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Identifying Skills Needs in Vietnam

The Survey of Detailed Skills

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Abstract

This paper describes a new survey designed to collect comprehensive and granular information about required skills and tasks for detailed occupations in Vietnam. The Survey of Detailed Skills asks workers in Vietnam about their skills and tasks for a set of 30 occupations that are in demand or of strategic importance for economic growth. In doing so, the survey generates practical, detailed information at the occupation level that policy makers and practitioners can use to inform their efforts to build skills in Vietnam. The Survey of Detailed Skills makes several contributions. Most existing efforts to profile occupational skills and tasks in developing countries draw on data from other countries, most frequently the Occupational Information Network (O*NET) in the United States. However, recent research has shown that translating these data across countries via occupational crosswalks yields inaccurate results. The Survey of Detailed Skills is among the first surveys to collect detailed O*NET-type information at the detailed occupational level in a developing country setting. The collection of information about detailed skills means that these skills can be flexibly grouped into different categories (for example, socioemotional skills, digital skills, routine skills, and interpersonal skills) as needed. The use of a consistent scale anchored to the time spent using or performing a skill or task creates clarity for respondents while also yielding a measure of skill and task importance that is easily interpreted. The Survey of Detailed Skills requires outlays on administering the survey, and inclusion of all occupations in Vietnam with regular updating would require ongoing investment.

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Identifying Skills Needs in Vietnam: The Survey of Detailed Skills[1]

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Introduction

Skills development is a key component of Vietnam's future growth, but key elements of the skills development system need to be strengthened. Vietnam's labor market faces challenges as the continued growth of knowledge-based industries, digitization and automation, an urgent need to facilitate climate-friendly development, and population aging alter the types of skills that are demanded, the speed at which skills demands change, and the workers available to meet these demands. Recent research has highlighted the important role of skills development in Vietnam's future growth (Cunningham and Pimhidzai 2018). But key elements of Vietnam's skills development system must be strengthened. One foundational area that recent diagnostic work has revealed as a weakness is Vietnam's labor market information (Mazza et al. 2019; Moroz, Nguyen, and Chu 2019b; Cunningham and Pimhidzai 2018). Vocational education and training institutions and providers of employment services lack the detailed information on in-demand skills that they need to develop curricula, advise students, and put jobseekers on the path to the right jobs.

The Survey of Detailed Skills (SDS) is a first step in filling the gap in information on detailed skills in Vietnam. Efforts in developing countries to profile occupational skills and tasks often draw on data from other countries, most frequently the United States' Occupational Information Network (O*NET). However, using the O*NET database outside the United States requires the assumption that the occupational characteristics described in O*NET are consistent across countries. Research has shown that this assumption does not hold due to differences in tasks, skills, and production technologies, particularly in low- and middle-income economies (Caunedo, Keller, and Shin 2021; Lewandowski et al. 2021; Lo Bello, Sanchez-Puerta, and Winkler 2019; Alatas, Granata, and Posadas 2020). To avoid this, the SDS draws on O*NET and other proven methodologies and takes a country-specific approach. The SDS asks workers in Vietnam about their tasks and skills for a set of occupations that are either in-demand or that are of strategic importance for economic growth. In doing so, the SDS seeks to generate practical, detailed information at the occupation level that policy makers and practitioners can use to inform their efforts to build skills in Vietnam. This report explains the SDS's methodology, provides summary results for the 30 occupations targeted by this round of the SDS, and presents an example of a detailed occupational profile for one of these 30 occupations, Nursing Associate Professionals. The SDS has also spurred further investigation of skills in Vietnam, particularly those needed for green jobs (Doan et al. 2023).

The SDS makes several contributions. First, the SDS provides a comprehensive but also in-depth portrait of skill, task, and educational requirements for a set of detailed occupations in Vietnam. The SDS is among the first surveys to collect this information at the detailed occupational level in a developing country setting. This is an important step beyond relying on data collected in other (developed) countries. The collection of information about detailed skills means that these skills can be flexibly grouped into different categories (for example, socioemotional skills, digital skills, routine skills, interpersonal skills) as needed. The use of a consistent scale anchored to the time spent using or performing a skill or task yields a measure of skill and task importance that is easily interpreted. The SDS approach also has some advantages over collection of skill and task data via online job vacancy data, which has become common in recent years. In developing country contexts, online vacancy data tends to be biased towards higher-skilled digital-intensive occupations and jobs at firms that use the internet (CSC 2019; World Bank 2021). The SDS avoids this bias by selecting the occupations of interest, including low-skilled jobs, first and using a sampling frame based on Vietnam's Labor Force Survey. Still, the SDS has some weaknesses. The SDS requires outlays on administering a survey. Initial data collection covered only 30 of the hundreds of occupations in Vietnam. Inclusion of all occupations with regular updating would require ongoing investment.

Complementing the SDS with online job vacancy data, which can be collected frequently at relatively low cost, could help achieve sustainability in the longer run.

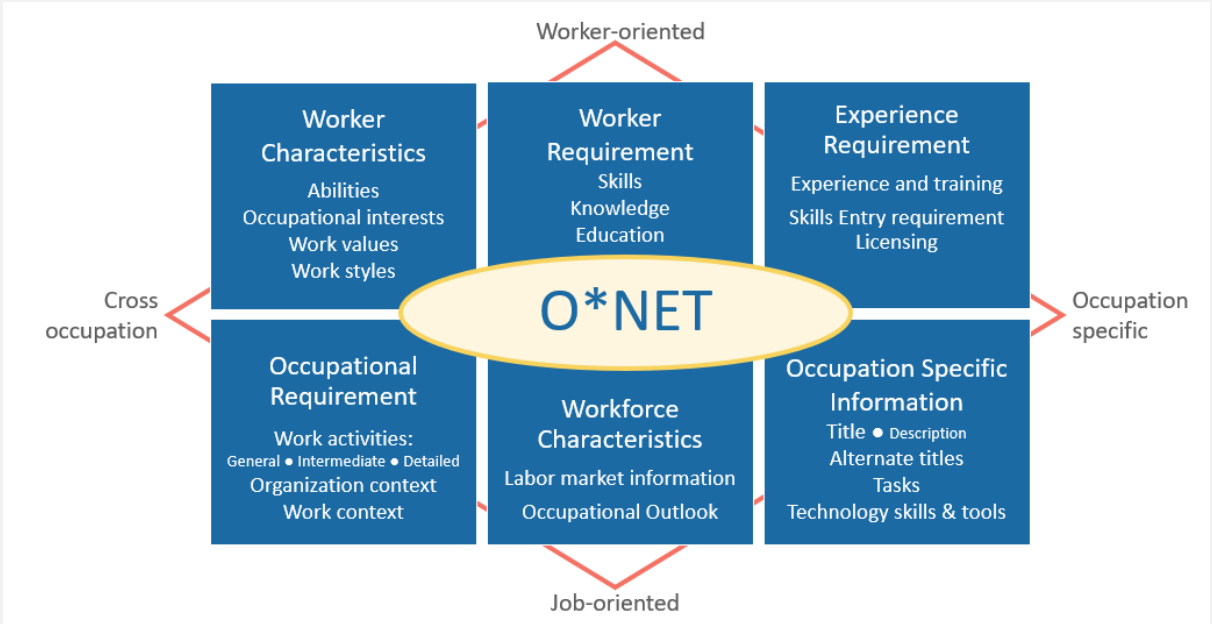
SDS Antecedents

The SDS draws on several well-known approaches to examining the skills and task content of occupations, as well as pilot occupational skills surveys undertaken in Vietnam and Indonesia. The SDS is modeled primarily on O*NET, but also draws from the Programme for the International Assessment of Adult Competencies (PIAAC) and the Skills Toward Employability and Productivity (STEP) survey. The current version of the SDS also reflects lessons learned from pilot occupational skills surveys in Vietnam and Indonesia that replicated several O*NET modules.

*The O*NET content model*

O*NET is an occupational database that provides quantitative and qualitative information on nearly one thousand occupations in the United States. The O*NET content model is the conceptual framework that organizes the data for each occupation. The model contains six modules that are either job-oriented or worker-oriented at the occupational and cross-occupational levels (**Figure 1**). For example, the "worker requirements" module contains worker-oriented data on skills, knowledge, and education requirements while the "occupation-specific information" module contains job-oriented data specific to the occupation such as job descriptions, tasks, and technologies and tools used for the job.[3]

Figure 1. O*NET Content Model



Source: O*NET.

[3] For more information on O*NET, see Dierdorff and Norton (2011) and DOL (2018).

Data for each module come from a variety of sources. The program pools together existing information in the United States' labor market information system[4] and collects additional data through 7 specific questionnaires: education and training (6 items), knowledge (32 items), work activities (41 items), work context (57 items), work styles (14 items), abilities (52 items), and skills (35 items). The questionnaires use a set of scales to measure the requirements. Many of them use an importance scale, which goes from 1 (*not important*) to 5 (*extremely important*), and a level scale, which goes from 1 (*basic*) to 7 (*sophisticated*). To avoid burdening respondents, O*NET mostly uses occupational analysts for questions containing more abstract concepts (i.e., abilities and skills) and occupational experts for occupations for which workers are difficult to find (Fleisher and Tsacoumis 2012; Rivkin, Lewis, and Cox 2001). However, a study comparing skills ratings across a large sample of occupations found minimal differences between ratings provided by job incumbents and those provided by occupational analysts.[5]

The O*NET content model is attractive for replication for several reasons. First, the O*NET content model describes occupations at a level of detail not found elsewhere, with the information included ranging from tasks and activities performed to tools and technologies to skills and abilities required to perform a job well. Second, the model has a modular format that allows for replication of individual modules of interest (e.g. on tasks or skills) with the potential to build sophistication as capacity develops. Third, O*NET is a globally recognized database widely used by academics, policy makers, and end users. Finally, O*NET questionnaires are publicly available.

PIAAC and STEP

The SDS also draws on two other skill measurement efforts the Programme for the International Assessment of Adult Competencies (PIAAC) and the Survey Toward Employability and Productivity (STEP).[6] The OECD carries out PIAAC in more than 40 high-income countries. The World Bank carries out STEP in selected low- and middle-income countries. Both household surveys have a module capturing the frequency of a set of skills used at work to assess the skills the workforce needs to sustain a productive working life. The surveys also assess key information-processing skills (literacy, numeracy, and problem solving).[7] Neither PIAAC nor STEP have been adopted by countries for regular implementation and, although these surveys collect job titles to standardize them into the International Standard Classification of Occupations (ISCO), neither has been used to inform occupational and skills profiling at a disaggregated level. For instance, the STEP database is publicly available at the sub-major group (2-digit ISCO). Therefore,

[4] For example, the components on Technology Skills and Tools come from big data analyses, and the Occupational Profiles and Labor Market Information data come from data collected by the Bureau of Labor Statistics.

[5] However, analysts were preferred for practical considerations (i.e., time, costs, and convenience) (Tsacoumis and Van Iddekinge 2006).

[6] Two previous international initiatives aimed at measuring adult skills in 22 OECD countries: the International Adult Literacy Survey, carried out between 1994 and 1998, and the Adult Literacy and Life Skills Survey (ALL), carried out between 2003 and 2008. Based on these surveys, UNESCO began the Literacy Assessment and Monitoring Programme in 2003, which aimed to measure the literacy and numeracy skills of youth and adults in developing countries (OECD 2016a). PIAAC and STEP modules are based on the Skills, Technology, and Management Practices survey, which was developed for the U.S. based on the Current Population Survey and the National Adult Literacy Survey.

[7] STEP has two surveys: a housheold survey and a firm survey. The household survey includes a direct reading assessment and an indirect (self-reported) assessment of other competencies and job-relevant and behavioral skills (Pierre et al. 2014). The firm module asks about the skills gap that employers perceive at an aggregated occupational level (management, professionals, and technicians and associate professionals).

although the initiatives have led to rich academic papers and policy reports, they have not yet proven useful to inform occupational skills profiling, qualification frameworks, curricula, and other decisions about human capital investments.

Occupational skills pilots in Vietnam and Indonesia

The SDS's methodology also builds on previous efforts to profile occupations in Vietnam and Indonesia. Both efforts piloted an adaptation of the O*NET content model to gather detailed skills information on in-demand occupations using surveys. In Vietnam, 7 occupations were selected for a survey replicating O*NET's skills, tasks, and education and experience modules (Moroz, Nguyen, and Chu 2019). The questionnaire asked respondents questions about the importance of the 35 skills in O*NET's skills module. Questions about a skill's level of sophistication, which are included in O*NET, were omitted given the correlation between these measures (Handel 2016). The questionnaire also asked about the task and education and experience requirements of each occupation. Respondents included both workers in the selected occupations and "occupation experts" who were individuals with significant knowledge about a given occupation.[8] Workers and occupation experts were identified through capstone contacts given resource constraints. In Indonesia, a pilot (Indotask) adapting similar O*NET modules targeted 51 occupations (Alatas, Granata, and Posadas 2020). The pilot also asked about task requirements, education and experience requirements, and respondent characteristics. Both job incumbents and occupation experts were included as respondents. Respondents were identified through an earlier firm-based survey of occupational demand. A comparison of results between Indotask and O*NET showed significant differences in skills use for comparable occupations. Lessons learned from these pilots are reflected in the design of the SDS, and discussed in the methodology section.

Methodology

The SDS adapts existing skills surveys to the country context and the objective of obtaining a comprehensive but also detailed picture of occupations in Vietnam. The SDS builds on O*NET in particular, but makes significant adjustments based on country context, lessons learned from the pilots carried out in Vietnam and Indonesia, and a review of other global skills measurement initiatives.

The SDS instrument

The level of analysis of the SDS is occupations at the 4-digit level as defined in the Vietnam Standard Classification of Occupation (VSCO) handbook.[9] In Vietnam, 4-digit occupations are the most detailed occupational aggregation above the level of job titles. The instrument comprises four modules. The complete survey instrument is available in **Appendix 2**.

Module I. Module I is based on the tasks component of the O*NET Occupation-Specific Information module. For O*NET, a task is the smallest unit of activity with a meaningful outcome. The SDS task module is unique to each occupation surveyed: the instrument includes all tasks listed in the VSCO

[8] The O*NET program relies on occupation experts when occupations have low employment, are new or emerging, lack industry data, or are located in remote or difficult-to-access areas.

[9] Vietnam created VSCO based on the International Standard Classification of Occupations 2008 (ISCO-08), which is a 4-level hierarchically structured system classifying and aggregating occupational information . Each 4-digit occupation has a description, task statements, and examples of job titles. For more information, see GSO (2008).

handbook for the specific occupation. Each occupation has between 4 and 9 tasks, and the majority has 6 or more. The module requests that respondents rate each of the tasks according to the frequency with which they are performed ranging from 1 for "Never" to 7 for "Hourly or more often."

The SDS task module differs from O*NET in two ways. First, the SDS uses task statements from the VSCO handbook rather than from O*NET. Second, the SDS uses a different rating scale. O*NET asks a yes/no question about the relevance of an occupation and about its importance on a 5-point scale ranging from 1 "Not important" to 5 "Extremely important." The Vietnam and Indonesia pilots found that the relevance and importance scales tended to be subjective and duplicative, and so the SDS replaces these with the question about performance.

The pilots also asked respondents to add relevant tasks that were not included in the list generated from the national occupational classification system (that is, VSCO in the case of Vietnam and Klasifikasi Baku Jabatan Indonesia 2014 (KBJI-2014) in the case of Indonesia). Given respondents' lack of clarity and detail responding to this question, this free text option was found not to be useful either to validate task statements or generate new ones., The SDS drops this option from the instrument.

Module II. Module II adapts the skills component of the O*NET Worker Requirement module. For O*NET, skills are the procedures or ways of working given acquired knowledge. Skills can be acquired on the job – in the same occupation or not – or through formal or informal education. The SDS skills module asks detailed questions about 9 types of skills: reading (5 items), writing (3 items), math (4 items), social (6 items), physical (3 items), problem-solving (6 items), technical (6 items), management (4 items), and digital (13 items). The questionnaire also pilots questions related to environmental skills (4 items) and the ability to work from home (1 item). The module requests that respondents rate each of the skills according to the frequency with which they are performed ranging from 1 for "Never" to 7 for "Hourly or more often."

The SDS skills module was redesigned after carefully reviewing O*NET and other skills measurement surveys, particularly PIAAC and STEP, and taking into consideration experience from the Vietnam and Indonesia pilots. The module also reflects issues raised in the literature about the vagueness and complexity of O*NET wording and responses (Handel 2016). **Appendix 1** provides a comparison of the O*NET and SDS skills instrument. Several important changes were made.

- Additional skills. The SDS instrument includes 56 skills while O*NET includes 35. Changes were made after reviewing the skills concept and the PIAAC and STEP's skills at work modules, which collect data on 46 and 56 skills, respectively). The SDS instrument adds complexity levels (for example, 4 levels of math), removes or merges highly related skills to prioritize and reduce the number of questions (for example, active listening), and adds skills that are growing in importance due to trends reshaping the skill and task content of work (for example, digital, environmental, and care skills).

- Simplified language. O*NET skills concepts may be difficult to understand and interpret for workers not accustomed to thinking in terms of skills taxonomies and concepts. To avoid misinterpretations that could result in measurement error, the Vietnam and Indonesia pilots introduced plain language definitions to each skills definition. However, this substantially increased the length of the survey. Therefore, based on the PIAAC and STEP instruments, the SDS questionnaire switched from using skills definitions to specific questions on how frequently a skill is applied coupled with examples of each of the skills. For example, O*NET's question on the importance of "Understanding written sentences and paragraphs in work-

related documents" was replaced with several questions on reading comprehension including "How often does your job involve reading letters, memos, or e-mails?"

- Different rating scale. O*NET uses two rating scales for each skill: the importance scale, ranging from 1 "Not important" to 5 "Extremely important," and the level scale, ranging from 1 "Basic" to 7 "Sophisticated." The importance scale is subjective, relying on a respondent's experience or understanding of the job. The level scale attempts to measure complexity by including anchors or examples, though these are not divided into equal intervals (for example, there is a tendency to have extreme examples for the highest levels of sophistication), do not measure a single concept/skill, require a high level of abstraction (since the examples are not always applicable to the occupation), and are not exclusive. The SDS, instead, uses a rating scale that captures the frequency with which the skill is applied. This provides more clarity to the respondent about how to rank the skill. The SDS also asks about multiple skill levels (for example, simple reading and advanced reading) rather than asking about the level of a skill. This allows for the inclusion of more specific examples. For example, the example provided for basic reading is "reading letters, memos, or e-mails" while the example provided for advanced reading is "reading books, professional journals, or scholarly publications."

Module III. Module III adapts the Education and Training questionnaire of the O*NET Worker Requirement module. The module asks respondents about the qualifications needed to perform the job, including the level of education, related work experience, on-the-job training, and job-related professional certifications.

The SDS modifies the Education and Training questionnaire in several ways. The SDS uses the Vietnam's education classification taxonomy, asks for field of studies required for the job, shortens the length scales used for work experience and training, and removes the question about apprenticeships given their infrequent use in Vietnam.

Module IV. Module IV collects demographic information on respondents, including age, gender, education, experience, and type of employer.

Targeted occupations

The SDS survey selected occupations that are in-demand and/or relevant for the growth of strategic sectors of Vietnam's economy. While in the long run it would be ideal to survey all occupations in Vietnam, given resource constraints the SDS pilot focused on 30 occupations. . The 30 selected occupations represent 31 percent of 2018 employment. . Occupations selected for the SDS had to meet several selection criteria.

- Minimum sample. Occupations had to have a minimum sample of 20 respondents in the latest rounds of the Labor Force Survey (March and September 2021) in Vietnam's major employment centers (Ha Noi, Ho Chi Minh City, Da Nang, Vinh Phuc, and Dong Nai).

- Exclusion of residual occupations. Occupations could not be "residual occupations," that is, an occupation with "not elsewhere classified" in its title.[10] These occupations tend to have vague descriptions.

[10] This is all 4-digit occupations ending in 9.

- In-demand. Occupations had to have an employment level above the first quartile and have non-negative 1- and 3-year employment growth.[11] These criteria were relaxed in some cases for occupations considered to be strategic to Vietnam's economic development.

In the VSCO, 111 4-digit occupations met these requirements. To narrow this to the 30 occupations that could be surveyed given resource constraints, several additional criteria were used.

- Digital transformation. Vietnam has prioritized digital transformation as one of the pillars of its development strategy for the next 10 years. This digital transformation may impact jobs either by increasing the demand for digital skills within existing jobs or by creating (destroying) jobs as the country adopts new technologies (World Bank 2022). Drawing on research on digital skills in Vietnam, jobs likely to be affected by digital transformation are selected (World Bank 2021; Cunningham, et al. 2022). Education-related occupations that may influence the transfer of digital skills to workers were also selected.

- Megatrends. Occupations that may be affected by megatrends influencing Vietnam's growth trajectory were also included. These megatrends include green growth, the fourth industrial revolution and automation (), and aging (Cunningham and Pimhidzai 2018; World Bank 2021b; Frey and Osborne 2017).

- Strategic sectors. Occupations relevant to strategic sectors for economic growth, particularly based on exports, were included. These sectors include electronics, textiles, and, to a lesser extent, machinery. For example, the electronics sector represented 38 percent of Vietnam's 2019 export basket.[12] The sector's exports grew 2,363 percent in the last decade (from $4.75B to $117.5B). The Textile sector represented 22 percent of the 2019 export basket, and its exports grew 283 percent in the last decade (from $17.8B to $68.2B). The machinery sector represented 8 percent of the export basket, and its exports grew 529 percent (from $3.85B to $24.2B).

Table 1 lists the selected occupations.

[11] Given data availability, employment indicators were constructed using 2018 as the base year.

[12] See Harvard University Growth Lab's Atlas of Economic Complexity available at https://atlas.cid.harvard.edu/.

Table 1. Occupations selected for inclusion in the SDS

Code	Name	Employed	Growth (%)		Selection criteria
			1-year	3-year	
2142	Civil engineers	112,731	-8	-11	Green growth
2144	Mechanical engineers	42,451	-8	8	Strategic sector. Automation
2151	Electrical engineers	72,826	11	19	Strategic sector. Green growth
2311	University and higher education teachers	59,519	-6	-19	Digital transformation (skills transfer)
2332	Secondary education teachers	173,954	5	5	Digital transformation (skills transfer)
2411	Accountants and related professionals	563,646	-7	3	Automation
2421	Organizational and management analysts	238,712	2	26	Digital transformation
2431	Advertising and marketing specialist	138,994	-11	11	Digital transformation
2512	Software developers	26,023	19	73	Digital transformation
3113	Electrical engineering technicians	76,935	29	46	Strategic sector. Green growth
3221	Nursing associate professionals	181,126	11	1	Population aging
3313	Accounting associate professionals	208,445	12	8	Automation
5211	Stall and market salespersons	3,863,663	6	2	Digital transformation
5221	Shop owner	32,305	-3	-29	Digital transformation
5223	Shop sales assistants	2,678,116	3	21	Digital transformation
7111	House builders	1,994,563	6	29	Green growth
7212	Welders and flame cutters	448,178	10	30	Automation
7231	Motor vehicle mechanics and repairers	354,800	10	-2	Green growth. Digital transformation
7412	Electrical mechanics and fitters	99,080	19	19	Strategic sector. Automation. Green growth
7543	Product graders and testers	89,528	38	38	Automation
8153	Sewing machine operators	1,444,261	5	31	Automation
8156	Shoemaking and related machine operators	482,780	13	10	Strategic sector. Automation
8183	Packing, bottling, and labeling machine operators	135,667	1	8	Automation
8201	Mechanical machinery assemblers	32,226	4	40	Strategic sector. Automation
8202	Electrical and electronic equipment assemblers	407,966	19	100	Strategic sector. Automation. Green growth
8321	Motorcycle drivers	355,464	2	7	Digital transformation. Automation
8322	Taxi and van drivers	727,132	6	21	Digital transformation. Automation
8332	Heavy truck and lorry drivers	497,271	7	13	Digital transformation. Automation
9313	Building construction laborers	1,308,041	8	47	Automation. Green growth
9333	Freight handlers	509,490	5	8	Automation

Source: Authors.

Implementation design and sampling frame

The SDS implementation design was adjusted to the local context in Vietnam in several ways.

- Respondents. The SDS relied only on job incumbents as respondents and did not use occupation experts. O*NET, in contrast, uses occupational analysts to fill in the skills questionnaire given the abstract nature of skills concepts. However, occupational analysts are not widely available in Vietnam. Given the minimal differences in ratings between analysts and incumbents in the United States and between experts and incumbents in the Indonesia pilot and given the fact that the SDS simplified the questionnaire language, job incumbents were used as respondents (Alatas, Granata, and Posadas 2020).[13] Respondents were selected based on their occupation as stated in previous rounds of the Vietnam Labor Force Survey.

- Number of respondents. The SDS targeted 20 respondents per occupation.[14] O*NET's minimum acceptable sample size per occupation is 10, although this varies widely depending on the questionnaire and respondent type. The SDS aimed to have a balanced sample of respondents from the most economically active areas in the country (Ha Noi, Ho Chi Minh City, Da Nang, Vinh Phuc, and Dong Nai). In addition, to address the tendency of female underrepresentation in the previous pilots, the SDS designed a sampling frame in which the share of female respondents approximated the share of employment in the occupation at the national level.

- Data collection strategy. The SDS was a supplement to the December 2021 round of Vietnam's Labor Force Survey, which is administered by Vietnam's General Statistics Office, which also oversaw collection of the SDS. This created significant administrative and cost benefits because separate survey collection infrastructure did not need to be created.

- Sample. Adding the SDS to the Labor Force Survey also permitted the use of the Labor Force Survey's sampling frame, which includes information about respondents' occupation at the VSCO 4-digital level. The sampling frame was drawn from the March and September rounds of the Labor Force Survey. In total, 543 workers answered the survey. Out of the 30 occupations selected, 15 had a sample size larger than 20 and only 6 smaller than 10.

- Data collection mode. The SDS survey was conducted in-person and through telephone interviews. Due to the COVID-19 pandemic, 67 percent of interviews were conducted in-person and the remainder through phone calls. These delivery methodologies were preferred to a web-based instrument (as in previous pilots) given the availability of a sampling frame and to improve the survey's ability to capture lower-skilled occupations.[15]

[13] However, analysts were preferred for practical considerations (i.e., time, costs, and convenience) (Tsacoumis and Van Iddekinge, 2006).

[14] For example, the skills data have a sample of 8 analysts across all occupations, while the tasks data have a range of sample sizes from occupations answered by 3 experts to occupations answered by 247 job incumbents.

[15] For cost efficiency in the case of Vietnam and because of precautions necessitated by the COVID-19 pandemic in Indonesia, the pilot surveys were carried out using web-based forms. Web-based instruments may not be suitable for collecting data related to low-skilled occupations given the possibility that less-skilled workers have less access to digital technologies and low digital literacy.

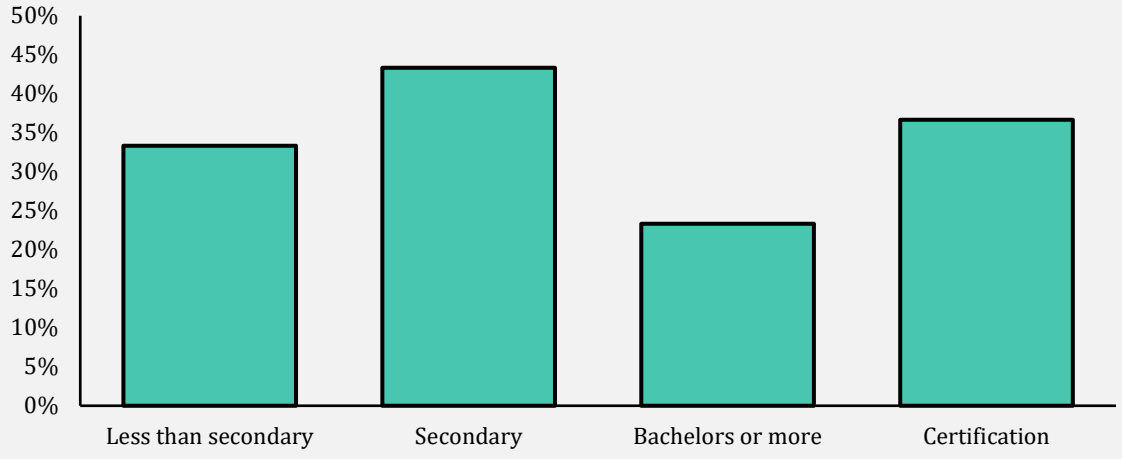
Results

Though limited by the occupations covered, the SDS can offer some general insights into the kinds of skills that are currently in demand in Vietnam. The primary objective of the SDS is to provide detailed profiles of the tasks, skills, and education and experience requirements of specific occupations in Vietnam. The following section includes an example of these profiles. This section summarizes the results of the SDS to provide a general picture of the kind of insights available from the SDS. Importantly, however, these summary results refer to the 30 occupations sampled and so are not representative of Vietnam's labor market at large.

Education. Forty-three percent of occupations require at least a secondary degree but not higher education (**Figure 2**). These are occupations that are more technical in nature (for example, technicians, assemblers, machine operators, heavy trucks drivers). A third of occupations require less than a secondary degree. These occupations are related to sales (for example, shopkeepers and stall and market salespersons), require operating simple machines (for example, sewing machine operators, motorcycle drivers), or involve performing elementary tasks (for example, building construction laborers, freight handlers). Twenty-three percent of occupations require bachelor's degree or above. All of these occupations are professional occupations (for example, engineers, teachers, analysts). Still, educational requirements vary significantly within occupational groupings (**Figure 3**). For example, fairly large shares of Plant and Machine Operators and Assemblers report needing secondary education or vocational training (about 25 percent each), though most report needing only less than secondary education. About a third of occupation require certifications (**Figure 2**). These occupations are mostly high-skilled (e.g., mechanical engineers, software developers, teachers, associate professionals), although some are semi-skilled machine operators (for example, drivers who need driver's licenses).

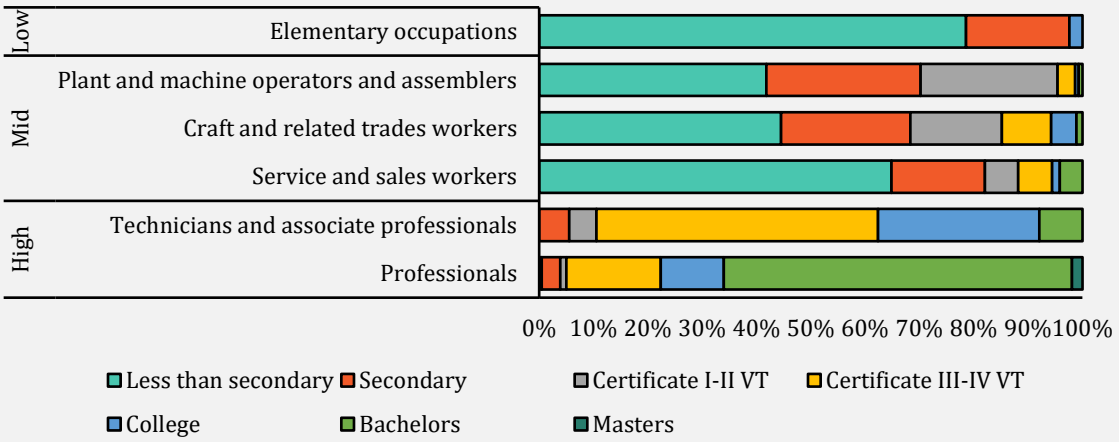
Figure 2: Education requirements of the SDS's 30 occupations

Share of occupations with at least half of workers reporting the level of education or certification is required (%)



Source: SDS.

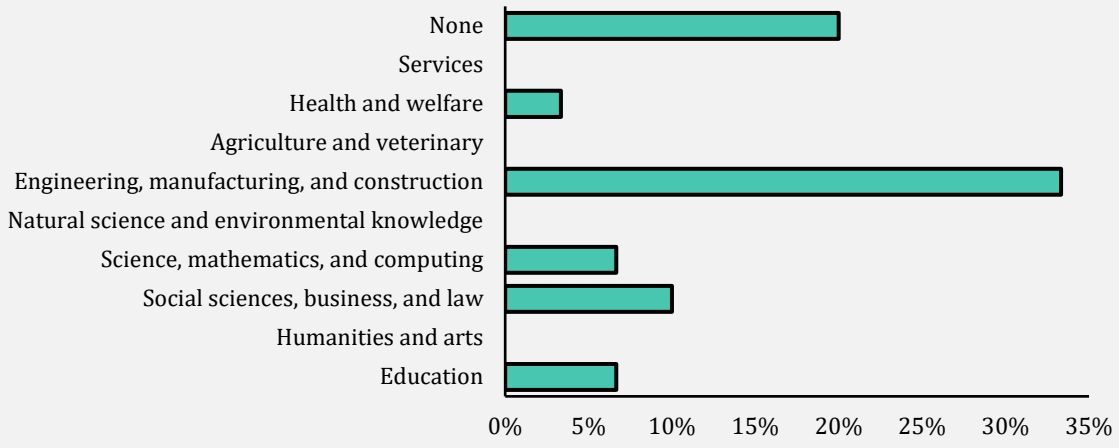
Figure 3: Education requirements of the SDS's 30 occupations by skill level
Share of workers reporting the level of education is required (%)



Note: Certificate 1-II VT and Certificate III-IV VT refer to secondary-level vocational training. College refers to tertiary-level vocational training.
Source: SDS.

Field of study. Engineering, manufacturing, and construction is a cross-cutting field of study important at all skills levels: a third of occupations covered by the SDS require this field (**Figure 4**). These are mostly engineers (professionals), electrical technicians, and technical craft and related workers (for example, assemblers, repairers, and fitters). In general, field of study requirements depend on the specific field of specialization of the occupation. For example, health and welfare are important to nursing associate professionals and elementary occupations such as freight handlers and construction laborers. However, 20 percent of occupations do not require a field of study. These are mostly less-skilled occupations such as elementary occupations, drivers, and sales workers.

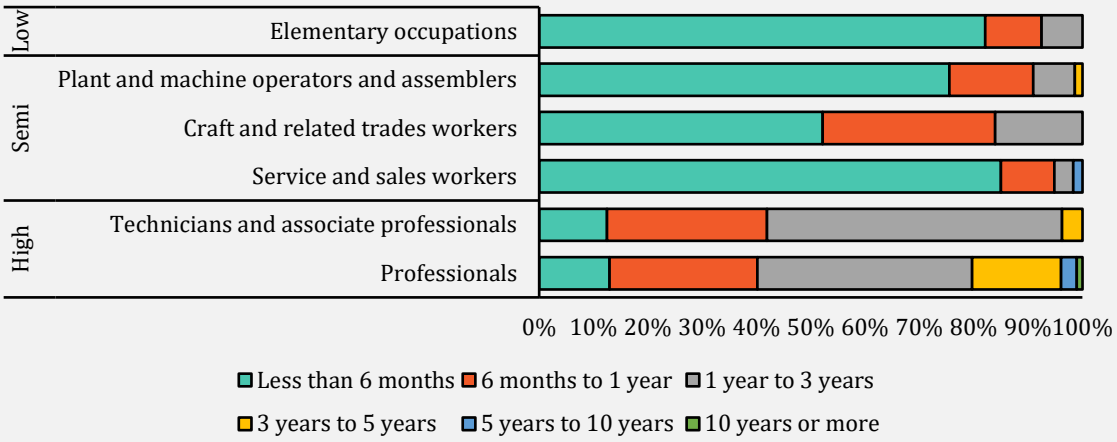
Figure 4: Field of study requirements of the SDS's 30 occupations
Share of occupations with at least half of workers reporting the field of study is required (%)



Source: SDS.

Work experience: The majority of occupations do not require substantial related work experience: 77 percent require up to 1 year of experience while almost all of the remainder require between 1 and 5 years. In general, semi- and low-skilled workers require less than 6 months of related work experience, while most higher-skilled workers require between 1 and 3 years (**Figure 5**). University and higher education teachers, software developers, and civil engineers are the occupations requiring the most experience (3 or more years).

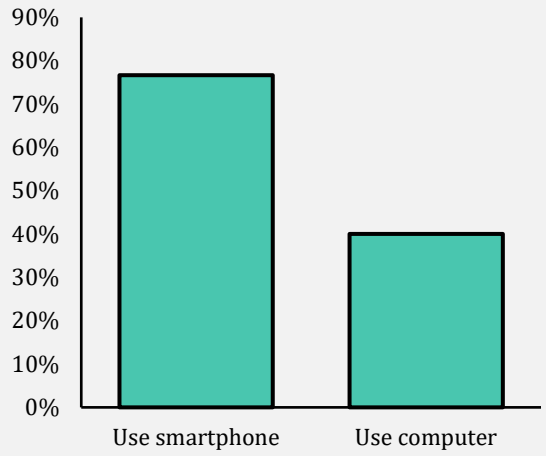
Figure 5: Work experience requirements of the SDS's 30 occupations by skill level
Share of workers reporting the level of work experience is required (%)



Source: SDS.

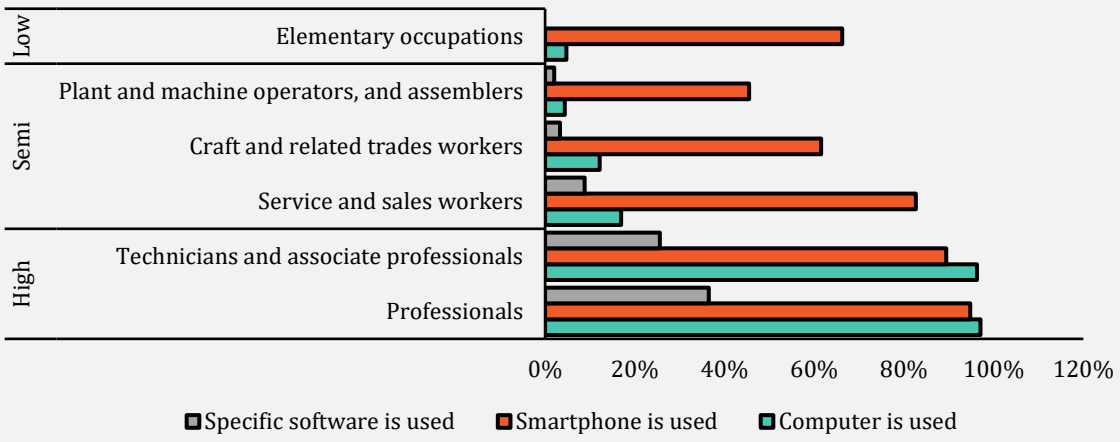
Digital tools. Most occupations require the use of smartphones (77 percent), while a smaller share (40 percent) require the use of computers (**Figure 6**). Smartphones are widely used at work across all skill levels except for occupations involved with a production line (for example, machine operators and assemblers) (**Figure 7**). Computers are used in high-skilled occupations (for example, professionals and technicians and associate professionals). A third of these occupations also require the use of specific software such as AutoCAD for Civil Engineers and MISA accounting software for accountants.

Figure 6: Smartphone and computer use requirements of the SDS's 30 occupations
Share of occupations with at least half of workers reporting use of a smartphone or computer is required (%)



Source: SDS.

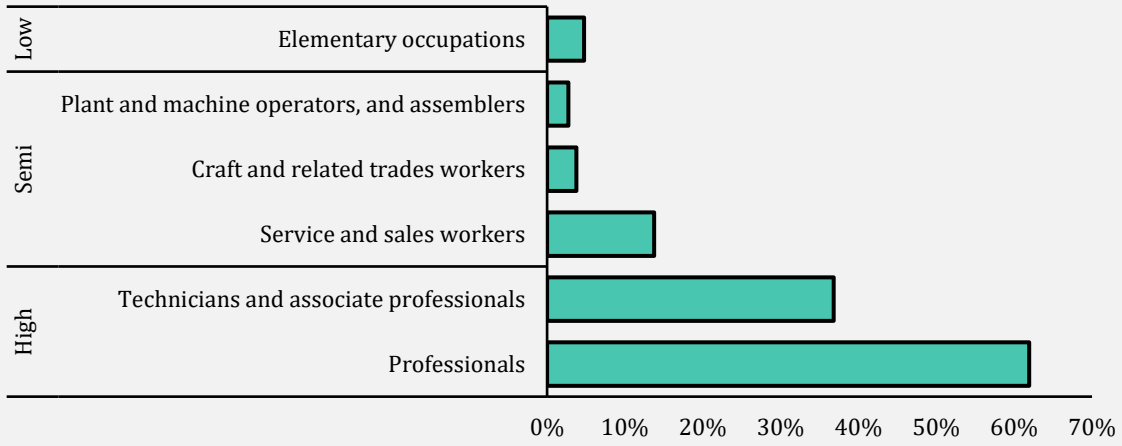
Figure 7: Smartphone and computer use requirements of the SDS's 30 occupations by skill level
Share of workers reporting the use of a smartphone, computer, or specialized software is required (%)



Source: SDS.

Work from home. Given the widespread use of computers in high-skilled occupations, workers in these occupations are also the most likely to be able to work from home if internet and computers are available (**Figure 8**). University, higher education, and secondary school teachers are the occupations with the largest share of workers saying that their jobs could be effectively carried out from home.

Figure 8: Work-from-home potential of the SDS's 30 occupations by skill level
Share of workers reporting being able to work from home given access to a computer and internet connection (%)



Source: SDS.

Skills. As described in the methodology section, the SDS's individual skills can be categorized into several summary skills groups. Here, we focus on 9 skill groups representing 45 detailed skills.

Most occupations use ***physical skills*** frequently (**Figure 9**). This is true across all skills levels, although lower-skilled occupations tend to use physical skills more frequently (**Figure 10g**). The importance of the physical skills group is driven by fine-motor skills (using hands and fingers): for more than half of the occupations at least two-thirds of workers say they use fine-motor skills on a daily basis (**Figure 11**). Mechanical Machinery Assemblers and Nursing associate professional are the occupations that use fine-motor skills the most, while Accounting Associate Professionals and Shop Sales Assistants use it the least.

Similarly, more than half of occupations use ***problem solving skills*** frequently (**Figure 9**). The higher the skill level, the more likely workers are to use it on a daily basis (**Figure 10e**). However, most occupations require workers to use simple problem solving (solving problems that take less than 5 minutes) (**Figure 11**). For more than half of occupations, more than 60 percent of workers say they use this skill on a daily basis.

Social skills, which include many socioemotional skills, are also common, including across skill levels (**Figure 9** and **Figure 10d**). A high percentage of workers in all occupations use the detailed social skill collaboration on a daily basis (**Figure 11**). For more than half of occupations, 75 percent of workers use the skill on a daily basis. Nursing Associate Professionals and Packing, Bottling, and Labelling Machine Operators are the occupations that use it the most, while Motorcycle Drivers and Stall and Market Salespersons use it the least.

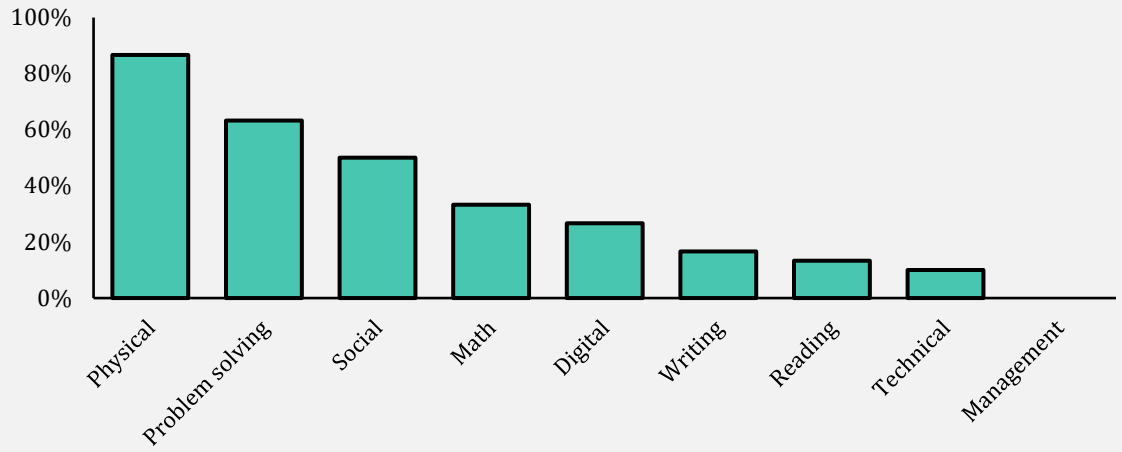
About one-third of occupation require ***math skills*** to be used frequently with this requirement more common among higher-skilled occupations (**Figure 9** and **Figure 10c**). Only basic math skills are generally required. Half of the occupations have at least two-thirds of workers using simple math (multiplication and division) on a daily basis (**Figure 11**). Financial math (calculating prices, creating budgets) is the second-most frequently required math skills: half of the occupations have at least 25

percent of their workers using financial math on a daily basis. Those that use financial math the most are Stall and Market Salespersons and Motorcycle Drivers. Moderate math (fractions and percentages) is used even less often. The occupations that use it the most are Accountants and Software Developers. Advanced math (algebra, trigonometry, and regressions) is rarely used. The occupation that uses it the most is Secondary Education Teachers (though only 30 percent of workers report using it on a daily basis).

Around one-quarter of occupations use ***digital skills*** frequently (**Figure 9**). While digital skills are more commonly required among more highly skilled workers, even low-skilled occupations sometimes require daily use of digital skills (**Figure 10i**). Conditional on using a computer or a smartphone at work, internet search, spreadsheets, social media, computer writing, and e-mail are the most commonly used individual skills (**Figure 11**).

Technical skills are not widely required (**Figure 9**). For most occupations (75 percent), few workers (at most a third) use technical skills like designing or adapting equipment or software, installing equipment or software, or maintaining and repairing equipment on a daily basis (**Figure 11**). Still, some occupations use technical skills such as monitoring equipment or quality control intensively. For example, two-thirds of Product Graders and Testers say they use quality control skills on a daily basis and nearly two-thirds of Welders and Flamecutters report monitoring equipment on a daily basis.

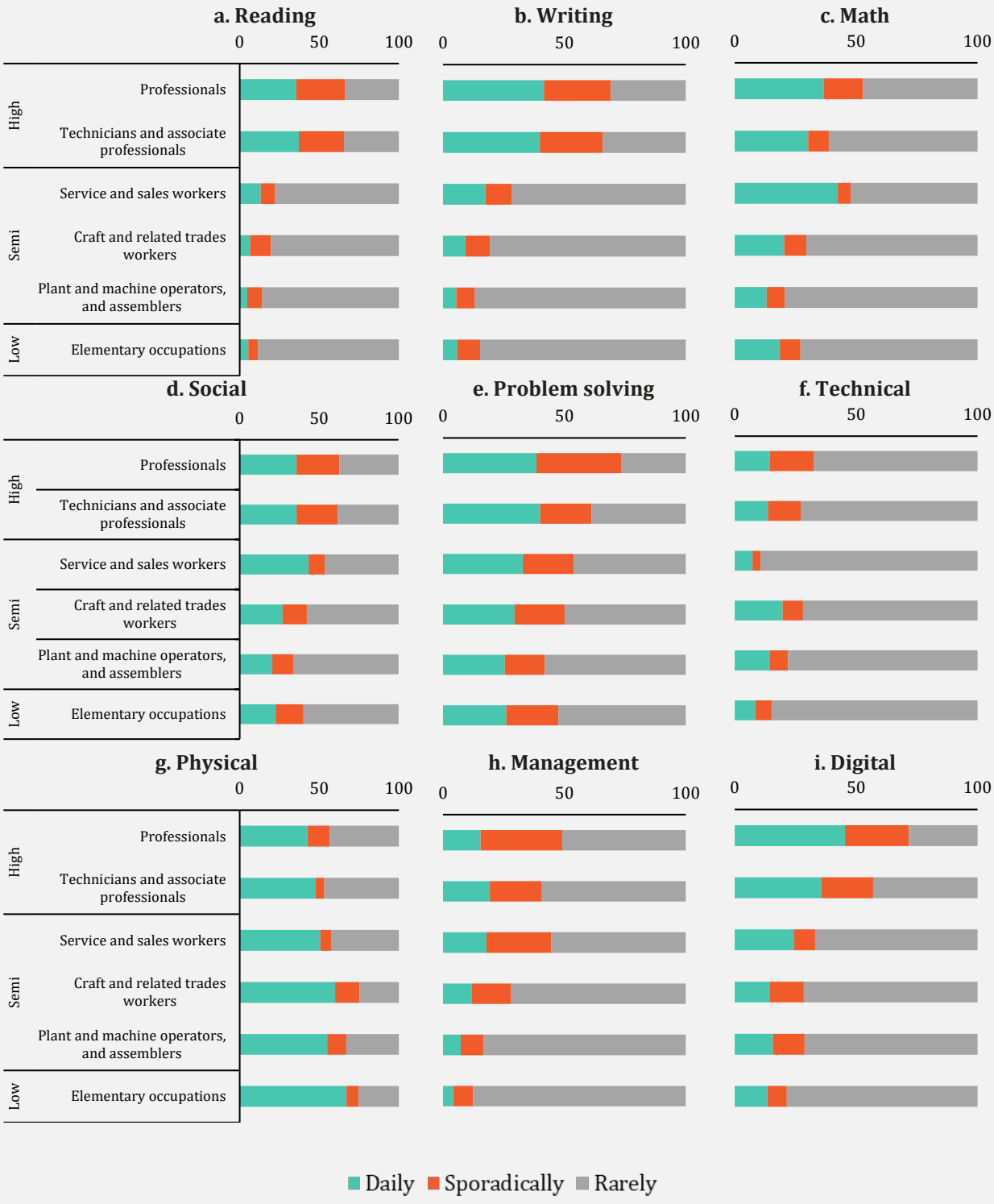
Figure 9: Skill group requirements of the SDS's 30 occupations
Share of occupations for which the skills group is in the top 3 skill groups (%)



Source: SDS.

Figure 10: Skill group requirements of the SDS's 30 occupations by skill level

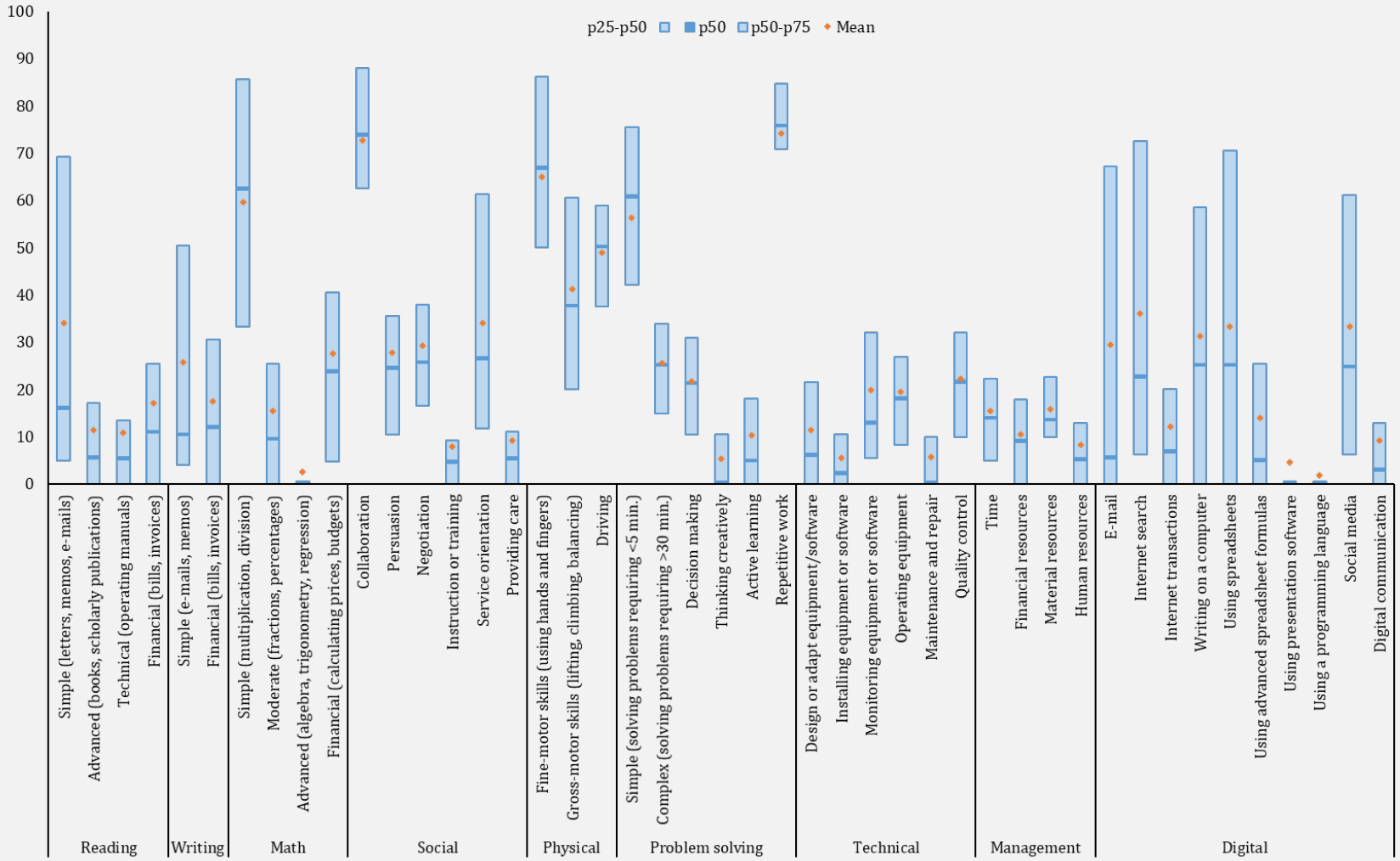
Share of workers reporting how frequently the skill group is used (%)



Note: Rarely is never or less than once a month. Sporadically is at least once a week to at least once a month. Daily is every day from once a day to hourly.
Source: SDS.

Figure 11: Detailed skill requirements of the SDS's 30 occupations

Median and interquartile ranges of share of workers reporting the detailed skill is used daily (%)



Note: Digital skills are conditional on a worker reporting the use of a computer or smartphone at work.
Source: SDS.

Occupation Profiles

How to read the profiles

Title and description. This section provides a summary of the occupation's main activities.

Tasks. This section lists the tasks performed in the occupation. The figures show the percentage of workers in the occupation who report that they do a task daily, sporadically, and rarely. Comparing occupations on this metric provides an indication of which tasks are more important.

Education and experience requirements. This section shows the percentage of workers in the occupation who report that a given level of education, a given field of study, or a certification are required for the occupation. The section also shows the percentage of workers in the occupation who think that work experience of different lengths is needed.

Use of digital tools. This section shows the percentage of workers in the occupation who report using computers and smartphones in their jobs. The section also shows the percentage who use specialized software and the percentage who believe that, given access to a computer and internet connection, they could efficiently work from home.

General skills. This section summarizes the skills needs of the occupation by grouping individual skills into broader categories. The section shows the percentage of workers in the occupation who report using a given broad skills category daily.

Detailed skills. This section provides information about the requirements of the occupation for detailed skills. The section shows the percentage of workers in the occupation who report using a detailed skill daily, sporadically, and rarely.

The Skill and Task Handbook

Profiles of Occupations in Vietnam

Select the language

English **Tiếng Việt**

Select an occupation

3221 - Nursing Associate Professionals

The occupational profiles are created from the Survey of Detailed Skills, a survey that asks about the skills that workers need and the tasks that workers undertake in their occupations. More information on the Survey of Detailed Skills is available here.

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The Skill and Task Handbook

Profiles of Occupations in Vietnam

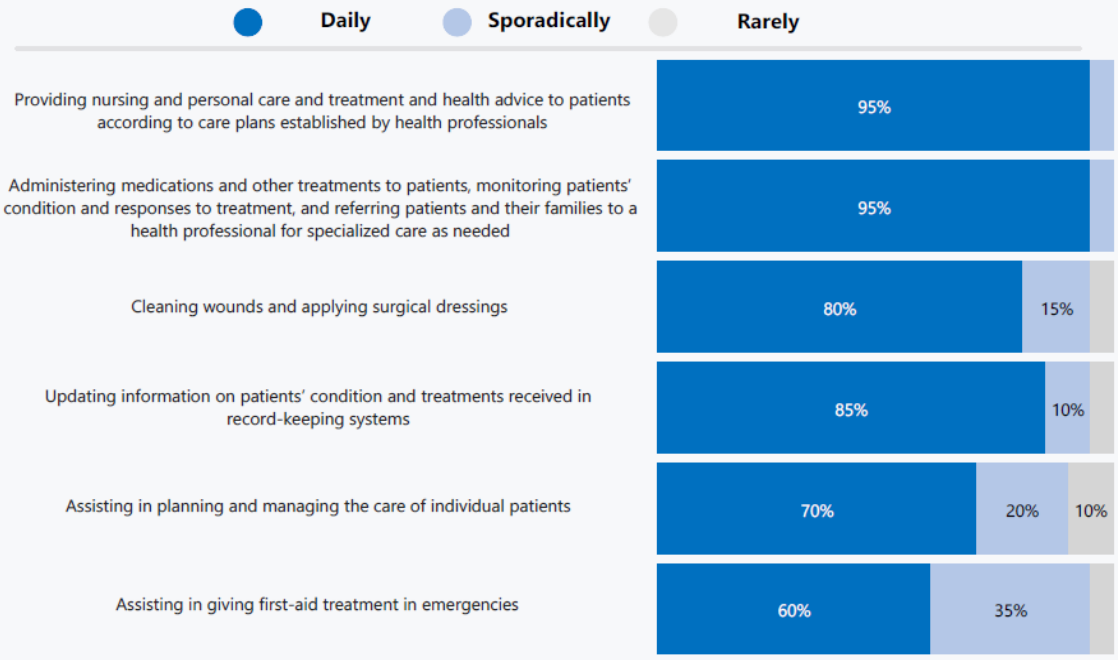
Nursing Associate Professionals (VSCO - 3221)

What Nursing Associate Professionals Do

Nursing associate professionals provide basic nursing and personal care for people in need of such care due to effects of ageing, illness, injury, or other physical or mental impairment. They generally work under the supervision of, and in support of, implementation of health care, treatment and referrals plans established by medical, nursing and other health professionals.

Tasks

The following activities are tasks that Nursing Associate Professionals do at work. Since there are different types of Nursing Associate Professionals doing different types of jobs, the figures show the share of workers reporting doing the task daily (dark blue), sporadically (light blue), and rarely (white).



The Skill and Task Handbook

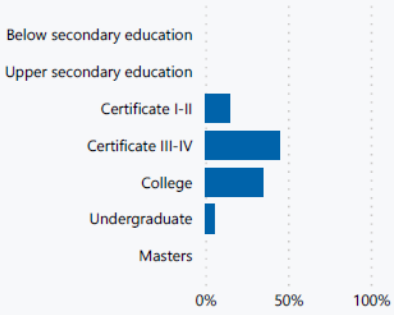
Profiles of Occupations in Vietnam

Nursing Associate Professionals (VSCO - 3221)

Education and experience requirements

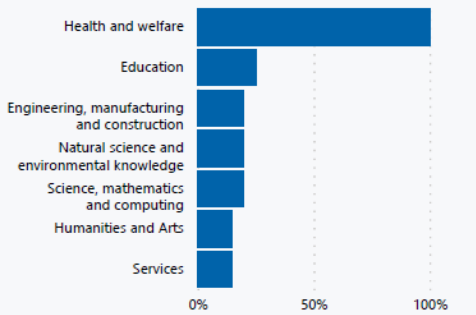
Education

% of workers saying level is required



Field of Study

% of workers saying field is required



Certifications

31% of workers say certifications are needed.

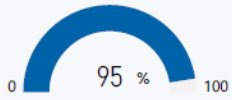
Related work experience

Jobs in this occupation typically require workers to have experience. 55% of workers say that up to a year of experience is required and 45% say that up to 5 years of experience is required.

Use of digital tools

Computers

% of workers saying computers are used

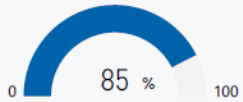


Specialized software

11% of workers say that the use of specialized software is required.

Smartphones

% of workers saying smartphones are used



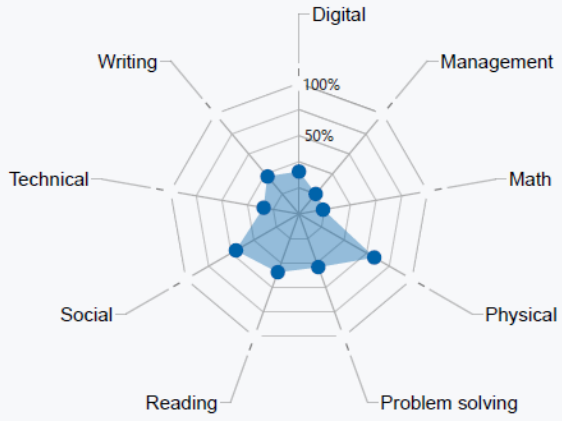
Work from home

45% of Nursing Associate Professionals say they could efficiently perform their work from home on a daily basis.

General Skills

Physical, Social and Reading skills are generally used more frequently by Nursing Associate Professionals.

% of workers saying they use the skill on a daily basis

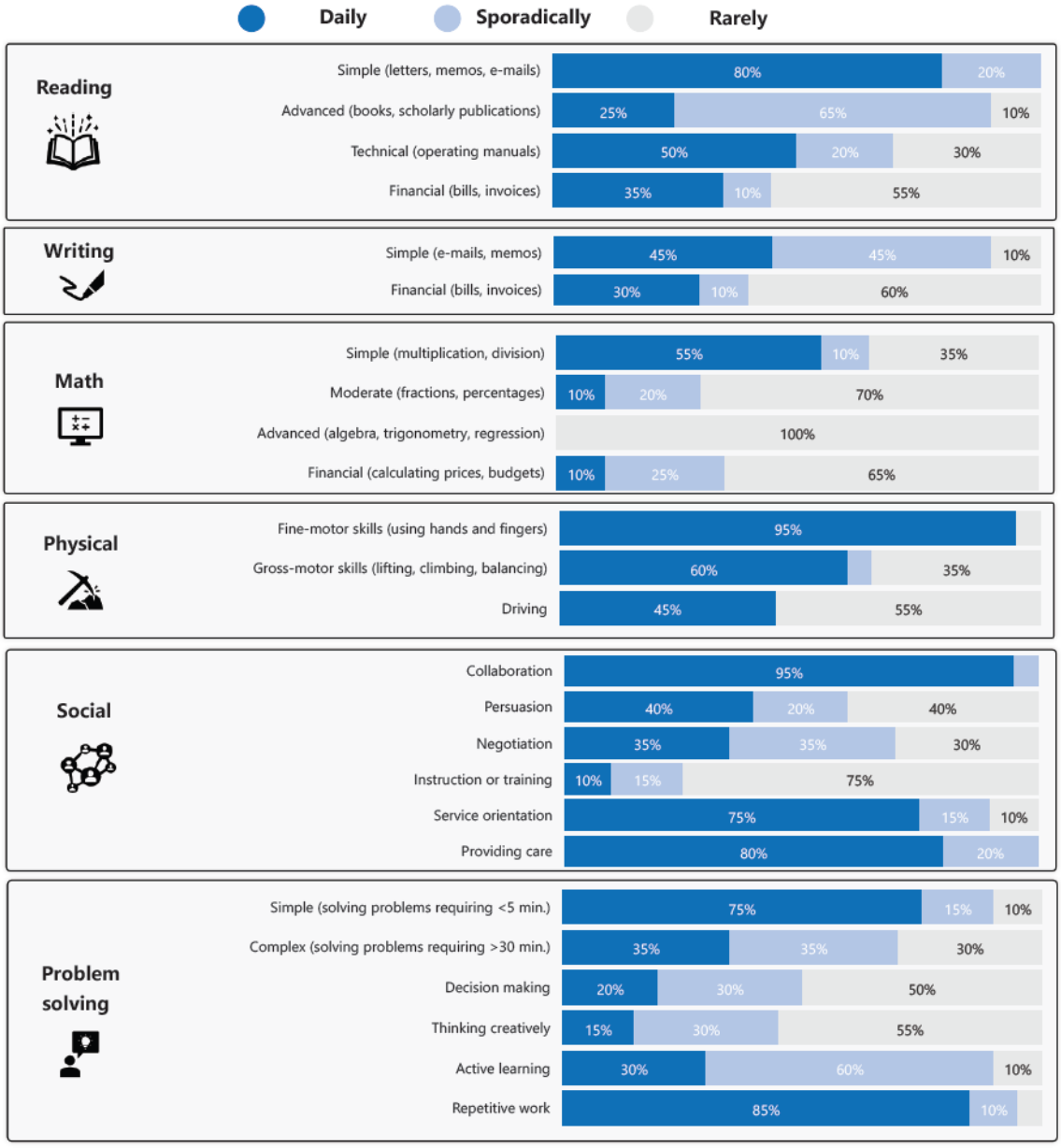


The Skill and Task Handbook

Profiles of Occupations in Vietnam

Nursing Associate Professionals (VSCO - 3221)

The figures show the frequency with which Nursing Associate Professionals use each skill to perform their job well. Since there are different types of Nursing Associate Professionals doing different types of jobs,the figures show the share of workers reporting using the skill daily, sporadically, and rarely.

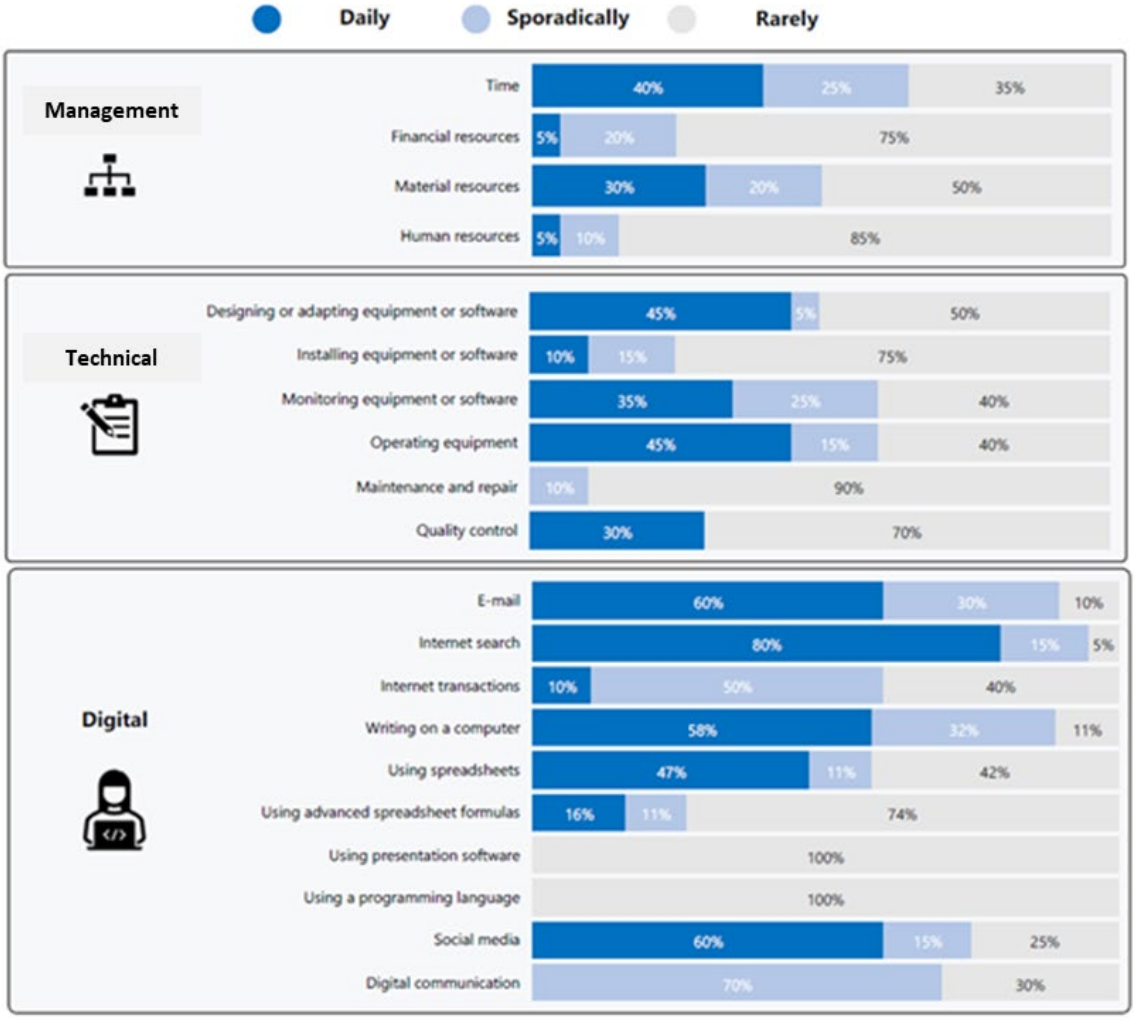


The Skill and Task Handbook

Profiles of Occupations in Vietnam

Nursing Associate Professionals (VSCO - 3221)

The figures show the frequency with which Nursing Associate Professionals use each skill to perform their job well. Since there are different types of Nursing Associate Professionals doing different types of jobs,the figures show the share of workers reporting using the skill daily, sporadically, and rarely.



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Conclusion

The SDS makes several contributions. First, the SDS provides a comprehensive but also in-depth portrait of skill, task, and educational requirements for a set of detailed occupations in Vietnam. The SDS is among the first surveys to collect this information at the detailed occupational level in a developing country setting. The collection of information about detailed skills means that these skills can be flexibly grouped into different categories (for example, socioemotional skills, digital skills, routine skills, interpersonal skills) as needed. The use of a consistent scale anchored to the time spent using or performing a skill or task yields a measure of skill and task importance that is easily interpreted. The SDS approach also has some advantages over collection of skill and task data via online job vacancy data, which has become common in recent years. In developing country contexts, online vacancy data tends to be biased towards higher-skilled digital-intensive occupations and jobs at firms that use the internet (CSC 2019; World Bank 2021). The SDS avoids this bias by selecting the occupations of interest, including low-skilled jobs, first and using a sampling frame based on Vietnam's Labor Force Survey. Finally, the information generated can be easily compiled into profiles that can be shared with labor market stakeholders in order to inform career and workplace decisions.

Still, the SDS has some weaknesses. The SDS requires outlays on administering a survey, and initial data collection covered only 30 of the hundreds of occupations in Vietnam at single point in time.

Ensuring the sustainability of occupational profiling efforts will require ongoing investment. To be useful to students, employers, training institutions, policy makers, and other labor market stakeholders, labor market information must be both comprehensive and updated. This means that the SDS would need to be expanded to eventually cover all occupations in Vietnam. Plans would also need to be made to periodically review occupations already covered by the SDS. These efforts would require investment in survey administration, analysis of data collected, and dissemination of the results. Complementing the SDS with online job vacancy data could help offset some of the costs of frequently updating the occupational information collected by the SDS. Online vacancy data on skills and tasks could help keep occupational profiles fresh in between rounds of data collection, which could likely take place at greater intervals if complemented with online vacancy data. For example, O*NET uses online job postings to identify tools and technologies, to inform task statement taxonomies, and to identify new job titles to update occupational profiles. Incorporating additional data sources into occupational profiles is also important to ensure that a complete picture is created. Labor Force Survey data, firm surveys, consultations with employers and other labor market stakeholders, and many other sources are useful complements to the SDS and online vacancy data. The SDS is thus part of a labor market information ecosystem with the comparative advantage of producing comprehensive, granular information about occupational skills and tasks.

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Appendix 1: Comparison between O*NET Skills module and SDS questions.

The following table shows the difference between O*NET's skills module and the SDS questionnaire. The row colors indicate the difference between the two instruments: **blank** indicates that O*NET and SDS are the same; **grey** that the skill is included in O*NET but not in SDS; **green** that the SDS question is slightly different from the O*NET question or that it is included under a different skill group; **yellow** that the SDS merged two distinct O*NET concepts; **blue** that the SDS added complexity levels to the skills; and **red** that the SDS included questions that are not included in O*NET's skills module.

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
BASIC					
Reading Comprehension	Understanding written sentences and paragraphs in work-related documents.	reading letters, memos, e-mails, newspapers, or magazines?	SDS captures different complexity levels included in PIAAC and STEP.	Reading simple content	Cognitive
		reading books, professional journals, or scholarly publications?		Reading advanced content	Cognitive
		reading instruction or operating manuals?		Reading technical	Cognitive
		reading bills, invoices, bank statements, or other financial statements?		Reading financial	Cognitive
		What is the longest document that you normally read at work?		Reading length	Cognitive
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.		Not included in SDS nor in PIAAC or STEP.		
Writing	Communicating effectively in writing as appropriate for the needs of the audience.	writing letters, memos, or e-mails?	SDS captures different complexity levels included in PIAAC and STEP.	Writing simple content	Cognitive
		filling out bills, invoices, bank statements, or other financial statements?		Writing financial	Cognitive
		What is the longest document that you normally write?		Writing length	Cognitive
Speaking	Talking to others to convey information effectively.		Highly related to social skills questions.	Speaking	Cognitive

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
Mathematics	Using mathematics to solve problems.	using simple math, such as multiplication or divisions?	SDS captures different complexity levels included in PIAAC and STEP.	Math simple	Cognitive
		calculating prices, costs or budgets?		Math financial	Cognitive
		using or calculating fractions, decimals or percentages?		Math moderate	Cognitive
		using more advanced math, such as algebra, trigonometry, regression techniques, etc.?		Math advanced	Cognitive
Science	Using scientific rules and methods to solve problems.		Not included in SDS nor in PIAAC or STEP.		
Critical Thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.		Highly related to problem-solving skills questions.		
Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making.	learning new things?	Included in STEP.	Active learning	Cognitive
Learning Strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.		Not included in SDS nor in PIAAC or STEP.		
Monitoring	Monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.		Highly related to resources management skills questions.		
SOCIAL					
Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do.		Not included in SDS nor in PIAAC or STEP.		
Coordination	Adjusting actions in relation to others' actions.	coordinating, co-operating, or collaborating with co-workers?		Coordination	Socioemotional

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
Persuasion	Persuading others to change their minds or behavior.	persuading or influencing people? (for example, selling a product, convincing a co-worker to change their mind)		Persuasion	Socioemotional
Negotiation	Bringing others together and trying to reconcile differences.	negotiating with people either inside or outside your firm or organization?		Negotiation	Socioemotional
Instructing	Teaching others how to do something.	instructing, training or teaching people, individually or in groups?		Instruction and training	Socioemotional
Service Orientation	Actively looking for ways to help people.	communicating with people outside the organization? (for example, with customers, the public, government, etc.)	SDS question is slightly different.	Service orientation	Socioemotional
		assisting and caring for others (for example, providing personal assistance, medical attention, or emotional support to customers or patients)?	Under O*NET Generalized Work Activities module. Not included in PIAAC or STEP.	Providing care	Socioemotional
PHYSICAL		performing physical activities that require considerable use of your body, such as climbing, lifting, balancing, walking, stooping, and handling materials?	Under O*NET Generalized Work Activities module. Similar question in PIAAC and STEP.	Gross-motor skills	Physical
		operating/driving vehicles such as a car, truck, forklifts, motorbike, three-wheeler, aircraft, or watercraft?	Under O*NET Generalized Work Activities module. Similar question in STEP.	Driving	Physical
		using skill or accuracy with your hands or fingers?	Under O*NET Abilities module. Similar question in PIAAC.	Fine-motor skills	Physical
PROBLEM-SOLVING					

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
		simple problems that require at least 5 minutes to find a good solution?	Similar to O*NET troubleshooting question included under technical skills.	Simple Problem-Solving	Cognitive
Complex Problem-Solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.	complex problems that require at least 30 minutes to find a good solution?		Complex Problem-Solving	Cognitive
		making decisions where you have to consider the relative costs and benefits of potential actions?	O*NET judgement and decision-making question under Systems skills.	Judgement and Decision making	Cognitive
		thinking creatively to design, develop, or create new things or ideas?	Under O*NET Generalized Work Activities module. Not included in PIAAC or STEP.	Thinking creatively	Cognitive
		doing short repetitive tasks?	Under O*NET Work Context module. Included in STEP.	Repetitive	Cognitive
TECHNICAL					
Operations Analysis	Analyzing needs and product requirements to create a design.	designing or adapting equipment, machines, or software to serve user needs?	SDS merged O*NET unique skills. Not in PIAAC or STEP.	Designing and adapting equipment or software	Technical
Technology Design	Generating or adapting equipment and technology to serve user needs.				
Equipment Selection	Determining the kind of tools and equipment needed to do a job.		Highly related to managing material resources. Not included in PIAAC or STEP.		

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
Installation	Installing equipment, machines, wiring, or programs to meet specifications.	installing equipment, machines, or software to make sure they are working properly?		Installing equipment or software	Technical
Programming	Writing computer programs for various purposes.		SDS included this question under digital skills sub-module.		
Operation Monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly.	monitoring equipment, machine, or software to make sure they are working properly?		Monitoring equipment or software	Technical
Operation and Control	Controlling operations of equipment or systems.	operating equipment or machines (other than computers and vehicles)?		Operating equipment	Technical
Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.	maintain or repair equipment, machines, or software?	SDS merged O*NET unique skills. Not included in PIAAC or STEP.	Maintenance and repair	Technical
Repairing	Repairing machines or systems using the needed tools.				
Troubleshooting	Determining causes of operating errors and deciding what to do about it.		SDS included a similar question under the problem-solving questions.		
Quality Control Analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance.	conducting quality control on products, services, or processes?		Quality control	Technical
SYSTEMS					
Judgment and Decision Making	Considering the relative costs and benefits of potential actions to choose the most appropriate one.		SDS included this question under the problem-solving questions.		

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
Systems Analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.		Highly related to problem-solving questions. Not included in PIAAC or STEP.		
Systems Evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.		Highly related to problem-solving questions. Not included in PIAAC or STEP.		
RESOURCE MANAGEMENT					
Time Management	Managing one's own time and the time of others.	developing specific goals and plans to prioritize, organize, and accomplish your work? (rather than following fixed procedures or instructions)	SDS question is related to worker's time only. Managing the time of other is included under people management question.	Time Management	Cognitive
Management of Financial Resources	Determining how money will be spent to get the work done, and accounting for these expenditures.	determining how money will be spent to get the work done?		Management of Financial Resources	Cognitive
Management of Material Resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.	managing material resources such as equipment, facilities, and materials needed to get the work done?		Management of Material Resources	Cognitive
Management of Personnel Resources	Motivating, developing, and directing people as they work, identifying the best people for the job.	planning the activities of others and/or managing people?		Management of Personnel Resources	Socioemotional
		As part of your job, how many employees do you supervise?	SDS added this question to understand level of complexity.	Management of Personnel Resources	Socioemotional

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
		Do you use a computer in your job?	Under O*NET Generalized Work Activities. Included in PIAAC and STEP.	Computer use	Digital
		Do you use a mobile phone or smartphone in your job?	Not in O*NET. Included in STEP.	Smartphone use	Digital
		using email?	Under O*NET Work Context module. Included in PIAAC and STEP.	E-mail	Digital
		using the internet in order to better understand issues related to your work?	Not in O*NET. Included in PIAAC and STEP.	Internet search	Digital
		conducting transactions on the internet, for example buying or selling products or services, or banking?	Not in O*NET. Included in PIAAC.	Internet transactions	Digital
		using a word processor, for example Word?	Not in O*NET. Included in PIAAC and STEP.	Writing on a computer	Digital
		using spreadsheet software, for example Excel?	Not in O*NET. Included in PIAAC and STEP.	Using spreadsheets	Digital
		using advanced formulas in spreadsheets (such as if conditions, vlookups, pivot tables, macros)?	Not in O*NET. Included in STEP.	Using advanced spreadsheet formulas	Digital
		using presentation software, for example PowerPoint?	Not in O*NET. Included in STEP.	Using presentation software	Digital
		using a programming language to program or write computer code, for example, Python, R, C++?	Under O*NET technical skills. Included in PIAAC and STEP.	Using a programming language	Digital
		using social media applications, for example Instagram, Facebook, twitter?	Not in O*NET. Not included in PIAAC or STEP.	Social media	Digital

ONET skills taxonomy	O*NET definition "How important is ..."	SDS Question "How often does your job involve...	Notes	SDS skills taxonomy	SDS Skills typology
		participating in real-time discussions on the internet, for example online conferences, or chat groups?	Not in O*NET. Included in PIAAC.	Digital communication	Digital
		Do you usually use any other specific software?	SDS added this question to understand level of complexity. Included in STEP.	Software	Digital
		monitoring and optimizing the use of energy such as electricity, heat, and fuel?	Not in O*NET nor PIAAC not STEP.	Energy use and efficiency	Environmental
		reducing the creation of waste and materials and/or conserving natural resources (for example, by recycling or reusing waste/materials, optimizing the use of inputs, monitoring water usage, and protecting ecosystems)?	Not in O*NET nor PIAAC not STEP.	Minimizing waste and Natural resource conservation	Environmental
		researching, applying, or communicating environmental knowledge, plans, or technologies (for example, by developing a process or technology that reduces environmental impact or teaching or increasing public awareness of environmental issues)?	Not in O*NET nor PIAAC not STEP.	Environmental knowledge	Environmental
		Producing renewable energy or environmentally-friendly outputs (for example, building renewable energy equipment, running renewable energy production facilities, or engaging in agriculture, forestry, or aquaculture using sustainable practices)	Not in O*NET nor PIAAC not STEP.	Environmental production	Environmental
WORK FROM HOME		Assuming that you have access to a computer and internet connection, how frequently would you be able to efficiently perform your job from your home?	Not in O*NET nor PIAAC not STEP.	Working from home	Work from home

Appendix 2: The Survey Instrument

Survey of Detailed Skills

2021

INTRODUCTION

FOR JOB INCUMBENTS: The survey is being conducted by the General Statistics Office on behalf of the World Bank. The purpose of this questionnaire is to create an accurate description of your job as a [**OCCUPATION TITLE**] for a project that the World Bank is undertaking about working in Vietnam.

Because you know your duties, responsibilities, and skills better than anyone else, we need your help to create this description. The questionnaire only asks what your job requires you to do. The questionnaire does not ask about your job performance.

Please complete this questionnaire as honestly, completely, and accurately as you can. Base your answers on what you normally do in your current job, not on special projects or temporary assignments unless they are a regular part of the job. When answering the questions, imagine you are describing what you do to a neighbor, friend, or someone just hired for your position.

Your responses are anonymous. All responses will be kept confidential. If you have any questions or comments, please contact our survey information center at XXXX. We appreciate your active participation in this important study.

FOR OCCUPATION EXPERTS: The survey is being conducted by the General Statistics Office on behalf of the World Bank. The purpose of this questionnaire is to create an accurate description of work as a [**OCCUPATION TITLE**] for a project that the World Bank is undertaking about working in Vietnam.

Because you are familiar with the duties, responsibilities, and skills of a [**OCCUPATION TITLE**], we need your help to create this description.

Please complete this questionnaire as honestly, completely, and accurately as you can. Base your answers on what is normally done in this job, not on special projects or temporary assignments unless they are a regular part of the job. When answering the questions, imagine you are describing the job to a neighbor, friend, or someone just hired for the position.

Your responses are anonymous. All responses will be kept confidential. If you have any questions or comments, please contact our survey information center at XXXX. We appreciate your active participation in this important study.

0. Main Job [JOB INCUMBENTS ONLY]

0.1 In the last 30 days, did you do any work for at least 1 hour to receive a salary or wage, engage in any productive or business activities to generate income, or do any unpaid work to generate family income?

1 YES
2 NO [STOP SURVEY]

0.2 In your main job/business, what kind of work do you do?

1 Main tasks and duties
2 ISCO code [STOP SURVEY IF MAIN JOB IS NOT RELATED TO 4-DIGIT OCCUPATION]

0.3 What is the main activity of the business or establishment where you worked?

1 Name of establishment (if any)
2 Main activity, goods, or services
3 ISIC code

0.4 How many people including you are there in the business or establishment?

1 1 person
2 2-4 persons
3 5-9 persons
4 10-19 persons
5 20-49 persons
6 50 persons and above

A. Tasks Performed on the Job

FOR JOB INCUMBENTS: This part of the questionnaire presents a list of tasks. A task is an action or set of actions performed together to accomplish an objective. Please listen carefully to each task and rate how frequently you perform the task in your current job. Ask yourself "How often do I perform this task in my job?" The responses provide different time periods like "Hourly or more often" and "Once per year or less often" and range from less frequent to more frequent. Select "Never" if you never undertake the task at work.

FOR OCCUPATION EXPERTS: This part of the questionnaire presents a list of tasks. A task is an action or set of actions performed together to accomplish an objective. Please listen carefully to each task and rate how frequently the task is performed in work as a [**OCCUPATION TITLE**]. The responses provide different time periods like "Hourly or more often" and "Once per year or less often" and range from less frequent to more frequent. Select "Never" if the task is never undertaken in work as a [**OCCUPATION TITLE**].

FOR JOB INCUMBENTS: How often do you perform the following tasks? **FOR OCCUPATION EXPERTS: How often are the following tasks performed?**	Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
A.1 Task statement 1…	1	2	3	4	5	6	7
A.2 Task statement 2…	1	2	3	4	5	6	7
A.X Task statement X…	1	2	3	4	5	6	7

B. Skills Used at Work

FOR JOB INCUMBENTS: This part of the questionnaire asks about the skills you use in your job. A skill is the ability to perform a task well. Please listen carefully to each question and rate how frequently you use the skill in your current job. Ask yourself "How often do I use this skill in my job?" The responses provide different time periods such as "Hourly or more often" and "Once per year or less often" and range from less frequent to more frequent. Select "Never" if you never use the skill in your job.

FOR OCCUPATION EXPERTS: This part of the questionnaire asks about the skills used in work as a [**OCCUPATION TITLE**]. A skill is the ability to perform a task well. Please listen carefully to each question and rate how frequently the skill is used in this job. The responses provide different time periods such as "Hourly or more often" and "Once per year or less often" and range from less frequent to more frequent. Select "Never" if the task is never undertaken in work as a [**OCCUPATION TITLE**].

1. READING

FOR JOB INCUMBENTS: **How often does your job involve…** FOR OCCUPATION EXPERTS: **How often does the job involve…**	**Frequency**						
	Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.1.1 reading letters, memos, e-mails, newspapers, or magazines?	1	2	3	4	5	6	7
B.1.2 reading books, professional journals, or scholarly publications?	1	2	3	4	5	6	7
B.1.3 reading instruction or operating manuals?	1	2	3	4	5	6	7
B.1.4 reading bills, invoices, bank statements, or other financial statements?	1	2	3	4	5	6	7

B.1.5 What is the longest document normally read at work?

1 DO NOT READ AT WORK
2 ONE PAGE OR LESS
3 2 TO 5 PAGES
4 6 TO 10 PAGES
5 11 TO 25 PAGES
6 MORE THAN 25 PAGES

2. WRITING

FOR JOB INCUMBENTS: **How often does your job involve…** FOR OCCUPATION EXPERTS: **How often does the job involve…**	Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.2.1 writing letters, memos, or e-mails?	1	2	3	4	5	6	7
B.2.2 filling out bills, invoices, bank statements, or other financial statements?	1	2	3	4	5	6	7

B.2.3 What is the longest document normally written at work?

1 DO NOT WRITE AT WORK
2 ONE PAGE OR LESS
3 2 TO 5 PAGES
4 6 TO 10 PAGES
5 11 TO 25 PAGES
6 MORE THAN 25 PAGES

3. MATH

FOR JOB INCUMBENTS: How often does your job involve… **FOR OCCUPATION EXPERTS: How often does the job involve…**	Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.3.1 using simple math, such as multiplication or division?	1	2	3	4	5	6	7
B.3.2 calculating prices, costs, or budgets?	1	2	3	4	5	6	7
B.3.3 using or calculating fractions, decimals, or percentages?	1	2	3	4	5	6	7
B.3.4 using more advanced math, such as algebra, trigonometry, or regression techniques?	1	2	3	4	5	6	7

4. ACTIVE LEARNING

FOR JOB INCUMBENTS: How often does your job involve… **FOR OCCUPATION EXPERTS: How often does the job involve…**		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.4.1	**learning new things?**	1	2	3	4	5	6	7

5. SOCIAL

FOR JOB INCUMBENTS: How often does your job involve… **FOR OCCUPATION EXPERTS: How often does the job involve…**	Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.5.1 coordinating, co-operating, or collaborating with co-workers?	1	2	3	4	5	6	7
B.5.2 persuading or influencing people (for example, selling a product or convincing a co-worker to change their mind)?	1	2	3	4	5	6	7
B.5.3 negotiating with people either inside or outside of your firm or organization?	1	2	3	4	5	6	7
B.5.4 instructing, training, or teaching people, either individually or in groups?	1	2	3	4	5	6	7
B.5.5 communicating with people outside the organization (for example, with customers, the public, or government)?	1	2	3	4	5	6	7
B.5.6 assisting and caring for others (for example, providing personal assistance, medical attention, or emotional support to customers or patients)?	1	2	3	4	5	6	7

6. PHYSICAL

	FOR JOB INCUMBENTS: How often does your job involve… FOR OCCUPATION EXPERTS: How often does the job involve…	Frequency						
		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.6.1	**performing physical activities that require considerable use of your body, such as climbing, lifting, balancing, walking, stooping, and handling materials?**	1	2	3	4	5	6	7
B.6.2	**operating/driving vehicles such as a car, truck, forklifts, motorbike, three-wheeler, aircraft, or watercraft?**	1	2	3	4	5	6	7
B.6.3	**using skill or accuracy with your hands or fingers?**	1	2	3	4	5	6	7

7. PROBLEM-SOLVING

FOR JOB INCUMBENTS: How often does your job involve… FOR OCCUPATION EXPERTS: How often does the job involve…		Frequency						
		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.7.1	**solving simple problems that require at least 5 minutes to find a good solution?**	1	2	3	4	5	6	7
B.7.2	**solving complex problems that require at least 30 minutes to find a good solution?**	1	2	3	4	5	6	7
B.7.3	**making decisions where you have to consider the relative costs and benefits of potential actions?**	1	2	3	4	5	6	7
B.7.4	**thinking creatively to design, develop, or create new things or ideas?**	1	2	3	4	5	6	7
B.7.5	**doing short repetitive tasks?**	1	2	3	4	5	6	7

8. TECHNICAL

FOR JOB INCUMBENTS: How often does your job involve… FOR OCCUPATION EXPERTS: How often does the job involve…		Frequency						
		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.8.1	**designing or adapting equipment, machines, or software to serve user needs?**	1	2	3	4	5	6	7
B.8.2	**installing equipment, machines, or software to meet specifications?**	1	2	3	4	5	6	7
B.8.3	**operating equipment or machines (other than computers and vehicles)?**	1	2	3	4	5	6	7
B.8.4	**monitoring equipment, machines, or software to make sure they are working properly?**	1	2	3	4	5	6	7
B.8.5	**maintain or repair equipment, machines, or software?**	1	2	3	4	5	6	7
B.8.6	**conducting quality control on products, services, or processes?**	1	2	3	4	5	6	7

9. RESOURCE MANAGEMENT

	FOR JOB INCUMBENTS: How often does your job involve… FOR OCCUPATION EXPERTS: How often does the job involve…	Frequency						
		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.9.1	**developing specific goals and plans to prioritize, organize, and accomplish YOUR work (rather than following fixed procedures or instructions)?**	1	2	3	4	5	6	7
B.9.2	**determining how money will be spent to get the work done?**	1	2	3	4	5	6	7
B.9.3	**managing material resources such as equipment, facilities, and materials to get the work done?**	1	2	3	4	5	6	7
B.9.4	**planning the activities of others and/or managing people?**	1	2	3	4	5	6	7

B.9.5 As part of your job, how many employees do you supervise? [JOB INCUMBENTS ONLY]

NUMERIC

10. DIGITAL SKILLS

B.10.1 FOR JOB INCUMBENTS: Do you use a computer in your job? FOR OCCUPATION EXPERTS: Is a computer used in this job?

1 YES
2 NO

B.10.2 FOR JOB INCUMBENTS: Do you use a mobile phone or smartphone in your job? FOR OCCUPATION EXPERTS: Is a mobile phone or smartphone used in this job?

1 YES
2 NO **[If B.10.1=2, B.11]**

FOR JOB INCUMBENTS: How often does your job involve… FOR OCCUPATION EXPERTS: How often does the job involve…		Frequency						
		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.10.3	**using email?**	1	2	3	4	5	6	7
B.10.4	**using the internet to better understand issues related to your work?**	1	2	3	4	5	6	7
B.10.5	**conducting transactions on the internet (for example buying or selling products or services, or banking)? [If B.10.1=2 & B.10.2=1, B.10.11]**	1	2	3	4	5	6	7
B.10.6	**using a word processor, for example Word?**	1	2	3	4	5	6	7
B.10.7	**using spreadsheet software, for example Excel?**	1	2	3	4	5	6	7
B.10.8	**using advanced formulas in spreadsheets (for example, IF conditions, vlookups, pivot tables, macros)?**	1	2	3	4	5	6	7
B.10.9	**using presentation software (for example, PowerPoint)?**	1	2	3	4	5	6	7
B.10.10	**using a programming language to program or write computer code (for example, Python, R, C++)?**	1	2	3	4	5	6	7
B.10.11	**using social media applications (for example, Instagram, Facebook, Twitter)?**	1	2	3	4	5	6	7
B.10.12	**participating in real-time discussions on the internet, for example online conferences, or chat groups? [If B.10.1=2 & B.10.2=1, B.11]**	1	2	3	4	5	6	7

B.10.13 FOR JOB INCUMBENTS: Do you usually use any other specific software? FOR OCCUPATION EXPERTS: Is any other specific software usually used?

Free text

11. ENVIRONMENTAL

FOR JOB INCUMBENTS: How often does your job involve… FOR OCCUPATION EXPERTS: How often does the job involve…		Frequency						
		Never	Less than once a month	At least once a month	At least once a week	Once a day	Several times a day	Hourly or more often
B.11.1	**monitoring and optimizing the use of energy such as electricity, heat, and fuel?**	1	2	3	4	5	6	7
B.11.2	**reducing the creation of waste and materials and/or conserving natural resources (for example, by recycling or reusing waste/materials, optimizing the use of inputs, monitoring water usage, and protecting ecosystems)?**	1	2	3	4	5	6	7
B.11.3	**researching, applying, or communicating environmental knowledge, plans, or technologies (for example, by developing a process or technology that reduces environmental impact or teaching or increasing public awareness of environmental issues)?**	1	2	3	4	5	6	7
B.1.4	**Producing renewable energy or environmentally-friendly outputs (for example, building renewable energy equipment, running renewable energy production facilities , or engaging in agriculture, forestry, or aquaculture using sustainable practices)**	1	2	3	4	5	6	7

12. WORK FROM HOME

Considering all of your responses so far…		Frequency				
		Never	Less than once a month	At least once a month	At least once a week	Every day
B.12.1	FOR JOB INCUMBENTS: **Assuming that you have access to a computer and internet connection, how frequently would you be able to efficiently perform your job from your home?** FOR OCCUPATION EXPERTS: **Assuming that a worker has access to a computer and internet connection, how frequently could this job be performed from home efficiently?**	1	2	3	4	5

C. Required Education and Experience

FOR JOB INCUMBENTS: This part of the questionnaire asks about the education and experience requirements for your current job. Please listen carefully to each question. Consider the job, not your personal experience, and answer based on the job as it currently exists.

FOR OCCUPATION EXPERTS: This part of the questionnaire asks about the education and experience requirements of a [**OCCUPATIONAL TITLE**]. Please listen carefully to each question. Consider the job, not your personal experience, and answer based on the job as it currently exists.

C.1 If someone were being hired to perform this job, indicate the level of education that would be required (Mark one box):

1 Less than high school education
2 High school
3 Vocational school
4 Technical school
5 Vocational college
6 College
7 Bachelor's degree
8 Master's degree
9 Ph.D.

C.2 If someone were being hired to perform this job, indicate the field of study that would be required (Check all boxes that apply):

1 Education
2 Humanities and Arts
3 Social sciences, business, and law
4 Science, mathematics, and computing
5 Natural science and environmental knowledge
5 Engineering, manufacturing, and construction
6 Agriculture and veterinary
7 Health and welfare
8 Services

C.3 If someone were being hired to perform this job, how much RELATED WORK EXPERIENCE would be required?

1 Less than 6 months
2 6 months to 1 year
3 1 year to 3 years
4 3 years to 5 years
5 5 years to 10 years
6 10 years or more

C.4 If someone were being hired to perform this job, how much organized training (ON-SITE OR INPLANT) provided by the employer would be required?

1 None

2 Less than 1 month
3 1 month to 6 months
4 6 months to a year
5 1 year to 3 years
6 3 years to 5 years
7 5 years to 10 years
8 10 years or more

C.5 If someone were being hired to perform this job, would job-related professional certifications be required?

1 Yes **[C.6]**
2 No **[D]**

C.6 If yes, please specify the name of any certification that would be required.

Free text

D. Respondent Characteristics

FOR JOB INCUMBENTS AND OCCUPATION EXPERTS: This final part of the questionnaire asks about your personal characteristics. Your responses to these questions will help us know that workers with different backgrounds are included.

D.1 For how long have you worked at this job? [**JOB INCUMBENTS ONLY**]

[Numeric] years [Numeric] months

D.2 In your current job, are you employed by (Mark one box) [**JOB INCUMBENTS ONLY**]

1 Government
2 Private, for-profit company
3 State-owned enterprise
4 Nonprofit organization
5 Self-employed
6 Family business

D.3 In what year were you born?

[Numeric] year

D.4 Are you male or female? (Mark one box)

1 Male
2 Female

D.5 Indicate the highest level of education that you have completed (Mark one box)

1 Less than high school education
2 High school
3 Vocational school
4 Technical school
5 Vocational college
6 College
7 Bachelor's degree
8 Master's degree
9 Ph.D.