivers highly interactive, hands-on workshops focusing on recognizing phishing attempts, preventing online fraud, protecting personal data, and the safe use of social media. This initiative has deployed successful large-scale sessions across multiple major municipalities.

- The Hi Digital Campaign:

  A major digital inclusion initiative developed via a joint partnership between the Romanian Police (including the Bucharest Police's specialized "Vigilant Seniors" project) and the Fundația Vodafone România. The campaign provides free, customized workshops tailored specifically to older adults, covering safe browsing, mobile phone operation, and online scam prevention. As of late 2025, over 6,000 senior citizens have successfully participated in this program.

### 3.5.5 Opportunities, Challenges, and Recommendations for SONET

Socio-Technical Opportunities:

The extensive development of broadband infrastructure and near-universal household internet coverage provide an ideal baseline for digital inclusion programs. The rapid, ongoing digitalisation of mandatory state services, online healthcare registration, and banking utilities provides an immediate, functional motivation for Romanian seniors to acquire technical skills. Furthermore, the presence of successful community-based models, active non-governmental networks, and enthusiastic volunteer ecosystems provides a culturally appropriate, highly receptive delivery framework.

Systemic Challenges and Pedagogical Barriers:

Due to a total lack of historical exposure to computing systems, instructional design must start at a very foundational level. Rural seniors face acute structural vulnerabilities and lack localized learning infrastructure. Furthermore, device patterns are overwhelmingly smartphone-centric, rendering standard desktop computing curricula ineffective. Technological fears, lower confidence levels, a trusting disposition, and low awareness of training opportunities combine to restrict enrollment. Shame-based hiding also prevents seniors from reporting financial victimization, thereby obstructing peer learning. At the regulatory level, Romania lacks a unified anti-fraud or competence validation framework, while premium assistive or security tools remain financially inaccessible on standard retirement incomes.

Curriculum Recommendations for Project SONET:

Curricula should be practice-oriented, smartphone-focused, slow-paced, and built on high repetition, paired with printed step-by-step visual guides. Workshops should

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be anchored directly within pre-existing day-care centers, libraries, and clubs where seniors already assemble. To combat shame-based hiding, psychological onboarding toolkits must be integrated to de-stigmatize victimhood and reduce technology anxiety. Training should focus on accessible security components (2FA, password managers, text transaction alerts) and deliver a physical training handbook alongside practical video troubleshooting guidelines to support sustainability.

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# 4 SONET SKILLS MAP

## 4.1 Cross-country synthesis

The cross-country research directly dictates four core training subjects for the SONET curriculum: General Safety in the Digital World, Cybersecurity and Data Protection, Media Literacy and Digital Information, and Ambient Assisted Living Technologies. This design addresses the central finding that seniors frequently possess device access but lack confidence, cybersecurity awareness, and the skills to navigate complex digital services independently.

A comparative synthesis of the target groups reveals a severe divergence between basic device access and actual, autonomous functional digital safety, a phenomenon formally defined as the **"Autonomy Gap"**. While basic device connection is high, functional digital competence remains disproportionately low. For example, Spain and Poland report high household internet or mobile phone utilization among the 65–74 age bracket, yet individuals possessing at least basic digital skills are limited to 34.3% in Spain and 22% in Poland. This baseline reality means older adults are connected enough to be targeted by sophisticated cyber threats (such as phishing, vishing, and smishing), but consistently lack the systemic digital literacy required to detect or report them. The research identifies four core digital areas where senior learners encounter critical functional gaps: cybersecurity (fear of online scams and fraud), e-government (difficulty navigating complex multi-step state identity systems), media literacy (heightened vulnerability to digital misinformation and fake news), and online services (lack of confidence using financial transactions and e-health platforms). Safety risks are increasingly hybrid, blending digital fraud with traditional psychological manipulation. Across all observed countries, fraudsters rely heavily on psychological pressure, such as manufactured urgency, fear, and exploiting the inherently trusting or polite nature of older adults, rather than executing purely technical hacking. This risk environment is exacerbated by underreporting due to psychological and social barriers. A consistent trend across Poland, France, and Romania demonstrates that older victims frequently refuse to report financial fraud or caregiver abuse due to severe feelings of shame, embarrassment, or the fear of losing their independence and being deemed incapable by family members.

## 4.2 Comparative Analysis & Skills Map

The structural research findings have been directly translated into a comprehensive SONET Skills Map. This matrix outlines the primary competence domains, specific practical skills, and cognitive outcomes required to foster complete digital autonomy and safety among European senior learners.

- Digital Access and Basic ICT Use

  Knowledge: Understanding basic digital devices including smartphones, tablets, and computers. Understanding internet

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connectivity parameters and common applications. Awareness of digital public services and core communication tools.

Skills: Using smartphones and tablets for basic everyday tasks. Connecting to Wi-Fi networks and independently managing basic device settings. Using messaging applications, email, and video calls to maintain social contact.

Competences: Cultivating personal confidence in using digital devices independently. Demonstrating the baseline ability to access online information and communicate digitally.

- Cybersecurity and Online Safety

  Knowledge: Understanding common online threats including phishing, spoofing, and digital scams. Awareness of personal data protection regulations and foundational privacy principles. Understanding safe authentication methods and secure password practices.

  Skills: Successfully recognizing suspicious emails, manipulative messages, and fraudulent websites. Creating and managing strong, resilient passwords. Utilizing antivirus tools and configuring account privacy settings.

  Competences: Demonstrating the ability to protect personal data and individual digital identity. Maintaining responsible and secure behaviour within diverse online environments.

- Media Literacy and Information Evaluation

  Knowledge: Understanding the mechanics of how information and viral content spread online. Detailed awareness of misinformation, fake news, and psychological manipulation techniques. Understanding how to define and locate credible sources of information.

  Skills: Evaluating the objective reliability and validity of online content. Successfully identifying trustworthy websites and official state sources. Habitually verifying information parameters before sharing content with peers.

  Competences: Actively deploying critical thinking within digital environments. Practicing completely responsible information consumption and sharing habits.

- E-Government and Digital Public Services

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Knowledge: Understanding how to access and navigate digital public services. Awareness of electronic identification systems including national digital ID infrastructure. Comprehensive understanding of online bureaucratic and administrative procedures.

Skills: Operating national e-government platforms independently. Accurately completing online forms and securely submitting digital documents. Booking healthcare appointments and accessing telemedicine services online.

Competences: Cultivating the structural ability to independently interact with public administrations online. Increasing overall civic participation using digital state tools.

- Digital Financial and Everyday Services

  Knowledge: Understanding the operation of online banking applications and digital payment systems. Awareness of financial fraud patterns and core scam prevention techniques.

  Skills: Using online banking applications safely on mobile devices. Performing secure digital transactions and retail interactions.

  Competences: Developing personal confidence in managing finances online. Committing to the responsible use of digital financial utilities and services.

- Ambient Healthcare and Assisted Living (AAL) Technologies

  Knowledge: Understanding technologies specifically engineered to support independent living. Awareness of smart home devices and assistive technologies available to older adults.

  Skills: Operating physical safety devices such as wearable SOS panic buttons and health monitoring tools. Managing basic smart home technology configurations.

  Competences: Demonstrating the ability to integrate protective digital technologies into daily life routines. Experiencing increased independence, autonomy, and personal well-being.

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| COMPETENCE AREA | SPECIFIC TARGET SKILLS | EXPECTED COGNITIVE COMPETENCES |
|---|---|---|
| Digital Access | Independent mobile device operation; Basic internet connectivity management; Adjusting accessibility and user-interface settings. | **Digital Confidence:** Overcoming technology-related anxiety and threshold fear. |
| Cybersecurity | Recognizing phishing emails, smishing SMS, and vishing attempts; Understanding emerging AIgenerated voice-cloning risks; Basic data protection and antivirus software utilization. | **Secure Behaviour:** Developing the habit of pausing, verifying sources, and managing passwords securely. |
| Media Literacy | Evaluating and verifying information sources; Discerning legitimate content from fake news and online rumors (bulos); Navigating social media platforms responsibly. | **Critical Thinking:** Developing resistance against digital manipulation and misinformation tactics. |
| E-Government | Registering and authenticating within national digital identity platforms (e.g., Cl@ve, FranceConnect, Trusted Profile, BundID); Navigating public administration portals and electronic forms. | **Civic Digital Participation:** Empowering independent citizen interaction with state institutions. |
| Financial Digital Skills | Safe utilization of digital banking mobile applications; Executing secure electronic payment transfers (e.g., Bizum); Identifying aggressive and deceptive commercial contract pressure. | **Safe Financial Behaviour:** Protecting accumulated life savings from digital and telephonic fraud vectors. |
| AAL Technologies | Operating wearable emergency systems and panic SOS buttons; Utilizing smart home sensors and automatic fall-detection devices; Utilizing Voice User Interfaces (VUI) and conversational AI assistants. | **Independent Living:** Utilizing assistive technologies to facilitate safe, autonomous ageing-in-place. |

*Table 1 - SONET Skills Map Matrix*

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# 5 SHARED PEDAGOGICAL METHODOLOGY

## 5.1 Geragogical Implementation Framework

The implementation of the SONET educational program requires a shift away from mainstream, fast-paced adult information and communication technology (ICT) instruction toward specialized, geragogical approaches tailored to the unique physical, cognitive, and psychosocial needs of senior learners. Based on the cross-country synthesis and the comparative research findings, adult educators must transition from being traditional technical instructors to acting as supportive learning mediators who actively combine technical execution with ongoing confidence building and procedural support.

To ensure practical accessibility and mitigate technological anxiety, adult educators must apply core cross-cutting geragogical principles:

- Learner-Centred Approach:
  Training activities are built entirely around the real-life needs and experiences of seniors, focusing on practical everyday scenarios like online communication, accessing public services, or recognizing digital fraud.

- Slow-Paced and Structured Learning:
  Materials are organized into small, clearly defined units that allow learners to progress gradually, avoiding cognitive overload while consolidating knowledge through repetition and guided practice.

- Experiential Learning:
  The methodology prioritises hands-on practice, enabling participants to directly manipulate digital devices during training sessions to strengthen skill acquisition.

- Confidence-Building and Positive Reinforcement:
  Trainers must provide supportive feedback and clear step-by-step guidance to systematically dismantle technology-related anxiety and enhance self-efficacy.

- Accessibility and Inclusiveness:
  Learning materials utilise clear, simplified language, visual support icons, diagrams, and intuitive navigation loops within the interactive online platform to avoid technical frustration.

- Peer and Blended Learning:
  Group formats encourage social interaction, trust, and peer support, while a blended model combines online tools with manual face-to-face assistance.

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- Continuous Support:

  Provision extends past the formal workshop setting, incorporating troubleshooting sessions to build long-term digital confidence.

The graphical summary of these core principles is illustrated in the figure below:

***Figure 2:*** *Pedagogical principles and accessibility elements for senior learners.*

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| GERAGOGICAL PRINCIPLE | TEACHING METHOD | DESCRIPTION OF ACTION | EXPECTED BENEFIT FOR SENIORS |
|---|---|---|---|
| Learner-centred learning | Real-life scenarios | Learning activities based on everyday tasks such as online banking, contacting family, or accessing healthcare services. | Increases relevance and motivation. |
| Slow-paced learning | Step-by-step instruction | Complex tasks are broken into smaller steps with clear explanations and live demonstrations. | Reduces cognitive overload. |
| Experiential learning | Hands-on practice | Learners practice tasks directly using digital devices during training. | Strengthens skill acquisition. |
| Repetition and reinforcement | Guided exercises | Key skills are practiced repeatedly through exercises and simulations. | Improves memory retention. |
| Confidence-building | Supportive feedback | Trainers encourage learners and provide positive reinforcement. | Reduces anxiety related to technology |
| Visual and multimedia learning | Use of videos, diagrams, and podcasts | Educational materials include visual and audio elements to support different learning preferences. | Enhances comprehension. |
| Interactive learning | Educational games and simulations | Scenario-based games help learners practice identifying risks and solving digital problems. | Increases engagement. |

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| | | | |
|---|---|---|---|
| Peer learning | Group discussions and peer support | Learners share experiences and support each other during activities. | Builds social interaction and trust. |
| Blended learning | Online and face-toface learning | Combines digital learning tools with guided support sessions. | Ensures accessibility. |
| Continuous support | Help and troubleshooting sessions | Trainers provide assistance after the training sessions. | Supports long-term digital confidence. |

*Table 2 - Comprehensive Geragogy Methodology Mapping*

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# 6 JOINT CURRICULUM, UNIT STRUCTURES, AND EVALUATION FRAMEWORK

## 6.1 Curriculum Architecture and Workload Parameters

The SONET joint curriculum is systematically organized into four thematic modules, accessible via an interactive online platform (E-Tool) complemented by multimedia assets. To accommodate diverse learning preferences, each module incorporates structured presentations (approximately 40 slides per module), one expert audio podcast episode, one recorded interview with a field specialist (e.g., police prevention officer, cybersecurity analyst), selfassessment quizzes, and a dedicated interactive simulation game.

The curriculum establishes a standardized, balanced workload model to ensure flexibility across short training courses, workshop series, or blended learning delivery pathways:

- Learning Content and Presentation Reading (1.5 hours per module)
- Podcast Listening (20 minutes per module)
- Expert Interview Viewing (20 minutes per module)
- Interactive Educational Game Play (30 minutes per module)
- Self-Assessment and Reflection Quiz (20 minutes per module)
- This culminates in an estimated workload of **3 hours per module**, totalling approximately **12 hours for the full training program**.

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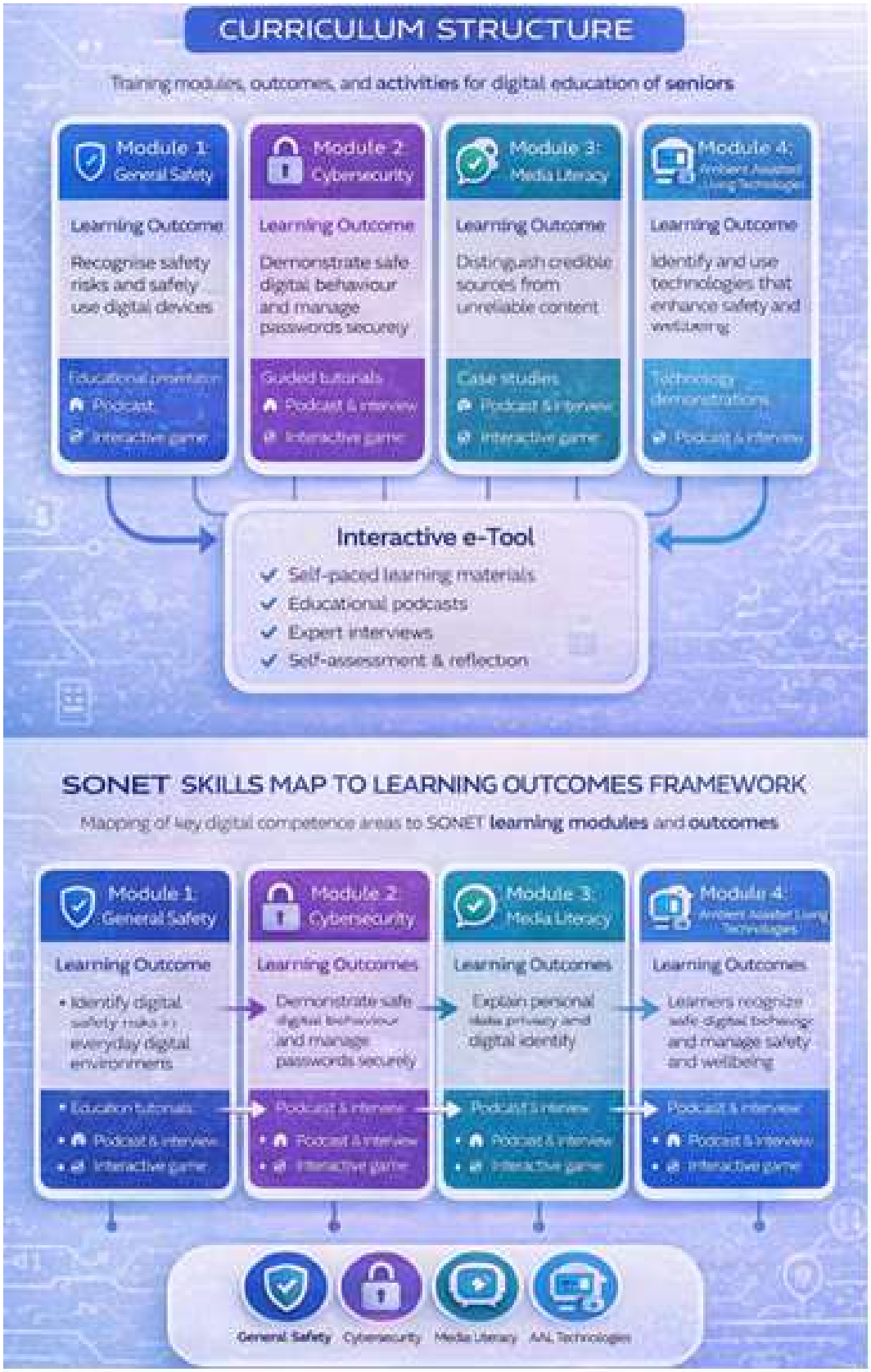


*Figure 3: SONET curriculum structure and skills mapping framework for senior digital education.*

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| MODULE | LEARNING FOCUS | LEARNING ACTIVITIES | MULTIMEDIA COMPONENTS | INTERACTIVE COMPONENT | LEARNING OUTCOMES | WORK -LOAD |
|---|---|---|---|---|---|---|
| Module 1: General Safety | Understanding safety risks in everyday digital environments. | Educational presentation, guided discussion, practical exercises. | Podcast with safety expert, interview with police prevention specialist. | Interactive game identifying fraud and suspicious communication. | Learners recognise safety risks and safely use digital devices. | ~3 hours |
| Module 2: Cybersecurity | Protecting personal data and digital identity. | Step-by-step tutorials, password exercises, demonstrations of secure login. | Podcast with cybersecurity specialist, expert interview. | Simulation game detecting phishing and fraud attempts. | Learners demonstrate safe digital behaviour and manage passwords securely | ~3 hours |
| Module 3: Media Literacy | Evaluating online information and recognising misinformation. | Case studies, group discussions, analysis of online content. | Podcast on misinformation and digital media, expert interview. | Game identifying reliable vs. misleading information. | Learners distinguish credible sources from unreliable content. | ~3 hours |
| Module 4: AAL Technologies | Using technologies that support independent living. | Demonstrations of assistive technologies, practical exercises with devices. | Podcast on digital health technologies, expert interview with AAL specialist. | Simulation exploring smart home and assistive devices. | Learners identify and use technologies that enhance safety and wellbeing. | ~3 hours |

*Table 3 - Module Structure and Activity Mapping*

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## 6.2 Granular Unit and Topic Breakdown

MODULE 1: General Safety (Led by Partner: PARASOL)

Introduction: This module introduces seniors to everyday safety risks in both physical and digital environments. It focuses on strengthening situational awareness and personal safety skills, helping seniors respond confidently to potentially risky situations, suspicious behaviour, and interacting with strangers.

Unit 1: Understanding Everyday Safety Risks

Unit 2: Safe Use of Digital Devices

Unit 3: Recognizing Fraud and Suspicious Communication

| UNIT | TOPICS COVERED | CORE CONTENT SCOPE | INTERACTIVE ELEMENT |
|---|---|---|---|
| Unit 1 | Common safety risks affecting seniors; Fraud targeting older adults; Suspicious situations in everyday life; Situational awareness. | Explanation of common scams; Examples of real-life situations; Safety checklists. | Scenario discussion: What would you do in this situation? |
| Unit 2 | Basic device safety; Safe use of smartphones and tablets; Connecting to safe Wi-Fi networks; Recognising trusted websites. | Step-by-step device guides; Safe browsing tips; Safe messaging practices. | Hands-on device practice |
| Unit 3 | Phone scams; Phishing messages; Fraudulent SMS and emails; Emotional manipulation tactics. | Examples of suspicious communication; Warning signs of fraud; How to respond safely. | Simulation game: “Safe or Suspicious?” |

*Table 4.1 - Granular Unit and Topic Breakdown (Modules 1)*

**Additional Non-Digital Safety Extensions: Addresses secure use of physical ATMs; transport navigation; doorstep safety protocols; emergency contacts; and local community support networks.)*

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MODULE 2: Cybersecurity (Led by Partner: E-SENIORS)

Introduction: This module focuses on protecting personal data, digital identity, and online accounts. Seniors learn how to safely manage passwords, recognise phishing attempts, and navigate online services securely to build operational confidence.

Unit 1: Personal Data and Digital Identity

Unit 2: Password Security and Account Protection

Unit 3: Safe Use of Online Services

| UNIT | TOPICS COVERED | CORE CONTENT SCOPE | INTERACTIVE ELEMENT |
|---|---|---|---|
| Unit 1 | What is personal data; Risks of sharing personal information; Digital identity protection. | Examples of sensitive information; Privacy settings in online platforms. | Exercise: What information should stay private? |
| Unit 2 | Creating strong passwords; Password management strategies; Two-factor authentication. | Password examples; Security practices. | Password creation workshop |
| Unit 3 | Online banking safety; Secure website identification; Safe online transactions. | Recognising secure websites (HTTPS); Avoiding suspicious links. | Simulation game: "Spot the Phishing Message." |

*Table 4.2 - Granular Unit and Topic Breakdown (Modules 2)*

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MODULE 3: Media Literacy (Led by Partner: BLSH)

Introduction: This module helps seniors develop critical thinking skills when consuming online information. Participants learn to evaluate sources, recognise misinformation, and understand how AI-generated content and manipulated media can influence public perception.

Unit 1: Understanding Online Information

Unit 2: Recognizing Misinformation and Fake News

Unit 3: AI-Generated Content and Media Manipulation

| UNIT | TOPICS COVERED | CORE CONTENT SCOPE | INTERACTIVE ELEMENT |
|---|---|---|---|
| Unit 1 | How information spreads online; Different types of media sources; Credible vs unreliable information. | Examples of trustworthy sources; Introduction to fact-checking tools. | Source comparison exercise |
| Unit 2 | Fake news characteristics; Manipulated headlines and images; Emotional manipulation in media. | Examples of viral misinformation; Responsible sharing practices. | Game: "Spot the Fake News." |
| Unit 3 | AI-generated images and texts; Deepfakes; Identifying manipulated media. | Examples of AI-generated content; How to verify information. | Exercise: Real vs AI-generated images |

*Table 4.3 - Granular Unit and Topic Breakdown (Modules 3)*

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MODULE 4: Ambient Assisted Living Technologies (Led by Partner: KIT)

Introduction: This module introduces seniors to technologies that support independent living, health monitoring, and home safety, promoting confidence in using assistive technologies to enhance safety and independence.

Unit 1: Introduction to Assistive Technologies

Unit 2: Smart Home Safety Technologies

Unit 3: Digital Tools for Health and Communication

| UNIT | TOPICS COVERED | CORE CONTENT SCOPE | INTERACTIVE ELEMENT |
|---|---|---|---|
| Unit 1 | What is Ambient Assisted Living (AAL); Benefits of assistive technologies; Examples of devices supporting seniors. | Overview of smart home technologies; Health monitoring tools. | Discussion: How can technology improve everyday life? |
| Unit 2 | Emergency alert systems; Fall detection technologies; Home safety sensors. | Examples of smart home solutions. | Case study: Designing a safer home environment |
| Unit 3 | Health monitoring apps; Telehealth services; Communication technologies. | Using apps for health tracking; Digital tools for family communication. | Simulation game: “Smart Home Safety Builder.” |

*Table 4.4 - Granular Unit and Topic Breakdown (Modules 4)*

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## 6.3 Self-Assessment Question Distribution Framework

To ensure balanced coverage, the system establishes a strict set of quantitative requirements for quiz design: each individual module must feature exactly 15 multiple-choice questions, evenly distributed as 5 questions per unit to ensure total representation of all topics.

| THEMATIC UNIT BLOCK | TARGET QUESTION COUNT |
|---|---|
| Unit 1 (Conceptual Understanding) | 5 Questions |
| Unit 2 (Tactical Skills Execution) | 5 Questions |
| Unit 3 (Threat Identification Scenario) | 5 Questions |
| **Total Assessment Pool per Module** | **15 Questions** |

*Table 5 - Self-Assessment Question Distribution Framework*

** Standardized Framework Example Question Formulation:

You receive a message saying your bank account has been blocked and asking you to click a link to verify your details. What should you do?

Answer Options: A. Click the link immediately

B. Contact the bank using its official phone number

C. Reply with your account number

D. Forward the message to friends.

Correct Designation: B

System Explanation Text: Banks do not request personal information through messages with links. Always contact the bank through official channels.

- Linguistic Restrictions:
  Questions must be simple, practical, and directly tied to the content. Negative or confusing question formats (e.g., "Which of these is NOT safe?") must be avoided in favour of direct positive formulations (e.g., "Which action is the safest?").

- Difficulty Distribution Mix:
  Questions must provide moderate, thought-provoking difficulty without being tricky or utilizing misleading formulations.

- Feedback Mechanism:
  Immediately after a learner submits their answer, the platform must display a short explanation reinforcing the safe behaviour.

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The questions are distributed across three distinct levels to balance comprehension and practical application (see Table 10).

| TARGET DIFFICULTY LEVEL | PERCENTAGE ALLOCATION |
|---|---|
| Easy (Foundational Knowledge) | 40% |
| Medium (Applied Skill Context) | 40% |
| Practical Scenario-Based Tasks | 20% |

*Table 6 - Self-Assessment Difficulty Distribution Mix*

## 6.4 Module Objectives and Outcomes Summary Table

The following table summarizes the overall quantitative distribution of targeted educational elements developed by the partnership across the comprehensive framework.

| THEMATIC CORE MODULE | LEARNING OBJECTIVES | LEARNING OUTCOMES |
|---|---|---|
| General Safety (Module 1) | 3 | 3 |
| Cybersecurity (Module 2) | 3 | 3 |
| Media Literacy (Module 3) | 2 | 2 |
| Ambient Assisted Living (Module 4) | 2 | 2 |
| **Total Framework Architecture** | 10 | 10 |

*Table 7 - Framework Strategic Quantities Summary Table*

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## 6.5 Multimedia Learning Components

Each module includes diverse learning formats to support different learning preferences and increase engagement among senior learners:

- Educational Presentations:
  Each partner organisation develops approximately 40 slides of educational content per module, presenting key competence concepts in a clear, accessible and structured manner.

- Podcasts:
  Each module includes one audio podcast episode, featuring field experts discussing highly relevant topics such as cybersecurity threats, digital safety, or assistive technologies to support auditory learners.

- Expert Interviews:
  Each module incorporates one recorded video interview with a specialist (e.g., cybersecurity experts, police prevention specialists, digital inclusion practitioners, or healthcare technology specialists) to deliver practical insights and real-life examples.

## 6.6 Interactive Educational Games and Simulation

To enhance user engagement and reinforce practical skill acquisition, each module features an interactive educational game designed to simulate real-life digital situations, enabling seniors to practice strategic decision-making and problem-solving in a safe sandbox environment:

- General Safety Module:
  A simulation game where learners identify potential safety risks and fraudulent indicators in everyday situations.

- Cybersecurity Module:
  An interactive scenario where learners must recognize phishing emails, suspicious links, and complex identity fraud attempts.

- Media Literacy Module:
  A game-based activity that challenges learners to actively distinguish between credible sources and misleading online misinformation.

- Ambient Assisted Living Module:
  A digital simulation showing how assistive technologies can be practically configured to improve safety and independence at home.

## 6.7 SONET E-Tool Platform Specifications

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All completed educational resources, media channels, and learning outcomes are structurally integrated into the official **SONET E-Tool**. This interactive digital platform is meticulously designed to support senior-friendly web accessibility guidelines. The portal comprehensively hosts all learning modules, multimedia presentations, expert podcasts, video interviews, simulated learning scenarios, downloadable reference sheets, and interactive self-assessment quizzes. The E-Tool provides an intuitive, low-barrier learning environment where seniors can access resources independently or under the face-to-face guidance of adult trainers.

## 6.8 Role of Partners in Curriculum Development

The joint curriculum is developed through a highly collaborative matrix where each project partner assumes structural responsibility for specific core components:

- Module 1 (General Safety): Developed and led by PARASOL.
- Module 2 (Cybersecurity): Developed and led by E-SENIORS.
- Module 3 (Media Literacy): Developed and led by BLSH.
- Module 4 (Ambient Assisted Living): Developed and led by KIT.

All partners actively contribute by developing standard educational text; preparing localized multimedia materials, self-assessments, podcasts, and interviews; contributing to interactive game scenario templates; and participating in cross-consortium validation reviews. To ensure total local accessibility and equity, all final materials are translated into partner languages.

## 6.9 Expected Impact of the Framework

The shared pedagogical methodology and joint curriculum aim to achieve the following long-term strategic results across Europe:

- Increase seniors' digital confidence, self-efficacy, and functional autonomy.
- Improve cybersecurity awareness and daily data protection habits.
- Support safe, independent civic participation in the digital society.
- Promote active, healthy ageing-in-place through the deployment of assistive technologies.

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# 7 TECHNICAL ALIGNMENT WITH THE EUROPEAN DigComp FRAMEWORK

## 7.1 DigComp Competence Areas Covered

To ensure institutional validity and facilitate cross-border transferability within the European Union, the SONET framework contributes directly to four core competence areas defined by the established European Digital Competence Framework for Citizens (DigComp):

| DigComp Area | Focus in Project SONET |
|---|---|
| Area 1 – Information and Data Literacy | Evaluating online information, tracking rumors, and verifying content sources. |
| Area 2 – Communication and Collaboration | Using digital communication tools for family support and care connectivity. |
| Area 4 – Safety | Implementing cybersecurity, preventing fraud, and managing personal data privacy. |
| Area 5 – Problem Solving | Using assistive technologies to support personal wellbeing and independent living. |

*Table 8 - SONET Focus Across DigComp Competence Areas*

## 7.2 Systematic Mapping of SONET Learning Outcomes to DigComp Standard

To ensure institutional validity and facilitate cross-border transferability within the European Union, the 10 SONET learning outcomes are structurally aligned with the established **European Digital Competence Framework for Citizens (DigComp)**.

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| MODULE | TARGETED LEARNING OBJECTIVE | MEASURABLE LEARNING OUTCOME | DIGCOMP AREA | SPECIFIC DIGCOMP MAPPING |
|---|---|---|---|---|
| General Safety | Increase awareness of general safety risks. | Identify common safety risks in everyday digital and reallife environments. | Area 4: Safety | 4.1 Protecting devices and personal data. |
| General Safety | Safe use of digital devices and everyday technologies. | Safely operate basic digital devices and connect to internet services. | Area 1: Literacy | 1.1 Browsing, searching, and navigating data, information, and content. |
| General Safety | Improve capacity to recognize fraudulent communication. | Identify warning signs of online fraud, phishing, and spoofing attempts. | Area 4: Safety | 4.2 Protecting personal data and privacy. |
| Cybersecurity | Increase understanding of personal data protection. | Explain basic principles of online privacy and identify sensitive data. | Area 4: Safety | 4.2 Managing personal data and privacy. |
| Cybersecurity | Develop safe password and account management habits. | Create strong passwords independently and use standard security measures. | Area 4: Safety | 4.1 Protecting devices. |

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| | | | | |
|---|---|---|---|---|
| Cybersecurity | Strengthen safe navigation of online service platforms. | Demonstrate safe login and secure use of high-stakes websites. | Area 4: Safety | 4.1 Protecting devices and digital identity. |
| Media Literacy | Develop critical thinking regarding online information. | Distinguish between reliable and unreliable sources using indicators. | Area 1: Literacy | 1.2 Evaluating data, information, and digital content. |
| Media Literacy | Improve the ability to identify fake news and rumors. | Identify explicit examples of fake news and explain why they are deceptive. | Area 1: Literacy | 1.2 Evaluating information credibility. |
| AAL Technologies | Increase awareness of assistive smart technologies. | Identify specific assistive tools supporting safe independent living. | Area 5: Problem Solving | 5.2 Identifying digital needs and technological responses. |
| AAL Technologies | Develop operational utilization of assistive technology. | Successfully demonstrate the basic operational use of one AAL tool. | Area 2: Comm. | 2.1 Interacting through digital technologies. |

*Table 9 - Systematic Mapping of SONET Learning Outcomes to DigComp Standards*

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# 8 CONCULUSIONS

The shared pedagogical methodology and joint curriculum developed under Work Package 2 aim to achieve the following macro-level results across the participating European partner regions:

- Increase Seniors' Digital Confidence and Autonomy:
  Actively dismantling technology-related anxiety and threshold fear through supportive geragogical learning frameworks and positive validation.

- Improve Cybersecurity and Data Protection Habits:
  Equipping senior learners with actionable, permanent safe behavioral routines to successfully detect phishing attempts, resist psychological urgency tricks, and manage passwords securely.

- Support Safe Civic and Social Participation:
  Empowering seniors to independently interact with digital state registries, online administrative platforms (such as Cl@ve, BundID, France Connect), healthcare systems, and family communication channels.

- Promote Active and Healthy Ageing:
  Optimizing physical home security and long-term autonomy by integrating assistive technologies (Ambient Assisted Living solutions, wearable SOS panic alerts, smart sensors) into daily life.

By combining community-based delivery infrastructure (public libraries, senior associations, clubs) with peer-to-peer volunteer matching and multi-modal interactive E-Tool platforms, the SONET framework provides a comprehensive, sustainable, and highly replicable educational model for senior digital inclusion across Europe.

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