Asia-Pacific
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Training Package on Caregiver Digital Upskilling

APEC Human Resources Working Group

July 2022

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Economic Cooperation

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APEC Human Resources Development Working Group

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Contents

1. Introduction

Chinese Taipei initiated the APEC Skills Development Capacity Building Alliance (ASD-CBA) Project in 2017 with a view to promoting skills development for the 21st Century talents, workforce employability and competency standards, as well as serving as a collaborative platform to share experiences and best practices among member economies. This initiative sets off to host APEC-wide workshops, forums and training camps, where experts, scholars, policymakers, and human resource managers from member economies may exchange ideas and best practices. Apart from the proposing initiative, two ASD-CBA Institutes in 2017 and 2018 were established as a platform of exchange to promote people-to-people, institute-to-institute and project-to-project connectivity.

In 2020, Chinese Taipei launched the Project entitled “Promoting APEC Innovative Caregiving through Digital Upskilling” aims at exploring tech-enabled caregiving skills, new forms of caregiving work, new ways of caregiving workplace learning and training to empower caregivers, service providers, TVET authorities and training providers. In this project, we developed a training package on caregiver digital upskilling, which is expected to promote innovation and adoption of enabling technologies and services to facilitate connectivity and inclusive economic growth for the benefit of all people.

The “Training Package on Caregiver Digital Upskilling” contains a research work of local and regional industry at first, including the current state and future, dilemma and challenges, industry prospect, current state of talent and potential problems. Secondly, from the research result and workshop findings, description over industry work was summarized into the main duties, work tasks, work processes, behavioral indicators, work output, competency level, competency content (knowledge, skills, manner). Finally, competency model and curriculum map were developed, integrating with digital and technological elements, to achieve training purpose of train the trainees with digital skills and related knowledge of care services, and train the trainees to be fully tech-capable to engage in care services related industries.

2. Research Method and Results

An overview of local and regional digital skills industry of caregivers was investigated, including the current state and future, dilemma and challenges, industry prospect, current state of talent and potential problems. The training needs of health caregivers in relation to the development of industry/business/organization are analyzed from the perspectives of population aging market trends, caregiving industry needs, our advantage in digital technology and Smart Care Federation, which are as follows:

2.1 Population aging market trends

Population aging is already the main trend in the change of global population structure. According to the definition of current state and trend of global population aging provided by our National Development Council (NDC), population aging refers to the increase of elder people in a population of a region during a particular period of time. Since the decrease of fertility rate and the expansion of life expectancy have become common around the world, which result in the continued reduction in the global youth population and the continued increase of elder population. The population aging has become the main driving force of global population variance in the 21st Century. Therefore, the long-term caregiving of elder people, and even the preventive caregiving of subhealth group, is currently the main concern in global health issues and will hugely affect the future society.

Population aging has become the main trend in global population change of the 21st Century. Most of the developed economies have reached “aging society,” or even “super-aging society.” According to World Population Prospects 2019, aging population (over the age of 65) accounted for 9.1% of the world, and by 2050 it will rise to 15.9%. Accompanied by the population structural change, aging and incapacitated population will also increase rapidly, and the needs of long-term care will also rise quickly.

The target groups of long-term care in Chinese Taipei include incapacitated elderly and disabled people. According to the statistics issued by the Ministry of the Interior, the number of persons with

disabilities reached 1.19 million in 2018, which accounted for 5.09% of the population. In addition, according to the estimate of NDC, Chinese Taipei is likely to become a “super-aging society” in 2025, which means that the proportion of elder population will account for over 20% of the overall population. An average of 3-4 young people will have to raise an elder person, so the need of long-term care will rapidly increase. According to the Long-Term Care 2.0 Implementation and Review issued by the Ministry of Health and Welfare in November 2020, the number of long-term care subjects was 106,000 in 2017, 180,000 in 2018, 284,000 in 2019, and 316,000 between January and November 2020.

In 1960, the economy that had the highest percentage of elder population (over the age of 65) was Austria. Among the list of top 30 economies, 24 of them were in Europe, 3 in Americas and 2 in Oceania. As for the Asian economies, only Georgia was among one of the top 30 list, while Chinese Taipei and Singapore were categorized as two of the 14 economies that had the lowest percentage of elder population. These figures showed that European economies, especially western and northern ones, had the highest percentage of aging population, while Asian economies had a comparatively lower percentage of aging population. Japan became the economy that had the highest percentage of aging population in 2010. As for the list of the top 30 economies, most of them were in Europe except Japan, Georgia and Canada. The rank of southern European economies was drastically higher, while eastern European economies was ranked slightly forward, and northern European economies ranked slightly backward. In Asia, while Chinese Taipei, Hong Kong, China, Korea and Singapore were not placed on the list of top 30, yet the sequence has been drastically moved forward.

It is estimated that by 2060, the economies that will have the highest number of percentage of elder population is Qatar, and followed by Chinese Taipei, surpassing Korea, Japan and Hong Kong, China Asia will become the region that has the highest percentage of population aging, especially in West Asia (Middle East), East Asia and Southeast Asia; as for Europe, southern and eastern European economies will have the highest percentage of elder population except Germany. Because of the social

structural change and advanced medical technology, the fertility rate and mortality rate have both declined. The society will consist of low fertility rate and aging people, and the needs of long-term care will inevitably become stronger. The society is no longer composed by large families as it was decades ago, so individuals will have to carry a burden of long-term care, which is heavy and hard to be shared by. Relevant economic and social problems will subsequently occur, and the needs of long-term care will also increase quickly.

2.2 Health caregiving industry needs

The primary needs of Chinese Taipei's long-term care service focus on home service daytime caregiving, domestic care, elder catering service, transport service, etc. The facilities include long-term care institutions, nursing institutions and elder apartments, elder housing, etc. Many families that have the needs of long-term care choose home care rather than long-term care institutions; however, in comparison with the needs of home-based long-term care, the current manpower is insufficient, so foreign caregivers are employed by many families to become home caregivers.

Currently, there are 1,091 long-term care institutions and nursing homes in Chinese Taipei, which could accommodate 59,000 people; however, this volume is still insufficient in comparison with the large number of future elder population. By July 2020, there were a total of 126,000 caregiving workers, including 82,256 licensed caregivers, 4,898 home caregivers, 37,835 social workers and medical staff, 1,236 caregiving managers. The ratio between caregivers and service users (those being taken care of) is 1:2.5. According to the statistics issued by the Ministry of Labor, there are a total of 245,957 foreign caregivers by March 2020, yet this number decreased sharply to 229,961 in March 2021 with a declining number of 15,996 and a percentage of 6.5%. The aforementioned information has shown the continued increase of long-term care needs, yet since the number of caregivers is comparatively insufficient to the services provided, developing digital caregiving to reduce the workload of caregiving and strengthen relevant quality is highly recommended as a future strategy.

2.3 Chinese Taipei's advantage in digital technology

In response to the needs of long-term care derived from rapid population aging, the cultivation of care service manpower is accelerated along with the mobility of talent in order to be in line with the development of long-term care system and service manpower. The main workforce of caregivers in Chinese Taipei consists of female workers aged between 45 and 54, who often need to frequently carry heavy goods or the person being taken care of. Relevant consequences also include unnatural posture, standing or walking around for a long time. Because of the advanced development of Chinese Taipei's industrial technology, there are some assistive equipment that could provide assistance to caregiving, such as technique of Robotic Exoskeleton, attire of Wearable Robotic Exoskeleton. Training programs are urgently needed to reduce occupational injuries or lack of manpower.

According to the statistics of NDC, the elder population will reach 5.59 million in 2030, yet the working age population (15-64 years) will decrease to 15.15 million. Under the dual impact of aging and low fertility rate, modern health caregiving is indispensable to the usage of digital technology. According to relevant studies, utilization of technology will be able to increase the productivity of caregivers. Technology-based health caregiving patterns are as follows:

(1) To utilize policymaking support and standardized work process is a key step in realizing the improvement of productivity. Systematic caregiving service could reduce variance and improve policymaking accuracy.

(2) To improve the relations between patients and caregivers by providing appropriate tools to enhance patients' participation rate and self-management ability.

(3) By providing a more active and target-oriented caregiving to reduce cost, so that service providers are able to intervene at an early stage with the support of strong analysts in order to maintain the health of people.

(4) Caregiving providers are supported by integrated caregiving for a more efficient cooperation in order to reduce the loss of cost resulted from fragmented and repetitive services.

(5) Caregiving providers are able to have an easier access to the technical support and recommendations from experts to facilitate the adoption of correct measure in order to reduce clinical transfer and hospital readmission.

(6) To utilize technology for planning staff duty itinerary and patient flow, so that the volume of processing could meet requirements and improve arrangements. Resource management quality may also be upgraded.

(7) To integrate the function of analysis, improve the scientific and organizational development in order to create a sustainable circulation for learning and progress.

2.4 Chinese Taipei Smart Care Federation

Chinese Taipei will reach “super-aged society” in 2026, and people aged 65 and over will account for more than 20% of the population. The caregiving manpower will not be able to cope with the large needs of caregiving in the future, and long-term care has become a forthcoming challenge. Facing more aging problems, dementia and agony of caregivers, Peng Yu-Min pointed out that the government has built a consensus of cooperation in the field of long-term care. As the government enacted Long-Term Care 2.0 in 2017, and besides social welfare, long-term care has been established as an industry. After conducting cross-cutting integration, stakeholders include private caregiving institutions, medical resources, technology industry, furniture retail, sports, construction companies, security companies and academia. The list of businesses for inter-disciplinary collaboration includes Testrite, Ritek, Chunghwa Telecom, Excelsior Medical, Advantech, AU Optronics, APEX Healthcare. More than 20 businesses are in connection to form “Chinese Taipei Smart Care Federation,” and established a new model with integration of artificial intelligence (AI), semiconductor chips and communication, and information security, so that caregiving technique and products may be verified, tested and integrated on this platform to provide overall service package. Technology is utilized to transfer traditional caregiving into a more efficient and well-qualified smart

caregiving. Patients will be able to receive a better caregiving by reducing and postponing the occurrence of sickness. The workload of caregivers will also be reduced and the problem on long-term care may be solved.

3. Workshop Summary Report

Promoting APEC Innovative Caregiving through Digital Upskilling Workshop

(Thursday, 23 September 2021 at 14:00-16:20 (GMT+8))

3.1 Objective of the Meeting

The main objective of this workshop is to identify best approaches of digital training for caregivers as well as APEC economies' implementations of digital technology of practical solutions for caregivers seeking to solve problems, learn new skills and get support.

Due to the COVID-19 pandemic, the meeting was held in a hybrid mode for 1 day through the Google Meet platform. Speakers and participants have to join online from various time zones. They were gathered in that platform with keynote speech, presentation and panel discussion.

Target audiences of this workshop are government officials who are in charge of making digital healthcare policies, training institutes and TVET educators who provide assistance in the development of public and private programs for caregivers.

3.2 Briefings of the Presentations in the Workshop

The speakers came from various backgrounds of expertise, such as policy makers, academics, researchers in APEC economies. This workshop was opened by APEC HRDWG Lead Shepherd, Professor Dong Sun Park, APEC HRDWG CBN Coordinator, Ms. Rosanna Urdaneta and Director General of Workforce Development Agency, Ministry of Labor, Mr. Meng-Liang Tsai.

3.2.1 Opening Remarks

1. Professor Dong Sun Park, APEC HRDWG Lead Shepherd

Against the backdrop of the fourth industrial revolution and COVID-19, modern society is undergoing a demographic shift to an aging society. Thus, caregiving for elderly people as well as for other underprivileged people has become an important social issue. Medical researchers, caregivers, scientists, and engineers actively collaborate to find innovative solutions to enhance the caregiving system.

Good caregiving contributes to remedying chronic illness and disabling conditions. Caregiving also provides individuals with a sense of fulfillment and a feeling of need and usefulness. More importantly, caregiving establishes extended social networks, which enrich the meaning of life. Therefore, we need quality caregiving human resources, who are competent with not only professional medical knowledge, but also good communication, interpersonal skills, and good characteristics such as patience, and compassion.

In this connection, today's workshop will be a useful opportunity for APEC member economies to discuss exemplary caregiving policies and programs. Our efforts would establish a comprehensive public and private care system for seniors and also people with disabilities. With concerted efforts, we can develop a holistic patient-centered and integrated care system, as well as a community-oriented regional care system in the Asia-Pacific region.

2. Ms. Rosanna Urdaneta, APEC HRDWG CBN Coordinator

CBN Coordinator Rosanna Urdaneta welcome speakers and participants for attending this workshop. As CBN pursues the objectives of capacity building and skills development for workforce, digital upskilling for health caregivers is a key factor that promotes the transformation of the industry.

3. Mr. Meng-Liang Tsai, Director General of Workforce Development Agency, Ministry of Labor

Due to the rapid change in technology and the spread of pandemic, the labor market now faces new challenges of transformation on traditional jobs, yet it also creates new opportunities of working style. Today, economies have been trying to harness the core skills for the future of work, and to build workforce that could keep pace with the quick change. In addition, cross-cutting resources have been used for planning of feasible programs. We look forward to seeing experts from academia and industry sectors to explore best practices and ways for the updated caregivers' digital upskilling, and hope to witness a fruitful exchange in this workshop in order to lay a more solid basis for future regional cooperation.

3.2.2 Workshop – keynote speech

This keynote speech addresses structural reform and future of work from the policy perspective.

1. Mr. Emmanuel A. San Andres, Analyst, Policy Support Unit, APEC

Technology, climate change, globalization and aging are mega drivers of the future work. Also, The COVID-19 pandemic has had a significant impact on enterprises and workers, affecting what work is available and how it is conducted. Some of the policy measures responding to COVID-19 come with serious economic costs, causing economic activity to slow down, and for some sectors to a near halt. Aa a result, from a policy perspective, we need to develop effective social protection systems, to develop skills and improve productivity and design efficient labour market regulations.

3.2.3 Workshop – presentation

This session focuses on competencies in caregiving. By combining innovative approaches, the speakers introduce how training package being developed and how training package may change the work functions, tasks and skills requirements.

1. Mr. Ching-Shun Li, Consultant, Chinese Management Association (Economy: Chinese Taipei)

In order to develop a caregiver digital upskilling training package, we underwent the following process:

(1) Demand Analysis: exam current industry; set up training objectives; confirm competencies required

(2) Reconstruct Competency Content: define target trainees; define competencies and demands; define the correlation and difficulties of the competency behaviors and contents

(3) Curriculum Map: define the competency level; organize overall curriculum structure; define prerequisite knowledge

2. Ms. Liju Lina Lin, Director, National Taipei University of Nursing and Health Sciences (NTUNHS) (Economy: Chinese Taipei)

Types of caregiver applications are as follows:

(1) Coordinating Care

a. The place where colleague, supervisor, nurse can go to find out how they can help you with caregiving.

b. Offer a calendar that your aging group can sign up to provide transportation to doctor appointments

or come by for a visit and more.

(2) Medication Management: Faced with multiple prescriptions and over-the-counter medications, the applications often include pill identification tools such as the FDA Drug Database, medication scheduling trackers and reminder alarms.

(3) Personal Health Record Tracking: Keeping track the health of the case your care for and offer secure tools to protect privacy, offer strategies to organize personal health records.

(4) Portable Device: Care providers will provide living support and care services for 3-4 family cases every day. A portable digital device needs to be lightweight and easy to use.

3.2.4 Workshop – Panel Discussion

This session focuses on the following topics:

1. Digital solutions for home care and caregivers responding to the COVID-19 pandemic
2. Best practices of innovative caregiving to empower public and private stakeholders (caregivers, training/service providers, TVET authorities)
3. The feasibility to enhance digital skills of caregivers in a tech-enabled workplace
4. The gap between technology's transformative potential and caregivers' ability to utilize it to reach wide-scale adoption
5. The next steps beyond competency-based training
6. Business models suitable for family caregivers

The panelists are as follows:

1. Ms. Carina Robinson, Program Lead, Aged Care Centre of Excellence, Technical and Further Education New South Wales (TAFE NSW) (Economy: Australia)

As the digital capacity is strengthened, sufficient technical support is also provided along with a more comprehensive regulatory safeguards to create a more friendly and safer environment for caregivers and patients.

2. Mr. Pitoyo Nugroho, Coordinator of Institutional Management, Ministry of Education, Culture, Research, and Technology (Economy: Indonesia)

In the Indonesian Curriculum Vocational High School, we involve industry in every aspect. For example, we arrange curriculum with industry to ensure hard skills being accompanied with soft skills. We invite guest expert from industry to teach project-based learning. By doing such, we provide quality workforce compatible with industry requirement.

3. Mr. Lorenzo Emanuel L. Guillermo, Acting Executive Director, Qualifications and Standards Office, Technical Education and Skills Development Authority (Economy: the Philippines)

The emerging technologies provide promising directions for family caregivers, such as remote monitoring, telehealth, enhanced IOT, assistive technologies. The internet has democratized access to information. There is a need to balance the benefits and promises of new technologies with their unintended consequences and risks. However, in the long term, it is the very nature of technology's rapid evolution that will increasingly make technology a crucial element in improving support for and the well-being of family caregivers.

4. Professor Eric Y. Chuang, Dean, College of Biomedical Engineering, China Medical University (Economy: Chinese Taipei)

Long-term care caregivers are mostly from social welfare and nursing backgrounds, and are not familiar with medical technology. Therefore, a credible "third-party platform" is urgently needed to help long-term care institutions understand smart medical technology. The long-term care industry face 3 tough problems, that is "falls in elderly," "dementia," and "insufficient caregiving workforce." We've established a Long-term Care Experiment Field incorporating to solve these 3 problems. In the Empowerment Area, senior exercise and fitness tips are offered, and doctors issue exercise prescriptions to reduce the risk of falls. In the Monitoring Area, a machine collects physiological information to grasp the physical condition of patients with dementia. In the Solution Area, AI robots are utilized to relieve the pressure of insufficient caregiving workforce.

5. Mr. Somchai Jakkareen, President, Thai-German Institute (Economy: Thailand)

Competency elements consist of knowledge, skill and attribute. The result of competency application is superior performance. A competency-based training framework contains competency assessment to

analyze competency gap to develop training program. The next step beyond competency-based training includes self-development through continuous learning, and a trainer is a facilitator and a presenter when delivering content, mentoring, coaching, and supporting change efforts.

6. Mr. Nguyen Anh Duong, Director, Department for General Economic Issues and Integration Studies, Central Institute for Economic Management (Economy: Viet Nam)

In Viet Nam, the numbers of people over 60 years old are rising. Various health incidences for older people become common. Both young and elderly people are increasingly familiar with use of information technology, which causes natural demand for enhancing skills of caregivers. But the training of digital skills for caregivers is still in early stage, for example, training curricula slowly adapted to the new contextual demand. Even awareness of digital skills very limited at caregiving businesses. In the future, more apps to support caregiving services would be necessary, and digital inclusion should be conducted, that is not just for people in remote and disadvantaged regions, but also for those under risks of exclusion in modern home in urban.

3.3 Results of Questionnaire Survey

There was a questionnaire survey to workshop participants after the workshop for purpose of statistics calculation (such as female participation rate and satisfaction rate) and feedbacks and comments gathering. The questionnaire is distributed together upon workshop registration in order to give time for the participants to answer.

Due to the Covid-19 pandemic and the related travel restrictions, we've planned the workshop a virtual and hybrid event. Target goals for overall event attendance is satisfactory. It was expected that at least 50 participants present in the workshop, this indicator was successful achieved due to that the workshop gathered 51 participants (33 female, 18 male).

As travel restriction and pandemic-control measures are implemented in Chinese Taipei, there is no requirement for funding participants as travelling and in-person attendance is not feasible.

The survey had collected 39 responses from participants in total (approximately 76% of the participants), from audiences of industrial and academic field in trades of TVET and human resources. Moreover, women participation in the project among the audience reached 64% which surpasses the target percentage of 50%.

Meanwhile, 70% participants reveal substantial knowledge increase on caregiving digital skills which meets our target percentage.

Audiences' response to the quantitative questions about the program objectives, content, and facilitator (see the following table) were positive.

Survey Responses

Question	Strongly Agree	Agree	Disagree
The objectives of the training were clearly defined	19	20	0
The project achieved its intended objectives	18	21	0
The agenda items and topics covered were relevant	13	26	0
The content was well organized and easy to follow	16	23	0
The trainers/experts or facilitators were well prepared and knowledgeable about the topic	14	25	0
The materials distributed were useful	16	22	1
The time allotted for the training was sufficient	15	24	0

	Very	Mostly	Somewhat	A little	Not much
How relevant was this project to yo and your economy?	16	21	1	1	0

	Very Substantial	Maybe	Not substantial
Do you feel substantial knowledge increase after participating in the event?	36	3	0

	Dissatisfied	Neutral	Satisfied
Overall, what is your level of satisfaction for this workshop?	0	5	34

APEC Project Evaluation Survey

APEC Project Survey HRD 09 2020A

ASD-CBA Project: Promoting APEC Innovative Caregiving through Digital Upskilling

Session: 23 September 2021

Thank you for attending the HRDWG 09 2020A Promoting APEC Innovative Caregiving through Digital Upskilling workshop on 23 September virtually held in Chinese Taipei. We would now like to gather your feedback with regards to how well the event has been organized and how it has helped build capacity for you. We value your inputs and this survey takes about 5 minutes to complete. We would appreciate the completion of this survey no later than October 1. Thank you.

Instructions: Please indicate your level of agreement with the statements listed in the table below.

	Strongly Agree	Agree	Disagree	COMMENTS (Continue on back if necessary)
The objectives of the training were clearly defined				
The project achieved its				

intended objectives				
The agenda items and topics covered were relevant				
The content was well organized and easy to follow				
The trainers/experts or facilitators were well prepared and knowledgeable about th topic				
The materials distributed were useful				
The time allotted for the training was sufficient				

1. How relevant was this project to you and your economy?

- very
- mostly
- somewhat
- a little
- not much

2. In your view what were the project's results/achievements?
3. What new skills and knowledge did you gain from this event?
4. Do you feel substantial knowledge increase after participating in the event?

- Very substantial
- Maybe
- Not substantial

5. Overall, what is your level of satisfaction for this workshop?

- Dissatisfied
- Neutral
- Satisfied

6. How will you apply the project's content and knowledge gained at your workplace? Please provide examples (e.g. develop new policy initiatives, organise trainings, develop work plans/strategies, draft regulations, develop new procedures/tools etc.).
7. What needs to be done next by APEC? Are there plans to link the project's outcomes to subsequent collective actions by fora or individual actions by economies?
8. How could this project have been improved? Please provide comments on how to improve the project, if relevant.

Participant information:

Name:

Organisation/Economy:

Email:

Gender: M/F

4. Case Study, Focus Group Meeting and Best Practices

From the previous research result and opinions gathered from the workshop, we found out that with the improvements in the IT sector, IoT, Big Data and AI, technologies are used in the development of digital assistive devices for elders; such digital assistive devices may help care attendants by more conveniently and efficiently providing daily care and healthcare services for elders and the disabled. For healthcare workers, favorable digital tools will be deeply involved in professional care procedures to help professional talent complete their work accurately and remind them of omitted or incomplete procedures at the appropriate points of time to achieve highly efficient, high-quality services. Furthermore, digital technologies shall also consider professional cooperation, real-time information integration, and assistance to achieve a favorable and consistent quality of care. Digital tools with such considerations that connect the intelligence and abilities of professional talent are goals for long-term care digital technology. In order to understand the needs of caregivers in the use of digital tools or assistive tasks, this project adopt case study as the method to understand the needs of caregivers in various economies in terms of digital technology and expert focus groups to develop digital tools and training kits for home-based caregivers.

4.1 Case Study on the Digital Skills Enhancement Needs of Caregivers in Philippines, Viet Nam, the United States, Thailand, and Chinese Taipei.

In order to understand the technical items and contents of digital tools that should be cultivated for caregivers in each economy, a case study was conducted. The case study methodology was used to compile a summary of the relevant presentation or studies on digital skills enhancement for caregivers published by APEC member economies, including the Philippines, Viet Nam, the United States, Thailand, and Chinese Taipei.

A. Case Study (Philippines)

Name: Mr. Lorenzo Emanuel L. Guillermo

Occupation: Acting Executive Director, Qualifications and standards office, Technical

Education and Skills Development Authority

Mr. Lorenzo Emanuel L. Guillermo introduces the challenges on applying technology solutions he confronts, such as inclusion and access of technology solutions, privacy and security concerns, lack of standard and interoperability between caregivers and patients, and misunderstandings of caregivers' job expectations. He also says the emerging technologies provides promising directions for family caregivers. These emerging technologies include enhanced internet of things and technology platforms, remote monitoring/telehealth, mobility/autonomous vehicles, assistive technologies, virtual/augmented/mixed reality, financial technologies and machine intelligence. He in the end concludes that how to keep pace with the speed of technology will be the one constant challenge in ensuring that remains relevant to practice. Also, he says competency-based training can reduces cost overruns caused by poor performance or miscommunication of job expectations.

B. Case Study (Viet Nam)

Name: Mr. Nguyen Anh Duong

Occupation: Director, Department for General Economic issues and integration Studies,

Central Institute for Economic Management

Mr. Nguyen Anh Duong says Viet Nam made drastic efforts to promote comprehensive economic reforms, aiming to broaden economic opportunities and capacity to realize such opportunities for all the people. This brings Viet Nam GDP growth, but also brings some challenges, such as the costs of taking care by oneself became higher and causes the rising demand for caregivers. He indicates that as both young and elderly people are increasingly familiar with use of information technology, it results in natural demand for caregivers to enhance digital skills. In addition to the above, further push for professional digitally-enabled caregiving services in the future are due to robust improvement of people's income, increasing popularity of smart home, modest development of social

insurance, rising interest of foreigners to come to Viet Nam to enjoy caregiving services, data analysis and ease of coaching/monitoring by employers. He in the end concludes that it is still not popular for caregivers to upskill in Viet Nam and more focus should be put on modern household appliances.

C. Case Study (Thailand)

Name: Mr. Somchai Jakkareen,

Occupation: President, Thai-German Institute

Mr. Somchai Jakkareen mentioned competency elements consist of knowledge, skill and attribute. The result of competency application is superior performance. A competency-based training framework contains competency assessment to analyze competency gap to develop training program. The next step beyond competency-based training includes self-development through continuous learning, and a trainer is a facilitator and a presenter when delivering content, mentoring, coaching, and supporting change efforts.

D. Case Study (USA)

Name: Kathleen Kelly

Occupation: Executive Director, Family Caregiver Alliance

Ms. Kelly has mentioned family caregivers need the databases of assistive technologies exist online, there needs to be better linkage between a problem identified and the possible technology solution. Just a database alone is not enough and is often overwhelming. Next, there needs to be training on the use of technologies online using quality production values and available in multiple languages. Training needs to include how to identify the problem, match the technology (or modify the home) and finally instructions on use of the device, program or modification made to the home. In addition, there needs to be training of professionals and paraprofessionals in the community about assistive

technologies and most importantly, where to refer family caregivers and adults with disabilities for additional assistance. The use of assistive technologies has proved to be successful in preventing injuries and alleviating stress in family caregivers. Now the task at hand is making sure families have access and support in using these technologies so they may provide better care at a lower risk for themselves and for their loved ones.

E. Case Study (Chinese Taipei)

Name: Liju Lin

Occupation: Director of International Education Center, NTUNHS

Ms. Lin has stated that the digital technology and assistive aids needs of home caregiver should cover the functions including (1) complete documentation and access to caregiving records; (2) reduced risk of judgment errors in physical assessments and health index measurements; (3) immediate access to resources and information on care response capabilities; (4) effective and immediate communication with the care receiver or support team; (5) reduced physical burden of home (6) Create a caregiving calendar; (7) Arrange home visitation pathways; (8) Integrate caregiving resources to download health education videos or instructions; (9) Directly link to other caregiving support services such as transportation, hospital follow-up, etc. Especially for the 70% of caregiver in Chinese Taipei who are middle-aged or older and second-time workers, a good digital technology is not about functional power, but about ease of learning and operation, and the ability to understand and communicate information with their client or their relatives and share notes with other care workers.

In summary, the above case studies show that the majority of the economies' demands for digital skills enhancement for caregivers focus on the ability to reduce caregiving workloads and errors, reduce workplace injuries, and increase the use of digital tools and operational skills for effective caregiving information transfer and communication.

However, considering the differences in the work content, workplace environment, and cost of digital tools among caregivers and care recipients, this project uses a focus group as a research methodology to define the most common work content and the digital tools that can be used by caregivers.

4.2 Focus Group Meeting

In addition to the above findings, the research team invited professionals and academics to conduct “focus group” meeting to recommend the digital competencies that caregivers should possess and to plan the core competencies and curriculum framework for digital skills training programs for caregivers. Through the training program, caregivers engaged in aging care will be equipped with skills to operate digital tools and technological assistive devices to reduce the workload and stress of providing daily nursing and care services and to alleviate the crisis of physical injury caused by providing care services in the workplace.

4.2.1 Focus Group Meeting - Methodology

The purpose of the focus group meeting was to solicit a wide range of expert opinions on digital tools that could be used to enhance caregiver productivity and reduce work-related injuries in the caregiver workforce. invited industry and education professionals in the fields of aging care and digital technology in Chinese Taipei to participate in focus group meetings and conducted three focus group meetings.

15 professionals and experts were invited to the first focus group meeting to identify the digital skills or assistive device use skills required for homecare caregivers to perform aging care services. in August 2021, a second "focus group" meeting was conducted, in which 7 experts were invited to identify the core competencies of digital skills and technical assistive devices based on the content of occupational competency standards for home caregivers issued by the Ministry of labor and

structure of the training program. Finally, a third Focus Group meeting was conducted in October 2021, where five professionals and experts identified the core digital competencies required for homebased caregivers, the content of the training program, and the assessment methodology.

4.2.2 Focus group meeting - the common service content of home-base caregiver

Based on the result of three focus group meetings, the professionals and experts has identified the common service content of home-base caregiver are as follows:

(1) Vital sign measurements and records. Caregivers may need to keep track of chronic conditions, or asses pain levels.

(2) Observe health status, i.e., diet, sleep, blood pressure and defecation

(3) Maintain physical functions, hygiene, and assist in requirements of daily healthcare

(4) Assist in the safe moving, turning over, or going up/down the stairs. Falls are a major risk to the health of older adults. Caregivers should take steps to help prevent falls and help older adults stay safe and comfortable.

(5) Maintain the independent execution abilities of individual cases in daily lives. Assist with basic needs such as eating, bathing, grooming and toileting.

(6) Provide the necessary health care education or instructions to clients and their families to comply with diet, cleanliness and medication related precautions.

4.2.3 Focus group meeting recommended nine digital skills for homebased aging caregiver

In addition, based on the above listed the common service content of home-based elder care providers, focus group experts recommend that caregiver shall possess a total of **nine digital skills when engaging in homebased aging care services.** These nine digital skills include:

(1) Use technology to fully document and view care (care) records.

(2) Utilizes digital tools to minimize risks associated with physical assessments and health index measurements.

(3) Ability to access and search information in order to promote the accuracy and quality of care.

(4) Ability to communicate immediately with the person receiving care or support team.

(5) Ability to use and operate assistive devices to reduce physical strain in the delivery of care

(6) Uses tools to develop and remind caregivers of work schedules.

(7) Use technology for planning home visiting route

(8) Be able to use digital tools to integrate nursing resources, download health education videos, or explain health indicators

(9) Be able to immediately connect to other care and supportive services (i.e., transportation and revisits at hospitals).

4.3 Five Best Practices

Based on the common service content of caregivers summarized by the focus group and their recommended 9 digital skills for caregivers, and corresponding to the professional competency standards for family caregivers issued by Chinese Taipei, the research team recommended to enhance the training of digital skills and aids for caregivers in vital sign measurement, wound care, lifting and case health tracking, and to establish key core competencies and training programs. As a result, 5 best practices were summarized by combining the 'digital skills and technical aids for vital signs measurement, wound care, lifting and case health tracking.

(1) Lift and moving aids: The most common occupational injury to homebased caregivers is when assisting the elderly in lifting and moving. Having the assistance of a lift or moving machine can reduce physical injuries to both the caregiver and the care recipient during movement.

(2) Decubitus ulcer wound measurement: Digital decubitus ulcer wound measurement can provide nursing staff with objective wound judgment, such as wound depth and infection level, to help nursing staff perform wound cleaning care for the elderly.

(3) Digital physiological measurement: the elderly could be monitored with physiological devices

(4) Remote able health tracking platform: home-base caregivers need to visit client’s house for providing care service and keep track of the life and health status of the client and communicate with the case's family or other care team in real time to arrange other care support.

(5) Position sensing detection: sensor-based elderly monitoring technologies in the home that detect elderly event, i.e., activities of daily living and falls with the aim of facilitating independent living.

The equipment being utilized in the practices above are as follows:

(1) Digital electronic sphygmomanometer

(2) Blood glucose, uric acid, and total cholesterol monitoring system

(3) AI Skin Wound Measurement APP

(4) Remote care cloud APP record

(5) Electronic ground raiser

(6) EZ-GO Patient Transfer Chair Stretcher (EZ-710)

(7) Cloud health management information platform

(8) Digital vital sign measurement equipment (including blood pressure, blood oxygen, blood glucose, and ear thermometer)

5.Training Package

Through a systematic curriculum development process, the digital skills enhancement needs of local and regional caregivers were first investigated, including current and future, dilemmas and challenges, industry outlook, talent status, and potential issues. Secondly, the caregiver job descriptions were grouped into the following items, such as primary responsibilities, job tasks, work processes, behavioral indicators, job outputs, competency levels, and competency content (knowledge, skills, and modalities). After that, the curriculum was developed based on “iCAP” by integrating the current digital technologies and relevant hands-on approach used by the caregivers. (Chinese Taipei's

curriculum quality review system), the training plan for this curriculum is as follows.

5.1 Background of the Training Program

The program cultivates students' basic knowledge and skills in utilizing digital or technological assistance in healthcare expertise. Students learn to show care, apply knowledge and skills related to healthcare, and duly utilize digital technologies and skills in practical scenarios for elders or long-term care through discussions, reflections, skills training, teaching back, autonomous learning experience activities, and other diverse training strategies and learning methods.

5.1.1 Training Design

1. Studying Qualification:

   Those who possess the professional qualifications of nursing and care attendants or possess relevant work experiences in elderly care.
2. The implementation status of the program's horizontal integration and vertical connection: The training design of the subject vertically connects the demands of professional talent for the healthcare of all ages and the concept of using digital technologies in long-term services, and horizontally integrates basic caring skills to cultivate the expertise used by students when engaging in various scenarios of care under the assistance of digital technologies.
3. Participation Recommendation: None.

5.1.2 Training Objective

After completing the program, the students will be able to achieve the following objectives:

1. Understand the concept of elderly healthcare digital environments and practical abilities.
2. Be familiar with skills of digital and basic care service in elderly healthcare practice.
3. Utilize integrated digital tools for individual health data records for care service items and other knowledge and skills related to elderly healthcare service connection, measure updates and health tracking management, and cultivate the trait of autonomous learning.
4. Accurately operate digital tools and execute elderly healthcare techniques and cultivate the trait of autonomous learning.

5. Possess the people-oriented concept for elderly healthcare to provide comfortable care and safe daily care for individual cases.
6. Possess the safe workplace risk evaluation ability and self-protection ability.

5.1.3 Training Plan

Opening Department			
Subject	Digital Skills Training Program for Healthcare Services		
Class		Credit	
Category			
School Year/Semester	1st semester		
Time	Intensive lecturing (Monday to Friday 9:00 ~ 17:00)		
Venue	Base and practical fields		
Lecturer	1. Professor HSIEH, NAN-CHEN 2. Lecturer, ITRI 3. Lecturer HUANG, HSIANG-HSIANG		

Table 1. Basic Information of the Training Program

Session	Date	Program Process	Training Hours	Remark
1		Introduction to the Program	1	
2		longterm care service and educational development trend	1.5	
3		Current state of digital long-term care service systems utilization and trend	1.5	
4		Aging care institution or assistance center visits (2 units)	3	
5		Utilize digital tools in basic vital sign measurement Technical audit: Utilize digital tools to carry out the measurement and recording of vital signs – body temperature, pulse, breath, blood pressure	6	
6		Utilize technological assistance devices in moving body Technical audit: Assist with moving and posturing, assistance device operation and safety, and the accuracy of	6	

		transportation techniques		
7		Program evaluation 1. Theory audit 2. Technique audit	3	

Table 2. Training Hours and Training Process

5.2 Course Units and Correlation with Functional Standards

Course units and the corresponding functional standards are as follows:

Training Objective of the Program				Functional Context Quotation/Analysis			Curriculum Content
Course (Unit) Title	Function Level	Number of Hours	Training Objective	Corresponding Behavioral Index	Knowledge (K)	Skill (S)	
Long-term care service and educational development trend	3	1.5	1. Learn the current development state of long-term care				1. Description of significant long-term care policies 2. Long-term care talent cultivation models 3. Future promotional direction for long-term care expertise and talent
Current state of digital long-term care service systems utilization and trend	3	1.5	1. Understand the utilization of digital information in long-term care services				1. The integration and utilization status of long-term care services and digital technologies 2. The integration between digital healthcare technologies and resident care

Training Objective of the Program				Functional Context Quotation/Analysis			Curriculum Content
Course (Unit) Title	Function Level	Number of Hours	Training Objective	Corresponding Behavioral Index	Knowledge (K)	Skill (S)	
Integration, utilization, and practices of digital technologies and vital sign measurement and disease sign detection	3	6	1. Be able to describe the theory of using digital technologies in vital sign compilation and disease prediction of individual cases of care 2. Be able to operate digital tools for vital sign measurement, information integration, and initial judgment, and other digital practicing techniques	P3.1.1 Utilize digital tools for vital sign measurements and records. P3.1.2 Utilize digital tools in observing health status (i.e., diet, sleep, blood pressure, and defecation). P3.1.3 Utilize digital technologies in maintaining	K18 Knowledge related to utilizing digital technologies in disease sign judgment K19 Usage of digital technologies for measurements related to body temperature, pulse, breath, blood glucose, and blood pressure K20 Methods for	S17 Operations and information interpretation ability for using digital tools in vital sign measurements S18 Knowledge and methods of using digital technologies in senses and awareness evaluations S19 Ability to use digital technologies in	1. State of utilizing digital technologies in vital sign measurement 2. Utilize digital technologies in disease sign detection and evaluation 3. Utilize digital measuring tools for vital sign measurement and information upload 4. Integration and utilization of digital technologies and information and interpretation of common diseases

Training Objective of the Program				Functional Context Quotation/Analysis			Curriculum Content
Course (Unit) Title	Function Level	Number of Hours	Training Objective	Corresponding Behavioral Index	Knowledge (K)	Skill (S)	
				physical functions, hygiene, and assist in requirements of daily healthcare.	preventing low blood pressure in digital technologies K21 Knowledge related to factors affecting sleep and utilizing digital technologies in improving the quality of sleep	determining health status SS04 Duly listen	
Practices of using digital assistive devices in daily life assistance and work safety for	3	8	1. Theory and practical skills that are able to utilize digital technological assistive devices in	P4.3.1 Assist service targets in accurately using digital assistance	K32 Categories, functions, usages, and timing of digital technological	S24 Ability to operate digital technological assistance in assisting in safely	1. Items of daily caring service and working risks of care attendants 2. Applicability status and risk evaluation for the

Training Objective of the Program				Functional Context Quotation/Analysis			Curriculum Content
Course (Unit) Title	Function Level	Number of Hours	Training Objective	Corresponding Behavioral Index	Knowledge (K)	Skill (S)	
individual cases			assisting service targets' moving and upward/downward movement 2. Be able to operate and use digital technological assistance devices in daily lives	devices and maintain the independent execution abilities of individual cases in daily lives as much as possible. P4.3.2 Utilize digital assistance devices in assisting the safe moving, turning over, or going	assistance devices in life assistance K33 Target, operating method, and cautions during usage for moving and mobile digital technological assistance devices commonly seen K34 Principles of digital technological	getting onto/off the bed S25 Ability to operate digital technological assistance in assisting patients using wheelchairs in safely getting onto/off the bed S26 Ability to use body mechanics and operate digital technological assistance for	utilization of digital daily care assistance devices in daily life assistance for individual cases 3. Utilize digital assistance devices to perform daily assistance practices and drills 4. Work safety evaluation for caregivers and assistance device use notice

Training Objective of the Program				Functional Context Quotation/Analysis			Curriculum Content
Course (Unit) Title	Function Level	Number of Hours	Training Objective	Corresponding Behavioral Index	Knowledge (K)	Skill (S)	
				up/down the stairs.	assistance in posture and supporting body moving and matter of notice K35 Methods and steps to utilize digital technological assistance in getting onto/off the bed and turning over	movement S27 Ability to use moving and mobile digital technological assistance devices	
Comprehensive evaluation	3	4	1. Be able to accurately and safely operate digital technological practices learned				1. Operate digital measuring tools to perform vital sign

Training Objective of the Program				Functional Context Quotation/Analysis			Curriculum Content
Course (Unit) Title	Function Level	Number of Hours	Training Objective	Corresponding Behavioral Index	Knowledge (K)	Skill (S)	
							measurement and information upload 2. Operate digital assistance devices in performing daily life assistance services

Table 3. Course Units and the Corresponding Functional Standards of the Training Program

Reminder for the program design: training objective shall cover the meaning of all corresponding “behavioral index.”

Content of curriculum: Displayed in itemized “noun” for easy identification and understanding, which shall cover all corresponding functional content (knowledge (K) and skill (S)).

5.3 Training Methods and Evaluation

Training Objective of the Course		Training Method				Evaluation Method for Learning Achievements			Corresponding Evaluation Tool	Remark
Course (Unit) Title	Training Objective	Lecturing	Demonstration Training	Role Play	Visit	Written Exam	Work Record	Practice Evaluation		
Long-term care service and educational development trend	2. Learn the current development state of long-term care	●			●					
Current state of digital long-term care service systems utilization and trend	3. Understand the utilization of digital information in long-term care services	●								
Vital sign measurement and disease sign detection and practices	1. Understand theories of vital signs and disease correlations.	●	●					●	Practice evaluation form	

Training Objective of the Course		Training Method				Evaluation Method for Learning Achievements			Corresponding Evaluation Tool	Remark
Course (Unit) Title	Training Objective	Lecturing	Demonstration Training	Role Play	Visit	Written Exam	Work Record	Practice Evaluation		
	2. Possess practical skills in vital sign measurement and measurement tool operations									
Use of daily life assistance and practices	1. Understand and possess theories and practicing skills for assisting in the moving and upward/downward	●	●		●			●	Practice evaluation form	

Training Objective of the Course		Training Method				Evaluation Method for Learning Achievements			Corresponding Evaluation Tool	Remark
Course (Unit) Title	Training Objective	Lecturing	Demonstration Training	Role Play	Visit	Written Exam	Work Record	Practice Evaluation		
	movement of service target 2. Be able to accurately operate daily life assistance devices									

Table 4. Training Methods and Evaluation of the Training Program

Training method: lecturing, collaborative teaching, demonstration teaching, practices, and visits.

Evaluation method for learning achievements: technical evaluation, oral test, learning history document evaluation.

Corresponding evaluation tool: Theory and practice evaluation table, photos.

For grade evaluation items and ratios, the ratios of oral test, skill test and usual performance are as follows:

Oral test: 40%

Skill test: 40%

Usual performance: 20% (including class attendance, number of attendance hours for technical practices, technique teach-back, and autonomous learning experience activities)

5.4 Training Completion Criteria

- Training certificate: Award the “training certificate” to those who achieved the initial training completion criteria.
- iCAP certificate: Achieve the attendance requirements, and the learning achievement evaluation grade is 60 and above, with the average total grade reaching 70 and above.

The acquisition of the “iCAP certificate” is subject to compliance with the abovementioned criteria.

According to the recommendations from the third session of the focus group, intensive lecturing is recommended regarding the lecturing timetable. Regarding the program structure, it is also recommended that two professional lectures, two visits to units of assistance device R&D and display centers, and two days of vital sign measurement, wound caring and moving and transportation training shall be arranged to establish the timetable, core ability learning history, and theory and technique audit and evaluation tools; recommendations for the content of the timetable, teaching content, and relevant skill learning history and evaluation tools are as follows:

(1) Actual Planning for the Timetable (including visits)

Date	Day 1	Day 2	Day 3	Day 4	Day 5
Morning	Current state of digital long-term care service systems utilization and trend	Long-term care service and educational development trend	Integration, utilization, and practices of digital technologies and vital sign measurement and disease sign detection I	Practices of using digital assistive devices in daily life assistance and work safety for individual cases I	Comprehensive evaluation

After noon	Visiting the elderly digital skill R&D center	Visiting the Multi-function Assistance Device Resource Integration and Promotion Center, Social and Family Affairs Administration	Integration, utilization, and practices of digital technologies and vital sign measurement and disease sign detection II	Practices of using digital assistive devices in daily life assistance and work safety for individual cases II	Completion Ceremony

Table 5. Timetable of the Training Program (including visiting activities

(2) Training Materials and Training Resources

Program Title: Digital Skill Training Program for Healthcare Services

Overall Functionality Level of the Program: Level 3

Training Objective of the Program		Training Materials and Training Resources			Qualification and Professional Academic Background and Experiences Required		
Course (Unit) Title	Training Objective	Training Materials	Teaching Aid/Equipment	Others	Lecturer	Evaluator	Program Assistant
Long-term care service and educational development trend	1. Learn the current development state of long-term care 2. Understand the demand for professional talent and the functional development trend for the long-term care industry	Self-prepared training materials	Computer		Graduated from a college or above; possess four years of relevant working experience and above; possess two years of teaching experience and above.	Same lecturer	-

Training Objective of the Program		Training Materials and Training Resources			Qualification and Professional Academic Background and Experiences Required		
Course (Unit) Title	Training Objective	Training Materials	Teaching Aid/Equipment	Others	Lecturer	Evaluator	Program Assistant
Current state of digital long-term care service systems utilization and trend	1. Possess cognition of using digital information in long-term care services	Self-prepared teaching materials	Computer		Same as the above	Same as the above	-
Integration, utilization, and practices of digital technologies and vital sign measurement and disease sign detection	1. Be able to describe the theory of using digital technologies in the vital sign compilation and disease prediction Be able to operate digital tools for vital sign measurement, information	Self-prepared teaching materials	1. Digital vital sign measurement equipment (including blood pressure, blood oxygen, temperature, blood	1. Test paper 2. Patch 3. Blood taking needle 4. Alcohol pad	Same as the above	Same as the above	High school/vocational school and above; possess two years of relevant working experiences and above.

Training Objective of the Program		Training Materials and Training Resources			Qualification and Professional Academic Background and Experiences Required		
Course (Unit) Title	Training Objective	Training Materials	Teaching Aid/Equipment	Others	Lecturer	Evaluator	Program Assistant
	integration, and initial judgment, and other digital practicing techniques		glucose, electrocardiograph, and ear thermometer) 2. Cloud health management information platform	5. Hand-washing equipment 6. Waste blood taking needle collection box 7. Garbage bin for infectious items 8. Towel paper			
Practices of using digital assistive devices in daily life	3. Theory and practical skills that are able to utilize digital technological	Self-prepared teaching materials	1. Electronic ground raiser 2. EZ-GO Patient	1. Hand-washing equipment	Same as the above	Same as the above	Same as the above

Training Objective of the Program		Training Materials and Training Resources			Qualification and Professional Academic Background and Experiences Required		
Course (Unit) Title	Training Objective	Training Materials	Teaching Aid/Equipment	Others	Lecturer	Evaluator	Program Assistant
assistance and work safety for individual cases	assistive devices in assisting service targets' moving and upward/downward movement 4. Be able to operate and use digital technological assistance devices in daily life		Transfer Chair Stretcher	2. Towel paper			
Teaching trial response and comprehensive evaluation	1. Be able to accurately and safely operate the digital technological practicing skills learned	-			Same as the above	Same as the above	Same as the above

Table 6. Training Materials and Training Resources

Training Materials and Training Resources: Including teaching materials, reference data operation, assisting teaching tools, relevant equipment

and materials, teachers, conditions for program assistants, and learning achievement evaluators.

(3) Skill Learning Profile

Establish the theory and skills profile for vital sign measurement skill and moving and transportation skill; the content is as follows:

Student's Skill Learning Profile

Student ID No.: Name:

Date	Item	Learning Skill	Whether Learned	Signature and Seal of Recognized Lecturer/Assistant Professor
	1	Digital electronic sphygmomanometer	□Yes □ No	
	2	Blood glucose, uric acid, and total cholesterol monitoring system	□ Yes □ No	
	3	Electrocardiograph	□ Yes □ No □ Yes □ No	
	4	Health management platform	□ Yes □ No	
	5	Remote care cloud APP record	□ Yes □ No	
	6	Electronic ground raiser	□ Yes □ No	
	7	EZ-GO Patient Transfer Chair Stretcher (EZ-710)	□ Yes □ No	

Table 7. Student's Skill Learning Profile

Theory Capacity Evaluation

Student ID No.: Name:

Date	Oral Test	Question No.	Evaluation Result	Signature and Seal of Lecturer/Assistant Professor
	Question 1		□ Passed □ Not passed	
	Question 2		□ Passed □ Not passed	

Table 8. Theory Capacity Evaluation

(4) Evaluation Tools and Evaluation Standards

Build evaluation tools that utilize digital technologies in assisting vital signal measurement (including blood pressure, pulse, blood glucose), practicing evaluation and utilizing technical assistance for the transfer chair stretcher, which includes the theory knowledge-ability and practical skill evaluation table and evaluation standards; the content is recommended as follows:

Comprehensive Evaluation for the Digital Training Program of Healthcare Services

Stage 1: Theory Knowledge-ability Evaluation

I. Method: the oral test is adopted; the student shall randomly draw the question to answer; each student shall draw two questions for answering (one question from each of the A and B groups).

II. Time: The oral test time for each student shall be limited to 5 minutes.

III. Timing Method: Not timed; however, the student shall pass to participate in the next stage of skill evaluation

IV. Question and Answer

No.	Program	Topic	Answer	Passing Standard
A-1	Integration, utilization, and practices of digital technologies and vital sign measurement and disease sign detection	Normal scope of value for blood pressure, early stage of high blood pressure, the definition of high blood pressure	Normal value: <120/80 mmHg Initial stage of high blood pressure: 120-139/80-89 mmHg Maintain a healthy lifestyle as soon as possible High blood pressure: >140/90 mmHg Seek medical help as soon as possible	The standard values for all periods shall be accurate to pass
A-2		Normal scope of value for blood glucose before/after meal, uric acid, cholesterol	Blood glucose before meal (fasting): <100mg/dl Glucose after meal: <140mg/dl Uric acid: Male: 3-7 mg/dl、 Female: 2-6 mg/dl Cholesterol: <200mg/dl	The standard values for all periods shall be accurate to pass
A-3		Basic handling for fever	>37.5℃ Drink more water, adjust blanket, clothes, and airing and facilitate the ventilation of the environment >38℃ Sleep on an ice pillow and take a warm bath to facilitate the heat dissipation >38.5℃ Take antipyretics and go to a hospital	Be able to speak out at least five temperature reduction measures and measures marking * must be performed

			* Adjust the temperature reduction measures according to the uncomfortable symptoms of individual cases Have meat with low intensity and high frequency; choose a light diet with higher water content or high protein and high calorific value * After providing the temperature reduction measure, the body temperature shall be measured again after 30 minutes to 1 hour	
A-4		Basic calculation for the water intake: Grandma Lin's weight is 65KG; with no disease restricting the water requirements, what is the minimum water content she has to intake each day?	Weight * 30cc= Water content to be supplemented For individual cases of high uric acid or obesity, the weight may be increased to * 40cc for the facilitation of metabolism 64*30=1950	Be able to speak out the calculation formula and answer
A-5		Stage of pressure sores	Stage 1 pressure sore (congestion period): Complete and red skin with clear boundary with the surrounding skin;	Be able to speak out the names and the symptoms of each period simply

			the color remains upon pressing, alongside with pain and skin temperature changes; often limited to the prominent part of bones. Stage 2 pressure sore (ischemia period): Partial skin defect; the surface of the skin has minor ulcer; red skin base with no scab; may also be a complete or broken congestive blister or ulceration. Stage 3 pressure sore (necrosis period): Missing the entire layer of skin; however, bones, muscle tendon, or muscle have not been exposed; may have and hidden wound and sinus tract.	
			Stage 4 pressure sore (ulcer period): Whole layer of skin and tissue defect and exposure of fascia, muscle, muscle tendon, cartilage, or bones, and may also have necrosis of tissues or eschar, epiboly, hidden wound and sinus tract.	
B-1	Practices of using digital assistive devices in daily life assistance and work safety for individual	Correct posture of body mechanics	Straight waist, bend knees, open legs 1. Straight waist – The spine shows a straight line when not bending 2. Bend knees – Bend knees slightly and put the stress of the body on muscles of thighs 3. Open legs – Open legs and stand with a width equivalent to that of shoulders for a better center of balance	Be able to speak out all correct items of postures
B-2		Three major	1. No lifting for horizontal movement; minimize the	Be able to speak out the emphasis of the

	cases	principles of transfer and moving	chance of lifting as much as possible 2. Choose correct assistive devices for the benefit of safety and to reduce the effort 3. Encourage elders to take moves themselves to save effort and prevent elders' rapid degeneration, and even improve their functions	three major principles
B-3		Evaluation items for transfer and moving	1. Basic physical functions of individual cases 2. Evaluation of the hardware space 3. With the individual case's both hands holding supports, maintaining the balance of the sitting posture, and being able to resist the interference of external forces 4. The muscle force tolerance level of the individual case's lower limbs 5. Route on the plane for transfer or moving may be cleared, and the height is accessible 6. Weight of the individual case	Be able to speak out the emphasis of the evaluation items in the left column
B-4		Five techniques to assist elders in moving	1. Bend legs first for turning over 2. Lie on one side, then sit up 3. Using the favorable side as the support 4. Bend forward and stand up 5. Make good use of assistive devices	Be able to speak out the emphasis of the techniques in the left column
B-5		Choose assistive devices according to the	• LEVEL 1: No problems running or jumping on flat ground; handrail or support is not required when climbing stairs.	Be able to speak out the emphasis of the categories in the left column

		demands of the care receiver (GMFCS)	• LEVEL 2: Be able to walk on flat ground; however, it is relatively tough for walking on uneven ground; handrails or support are required when climbing stairs. • LEVEL 3: A support is required when walking, or requires others' support. • LEVEL 4: Unable to independently step out and walk, but is able to maintain the sitting posture when sitting on a chair with back and armrests. • LEVEL 5: Unable to maintain the sitting posture even when sitting on a chair with back and armrests.	

Table 9: Comprehensive Evaluation for the Digital Training Program of Healthcare Services

Stage 2: Practical Skill Evaluation

I. Method: A skill test is adopted; students shall draw the question for operations; each student shall draw one question.

II. Time: The skill evaluation time for each student is up to 15 minutes.

III. Rating method: Please refer to Practice Evaluation Table I and II for the standards of the skill evaluation plans

Questions and answers: Please refer to Practice Evaluation Table I and II

Practice Evaluation Table I

Practice Evaluation Form — Practice of the methods of measuring vital signs (including blood pressure, pulse, blood glucose) with digital technology

1. Evaluation time: 15 minutes

2. Situation: Mrs. Chen, 78 years old, has been diagnosed with high blood pressure and diabetes for many years. She woke up this morning and has not eaten breakfast yet. The caregiver is to take the routine measurements of the client's blood pressure, pulse, and fasting blood-glucose with the "Chiline" device, and to upload the data to the cloud system.

3. Operating steps:

Name:_____

Operating steps (scoring items)	**Scoring proportion**	**Scoring**	**Scoring criteria (**Points are given if …)	**No-scoring criteria (**No points are given if …)
I. Preparation in advance (20 points in total)				
1. Explain to the client the purpose of the measurement, the device used and the measurement items	3		The purpose, device used, and measurement items are explained.	Any of the purpose, device used, or measurement items are not explained (points deduction accordingly).
2. Evaluate the influencing factors of each measurement item				
(1) Blood pressure and pulse —ensure no influencing factors involved, e.g. food consumption, exercise or walking, mood changes, etc. within 15-30 minutes prior to the measurement	3		All influencing factors are checked and confirmed.	Checking and confirmation is incomplete, where one point is deducted for each non-confirmed factor.

(2) Blood glucose — ensure no food consumption or check the previous eating time	2		Confirmation is done.	Confirmation is not done.
3. Wash hands	5		Both hands are washed in accordance with the standard hand washing procedures.	Hands are not washed in accordance with the standard hand washing procedures.
4. Supply preparations: (1) Ensure the integrity of the device and whether the device is adequately charged	2		Actual confirmation is done.	Actual confirmation is not done.
(2) Supplies: a set of “Chiline” device, alcohol cotton swabs, blood glucose test strips, blood taking needles, needle disposal container, curved basin, and smartphone	5		Supply reparation is complete.	Supply reparation is incomplete, where one point is deducted for each incomplete supply, up to 5 points.
II. Measurements of blood pressure and pulse (30 points in total)				
1. Ensure that the client is sitting properly with her arms supported at a comfortable and relaxed height	3		The client sits properly and feels comfortable and relaxed.	The caregiver fails to pay attention to or ensure the client’s position, or the client fails to feel comfortable or relaxed.
2. Turn on the smartphone and ensure that the Bluetooth function is activated	2		Actual confirmation is done.	Actual confirmation is not done.

3. Open up the slide cover of the blood pressure measurement device (named “Jian-Jian-Bao”), and turn on the sphygmomanometer. A steady green light indicates that the device has been turned on. Then open the “Chiline” APP or remote care App, and confirm that the account login is done.	4		All the steps in the left are correctly operated.	Any of the steps in the left are incorrectly operated or normal login fails.
4. Insert the air tube of the cuff into the sphygmomanometer and confirm that the air tube is fully inserted	3		The air tube is firmly inserted.	Any of the steps in the left are incorrectly operated such that no measurements can be taken.
5. Place the client’s right palm with face up on the table; assist the client in putting on the cuff; ensure that the air tube is at the center of the arm. Ensure the end of the cuff is about 2-3 cm away from the elbow, and that two fingers can be inserted into the cuff confirm the cuff. Ensure that cuff is placed at the same height as the heart.	10		All the steps in the left are correctly operated.	The cuff is not placed in the correct position or the tightness of the cuff is improper.
6. Switch the screen of the “Chiline” APP on the smartphone to the main page of the blood pressure; click on “Blood Pressure	3		All the steps in the left are correctly operated.	Any of the steps in the left are incorrectly operated such that no measurements can be taken.

Measurement”; and the APP will connect to the sphygmomanometer via the bluetooth. A steady blue light indicates the success of the connection.				
7. Click on the "START" button to perform the blood pressure measurement	2		Step in the left is correctly operated.	
8. After the measurement is completed, the blood pressure and pulse measurements will be displayed on the APP, and the measurements data will be automatically uploaded to the cloud system. Remove the cuff and close the slide cover. The green light will go out after the device is shut down.	3		All the steps in the left are correctly operated.	Any of the steps in the left are incorrectly operated such that no measurements data can be uploaded.
III. Measurement of fasting blood-glucose (40 points in total)				
1. Take out the lancing device and the blood taking needle; insert the blood taking needle into the fixed hole; remove the round-head shield of the blood taking needle by rotating the blood taking needle; tightly put on the front cover of the lancing device; adjust the front cover of the lancing device for the	5		All the steps in the left are correctly operated.	Any of the steps in the left are incorrectly operated or the needle is contaminated.

selection of the appropriate depth for the blood collection. Hold the front cover of the lancing device with one hand; pull the lancing device to the end with the other hand; and a clicking sound is heard at the same time.				
2. Switch the screen of the “Chiline” APP on the smartphone to the main page of the blood glucose; click on "Blood Glucose Measurement"; and the APP will connect to the glucometer via the bluetooth. A steady blue light indicates the success of the connection.	5		All the steps in the left are correctly operated.	Any of the steps in the left are incorrectly operated such that no measurements can be taken.
3. After selecting the measurement conditions, click on the "START" button to perform the blood glucose measurement.	5		Step in the left is correctly operated.	Any of the steps in the left is incorrectly operated.
4. When the screen shows “Please insert a new test paper”, insert the test paper into the glucometer according to the instructions	2		The direction of the test paper and insertion position of the test paper are correct.	The direction of the test paper and/or insertion position of the test paper are/is incorrect.
5. Disinfect the area of the skin where the blood is taken	2		Disinfect the area of the skin	Repeatedly wipe the skin where the blood

with an alcohol cotton swab			where the blood is taken in a circular motion.	is taken, causing the contamination of the area of the skin.
6. After the alcohol is dry, lightly massage the client's finger from which the blood is taken in the direction of the fingertip, and push the blood towards the fingertip.	2		The direction of the massage is correct.	Failure to do the steps as required.
7. Apply the lancing device to the skin where the blood is taken; press the trigger button; release the trigger button; and remove the lancing device. Ensure that sufficient amount of blood is taken.	5		The lancing device firmly touches the skin and sufficient amount of blood is taken.	Insufficient amount of blood is taken such that the measurement fails.
8. Lightly touch the blood with the end of the test paper to allow the test paper to automatically take in the blood. The glucometer will automatically count down for six seconds after detecting the blood to complete the blood-glucose measurement.	3		All the steps in the left are correctly operated.	Any of the steps in the left are incorrectly operated such that no measurements can be taken.
9. Press an alcohol swab against the skin where the blood is taken to stop the bleeding.	2		Step in the left is correctly operated.	Step in the left is incorrectly operated.
10. After the measurement is completed, the	3		All the steps in the left are	Any of the steps in the left are incorrectly

measurement time and the reading of the blood glucose measurement will be displayed on the APP and automatically uploaded to the cloud system.			correctly operated.	operated such that no measurements data can be uploaded.
11. Remove the blood taking needle; turn counterclockwise to remove the front cover of the lancing device; and pierce the blood taking needle into the round-head shield to dispose of the needle into the disposal container. Focus on the entrance of the disposal container; press the top of the lancing device to eject the blood taking needle into the disposal container. Put the lancing device back into the storage box.	4		All the steps in the left are correctly operated.	Any of the steps in the left is incorrectly operated.
12. Ensure that the skin where the blood is taken has stopped bleeding, and discard the contaminated alcohol swab in the curved basin.	2			
IV. Post-processing (10 points in total)				
1. Correctly place all items back to their original places	1		Items are completely placed in their	Any of the items is not placed in its original place.

			original places.	
2. Correctly perform garbage classification	2		Alcohol swabs shall be thrown into the trash can for infectious items.	Garbage is not disposed of according to garbage classification.
3. Wash hands	5		Both hands are washed in accordance with the standard hand washing procedures.	Hands are not washed in accordance with the standard hand washing procedures; or hands are washed before the trolley is checked.
4. Determine whether the reading is normal or not and inform the client of the measurement result	5		The reading result is correct and the client is informed of the reading.	The reading result is incorrect or the client is not informed of the reading.
Total	100			

Table 10: Practice of the Methods of Measuring Vital Signs with Digital Technology

Note: The passing score for this skill practice is set at 70 points.

Evaluation result: □ Pass □ Fail

Signature of the evaluating instructor: _____

Practice Evaluation Table II

Practice Evaluation Form — Practice of the trolley, an assistive equipment with digital technology, for horizontal transposition of patients in sitting and lying positions

1. Evaluation time: 15 minutes

2. Situation: Mr. Wang, 86 years old, has been diagnosed with a stroke and has been bedridden for many years. He is to watch TV in the living room at 10 o'clock this morning. The

caregiver is to help the patient sit up in his bed, to horizontally translocate the patient to the trolley, and to transport the patient a short distance to the living room. After the patient finishes watching TV, the care giver is to assist the patient in moving him from the trolley back to his bed.

3. Operating steps:

Name:_____

Operating steps (scoring items)	**Scoring proportion**	**Scoring**	**Scoring criteria (**Points are given if …)	**No-scoring criteria (**No points are given if …)
I. Preparation in advance (20 points in total)				
1. Explain to the client the steps of the transposition, and ensure the safety of the transposition	2		The steps of the transposition are explained, and the safety of the transposition is ensured.	Any of the steps of the transposition is not explained, or the safety of the transposition is not ensured.
2. Supply preparations:				
(1) Check the functions of the transposition trolley; and ensure that the	8		All functions are checked and confirmed	One point is deducted for each one function unchecked.

trolley is safe without faults – including the brake, wheelchair, rotation handle for the height, rotation handle for the mattress, foot pedals, dual-purpose grip at the front of the trolley, armrests on both sides, protective belt buckles				
(2) Move the trolley close to and in parallel with the bed; park the trolley with the brake; and lower the head of the bed to horizontal position	5		All the steps in the left are correctly operated.	

3. Wash hands	5		Both hands are washed in accordance with the standard hand washing procedures.	Hands are not washed in accordance with the standard hand washing procedures; or hands are washed before the trolley is checked.
II. Assisting the patient in moving from the bed to the trolley (35 points in total)				
1. Roll the trolley so that the mattress of the trolley is higher than the mattress of the bed; and remove the armrest on one side of the trolley	4		All the steps in the left are correctly operated.	
2. Put down the bed rail; and use body mechanics to assist the client in turning his body over to the opposite side of the bed	5		The safety and comfortability of the client are ensured.	The body mechanics is not followed; or the client's safety or comfortability is not ensured.
3. Release the brake of the trolley; move the trolley against and	3		All the steps in the left are correctly	The brake of the trolley is not applied or the height of the mattress of the trolley

in parallel with the bed; ensure the mattress of the trolley is higher than the side of bed mattress; and apply the brake of the trolley.			operated.	is incorrect.
4. Roll the trolley until the mattress of the trolley is against the mattress of the bed; and move the mattress of the trolley to go underneath the client's body	4		All the steps in the left are correctly operated.	The mattress of the trolley is in the incorrect position.
5. Assist the client in making his body lie flat on the mattress of the trolley; place both the client's hands on his abdomen; and place the client's feet on	4		All the steps in the left are correctly operated.	The client's hands or feet are not place properly.

the pedals of the trolley.				
6. Rotate the mattress rotating handle in the opposite direction to retract the mattress of the trolley; and move the client to the trolley along with the momentum of the mattress of the trolley.	2		All the steps in the left are correctly operated.	Any of the steps in the left is incorrectly operated.
7. Raise the height of the trolley again and move the trolley away from the bed surface	2		Step in the left is correctly operated.	
8. Put back and fix the armrest on the one side of the trolley, and fasten the protective belts (including chest belt and ilium belt) into	6		Relevant protective measures are fully adopted.	The armrest is not properly fixed or any of the buckles of the protective belts is not properly buckled.

the buckles to ensure the client's safety				
9. Release the brake of the trolley and push the trolley away from the bed in a parallel direction	2		Step in the left is correctly operated.	
10. Apply the brake of the trolley; raise the head of the trolley to a sitting position; release the brake of trolley; and move the trolley for a certain distance	3		All the steps in the left are correctly operated.	Failure to apply the brake of the trolley before the adjustment of the height of the trolley.
III. Assisting the patient in moving from the trolley to the bed (35 points in total)				
1. Move the trolley to the side of the bed (facing the foot of the bed); place the trolley in parallel with the foot of the bed; and put the head of the bed flat	5		All the steps in the left are correctly operated.	The direction or position of the trolley or the bed is not properly placed.

in a horizontal position.				
2. Fasten the brake; roll the rotation handle for the height so that the height of the mattress of the trolley is higher than the height of the mattress of the bed	3		All the steps in the left are correctly operated.	The brake is not fastened or the height of the mattress of the trolley is inappropriate.
3. Release the brake of the trolley; move the trolley towards and in parallel with the bed; ensure the mattress of the trolley is higher than the mattress of the bed; and fasten the brake of the trolley.	2		All the steps in the left are correctly operated.	The brake is not fastened or the height of the mattress of the trolley is inappropriate.
4. Remove the armrest on one side of the trolley; release the protective belts (including chest belt	5		All the steps in the left are correctly operated.	Any of the steps in the left is incorrectly operated.

and ilium belt); and toll the trolley until the mattress of the trolley is against the mattress of the bed				
5. First move the client’s feet to the bed; protect the client's upper body with one hand and roll the rotating handle for the mattress with the other hand; push the client from the mattress of the trolley to the bed; and let the client lie on his side	5		The client’s safety is ensured at all time and the client’s body is placed in a correct position.	The client’s safety is not ensured at all time or the client’s body is not placed in a correct position.
6. Protect the client's body with one hand to avoid the client’s body from turning back; and turn the rotating handle for	4		The client’s safety is ensured at all time and the and the actions are fully taken.	The client’s safety is not ensured at all time or the actions are taken in a hurry such that the client is uncomfortable.

the mattress with the other hand to retract the mattress back to the trolley.				
7. Protect the client's body with one hand to avoid the client's body from turning back; and turn the rotating handle for the height with the other hand so that the mattress of the trolley is higher than the mattress of the bed.	4		The client's safety is ensured at all time and the and the actions are fully taken.	The client's safety is not ensured at all time or the safety of the client is threatened due to negligence.
8. Continue to protect the client's body with one hand; release the brake with the foot; and push the trolley away from the bed in a parallel direction with the	3		The client's safety is ensured at all time and the and the actions are fully taken.	The client's safety is not ensured at all time or the safety of the client is threatened due to negligence.

other hand				
9. After assisting the client in lying down, completely push the trolley away.	2		Step in the left is correctly operated.	Step in the left is incorrectly operated.
10. After assisting the client in adopting a comfortable lying position, pull up the bed rail.	2		All the steps in the left are correctly operated.	Any of the steps in the left is incorrectly operated.
Post-processing (10 points in total)				
1. Restore the trolley back to its original position and fasten the brake, and raise the head of the trolley (store the trolley in a sitting position)	5		All the steps in the left are correctly operated.	The trolley is not returned to its original position, or the brake is not applied, or the head of the trolley is not raised.
2. Wash hands	5		Both hands are washed in accordance with the standard hand washing	Hands are not washed in accordance with the standard hand washing procedures; or hands are washed before the trolley is checked.

			procedures.	
Total	100			

Table 11. Practice of the Trolley for Horizontal Transposition of Patients in Sitting and Lying Positions

Note: The passing score for this skill practice is set at 70 points.

Evaluation result: □ Pass □ Fail

Signature of the evaluating instructor: _____

6.Suggestions

As medical technology continues to grow and human life continues to be prolonged, the demand for elderly care continues to change and increase. Existing digital technology and intelligent assistive devices can provide assistance and equipment in smart living for the elderly, prevent accidents from happening, or provide care for daily life and health management, etc. In terms of medications, the elderly often feel confused in the face of multiple prescriptions and over-the-counter drugs, when to take what, and the quantity of dose to take. The development of software applications, including pill identification tools such as FDA drug database, drug dispatch tracker, and drug reminder notification device, are provided to accommodate the demands of the elderly and the caregiver. In particular, the development of personal health management tools and software applications is quite mature. These software applications can provide secure tools for protecting privacy and strategies for managing personal health records, which usually include a method of recoding symptoms and tracking test results and diagnosis, as well as being able to track dates of hospital visits and immunization, maintain insurance records, and provide health-related alerts. There is even a tool included in the software application, which can advise doctors of issues during the patient's doctor appointments, record the records of doctor visits (with the doctor's consent of course), remind the patient of questions to ask when seeking medical treatment, and share all or some of these contents with key family members.

However, for caregivers, a good digital tool should include the following characteristics:

1. **Such a digital tool can be closely incorporated into the professional care processes and help professionals correctly complete their work**

   Digital tools that meet the needs of caregivers should be able to be closely incorporated into the professional care processes based on full understanding of such processes, and be able to remind the caregivers of missing or incomplete processes at appropriate points of time, so as to achieve services of high efficiency and high quality.

2. **The digital technology is equipped with friendliness and integration with service resources**

   Digital tools should take into consideration the friendliness to users, and provide integration

functions such as connection to and notification of professional processes and caring resources, etc., which should be able to integrate information in real time, and be able to help the coordination in linking, connecting, or tracking resources or services, so as to achieve consistent and standardized services for all.

3. **Training courses on digital technology are provided**

   In Chinese Taipei, 70% of caregivers are middle-aged women returning to the job market after being unemployed for some time. The selection of digital technologies and the training of the operational skills are particularly important to these caregivers. For most of the home caregivers, good digital technologies do not lie in their powerful functionality, but lie in the friendliness in learning such technologies, in operating such tools, as well as in understanding and communicating the information therein.

4. **Such a digital tool can be used as a means for communication between the caregiver and the individual being cared or between the caregiver and the family members**

   In the workplace of health care, the relationship between the caregiver and family members is often unpredictably unstable. According to a survey report from the supervising organization of long-term care in the U.S. in 2015, among the complaints received by the organization, issues related to communication with caregivers ranked among the top five issues. Most of the family members' misunderstandings about and conflicts with the caring institution usually result from the lack of adequate tools in bridging the gap between the caregiver and the family members during the caring processes. Therefore, Caremerge in Chicago, the U.S. provides a real-time event calendar for caring institutions to update the latest situations of the individuals under care at all times, as well as for family members to enhance their participation in the care. Similarly, in Chinese Taipei, the "Jubo" device from the SMART AGING TECH CO. LTD. or the "Chiline" from the INVENTEC CORPORATION also integrates the health records, activity schedules, and diet situations into the graphic information, allowing family members to better understand the effort made by caregivers. While the information barrier is removed step by step, communication between family

members and caregivers has also been improved step by step, thus improving the trust relationship between the two parties.

Friendly digital tools should be able to meet the work needs of professional workers and provide professional support, effectively solve the difficulties of the workers, and enhance the professionalism and confidence of the caregivers. These are the goals of the digital technologies that the caregivers need.

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