DEVELOPMENT AND PSYCHOMETRIC PROPERTIES OF THE SOFT SKILLS ASSESSMENT BATTERY (SSAB)

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Abstract

Soft skills are very important in several aspects of human life, including the workplace and education, and are anticipated to play an even more important role in the future. Organizations, employers, employees and students demand soft skills since they are considered important predictors of career success. The present study reports the development of the Soft Skills Assessment Battery (SSAB), a measure developed to assess some of the most important soft skills, namely adaptability, collaboration, creativity, persuasion, and time management. Initially, 100 items per scale were developed and administered to a sample of 2122 participants (approximately 400/scale). Next, using EFA, a series of unidimensional models were tested, resulting in the retention of 75 items (15x5). In the next step, the factor structure of the new scale was examined via CFA, using a new sample (N=224). Four different models were contrasted: a one-factor, a five-factor, a hierarchical (second-order), and a bifactor model. Results showed that the five-factor and the bifactor models provided a good model fit. Based on the principle of parsimony, the five-factor model was preferred to represent the dimensional structure of the SSAB. Composite Reliability using omega index showed that all scales presented acceptable internal consistency estimates, with values ranging between .851 (Adaptability) and .911 (Creativity). Finally, using the Fornell-Larcker criterion, convergent validity (i.e., all items within each scale are correlated well) and discriminant validity (i.e., the extent to which scales are distinct and uncorrelated) were demonstrated. Consequently, using indices such as the Average Variance Extracted (AVE) and the Composite Reliability (CR), we provided evidence supporting the construct validity of the SSAB.

Keywords: *soft skills, test development, adaptability, collaboration, creativity, time management, persuasion*

1. INTRODUCTION

In recent years, soft skills have attracted increasing attention among researchers, especially in the labor market, due to their dominant role in professional development and long-term success. They are defined as "*a dynamic combination of cognitive and meta-cognitive interpersonal, intellectual and practical skills and ethical values…that help people to adapt and behave positively so that they can deal effectively with the challenges of their professional and everyday life*" (Haselberger et al. 2012, p.67). Today, there is a vast amount of evidence showing that soft skills positively impact job performance, job satisfaction, and, most importantly, professionalism in the workplace (e.g., Cook, 2016; Hendarman & Tjakraatmadja, 2012; Hodges & Burchell, 2003; Robles, 2012).

Although it is well-established that employers are increasingly putting more emphasis on soft skills and hire, retain and promote employees who demonstrate different soft skill attributes, recently, educators recognized that it is equally important that students should also adequately appreciate the value of such skills and make deliberate efforts to acquire them (Majid et al., 2012; Tang, 2020). Several studies have linked soft skills with success at school since teaching, and learning processes acquire abilities such as communication, collaboration, problem-solving, self-motivation, decision-making, and time management skills (Gupa, 2009; Hashim & Mohd Yunus, 2014; Lim, Tang & Tan, 2013). In addition, students learn in cooperation with teachers, their peers, and their families. In this perspective, social relationships and emotional processes affect how and what we learn (Elias et al. 1997). Moreover, soft skills promote teachers' interactions with their students and affect their job performance and career

viewpoints (Pachauri & Yadav, 2014). Also, soft skills have been linked to effective organizational processes, which in turn leading to high achievement (Tang, Ching & Mohd Shahid, 2015). According to Hodges and Burchell (2003), recognizing and addressing soft skills in the educational context is challenging for curriculum designers, teachers, and administrators.

Recent efforts in the labor market targeted matching individuals and their skills and propensities with suitable employment. Employability skills have been split into hard and soft skills. Hard skills refer to technical expertise and knowledge needed to adequately perform specialized tasks (Andrews and Higson, 2008; Robles, 2012). Soft skills have undergone several revisions. Some define soft skills specific to personal interactions, communication behaviors, and management skills (Andrews and Higson, 2008; Rainsbury et al., 2002), while others as intrapersonal and interpersonal skills (Lakker and Powell, 2011). Hendarman and Tjakraatmadja (2012, p. 37) defined soft skills as "*personal attributes that enhance an individual's interactions and his/her job performance*." Until recently, exhibiting hard skills was more than enough for an employee to sustain their job, but more recently, there has been a swift in this rationale (El Mansour and Dean, 2016; Robles, 2012). Parlamis and Monnot (2019) reckon that soft skills should be named C.O.R.E. skills, i.e., Competence in Organizational and Relational Effectiveness skills. They believe that these skills are so fundamental that the word "soft" neither defines their meaning nor significance. This argument has been supported by Succi and Canovi (2019); in their study, HR managers, employees, employers, and students/recent graduates indicated a continuously increasing value in possessing soft skills. Soft skills are so essential that the European Centre for the Development of Vocational Training (CEDEFOP) created the Skills-OVATE: Skills Online Vacancy Analysis Tool for Europe (European Centre for the Development of Vocational Training, 2021) to visualize the demand for European Skills, Competences, Qualifications, and Occupations (ESCO), in real-time according to job demands.

The present study aimed to develop and evaluate the psychometric properties of a new battery of soft skills, namely the Soft Skills Assessment Battery (SSAB) that assesses some of the most important soft skills. To determine which soft skills would constitute the instrument, a thorough literature review was conducted, and evidently, the ranking of soft skills according to their importance was evaluated. As reported by ESCO, among 288 elements of skills, knowledge, attitudes, and values, first in the ranking were adaptability and teamwork. Succi and Canovi (2019) further added communication, teamwork, adaptability, and creativity. Teamwork/co-cooperation and impact/influence on others was also ranked high amongst other skills (Rainsbury et al., 2002). Jacobs and Karpova (2020) further confirmed the salient role of communication, teamwork, adaptability, time management, decision making, and creativity. Creativity, flexibility, impact/influence on others, teamwork, and cooperation were also included in Pang et al.'s (2019) list of important skills. Finally, taking into account the pulse of the labor market, LinkedIn's top soft skills that companies referred to as -needed the most- in 2019 were: adaptability, collaboration, creativity, time management, and persuasion (Petrone, 2018). The list remained relatively unchained in 2020; an exception was that time management was substituted by Emotional Intelligence (Pate, 2020). In summing up, the empirical evidence has consistently pointed to the utility of the following five soft skills: adaptability, collaboration, creativity, time management, and persuasion. Consequently, the development of the Soft Skill Assessment Battery was guided by these empirical theses. Next, these constructs are described in more detail.

Adaptability

Adaptability refers to someone's "*ability, skill, disposition, willingness, and/or motivation, to change or fit different task, social, and environmental features*" (Ployhart & Bliese, 2006, p. 13). Adaptability may be proactive, that is, someone is changing even if the environment isn't, or reactive, that is, is changing to accommodate environmental change (Ployhart & Bliese, 2006). They also argue that adaptability is a key factor in successfully performing succesfully on a changing task and adjusting to change in social encounters and work environments. The authors theorized the presence of eight forms of adaptability: crisis adaptability, stress adaptability, creative adaptability, uncertainty adaptability, learning adaptability, cultural adaptability, and physical adaptability. Their theory is based on the dimensions of adaptive performance by Pulakos et al. (2000), who suggests that when employees exhibit adaptability, they are capable of handling emergencies or crises, managing work stress effectively, creatively solving

problems, dealing effectively during uncertain and unpredictable work situations, learning new work tasks technologies and procedures, and of demonstrating interpersonal, cultural and physically oriented adaptability. Research indicates that when employees demonstrate adaptability, they do not quit their job easily (Zhu et al., 2019). Moreover, it has been shown that career adaptability is positively linked to career success, job performance (Yu & Zheng, 2013), and employee well-being (Ohme & Zacher, 2015). In education, Collie et al. (2020) pointed out that teachers' adaptability promotes teacher and student outcomes such as self-efficacy.

Collaboration

Bedwell et al. (2012) define collaboration as an evolving process about two or more people who share at least one common goal and act mutually and actively to achieve the shared goal. Orchard et al. (2012) contend that employee collaboration comprises four elements: partnership, shared decision making, cooperation, and coordination. According to Robles (2012), collaboration is in the ten top soft skills needed in the workplace, and Gray (1989) views collaboration as a process "through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their limited vision of what is possible" (p. 5). Kenaszchuk et al. (2010) found that interprofessional collaboration in the health care area is expected to maximize human health resources, promote habits and customs leading to safer patient care, and increase satisfaction among patients and providers. In education, the collaboration between parents and teachers is essential for both educational and psychological outcomes (Manca & Delfino, 2021).

Creativity

A person is considered creative when their ideas, perspectives, actions, and solutions in challenging problems are novel and useful (Amabile,1983; Carey & Flower, 1989; Runco & Jaeger, 2012). According to Amabile (1996), creative ideas encompass two different assumptions: a) producing or generating ideas, and b) these ideas are judged as both novel and useful. Creativity in the workplace is associated with different work procedures, products, services, and strategies (Shalley et al., 2004). It is defined by personal characteristics (e.g., creativity traits, creative self-efficacy), contextual factors (e.g., the organizational culture, support for innovation), and their fit (Duan & Li, 2020). According to Shalley et al. (2000), a creative work environment can advance employees' well-being regarding job satisfaction and lower intentions to leave (Shalley et al. 2000). More recently, Kapoor and Kaufman (2020) linked creativity with Covid-19 pandemic. They found that creative people coped relatively well during the pandemic; they were able to find some kind of meaning in the crisis and were efficient responders to everyday challenges. In education, on the other hand, teachers' creativity and creative learning environments predict students' creative personality traits (Ayyildiz & Yilmaz, 2021).

Time Management

CEDEFOP rank orders "planning and scheduling events and activities" as the eighth among the 288 elements of soft skills. Recently, there has been a growing recognition of the importance of time in the organizational literature. For example, Claessens et al. (2007) define time management as behaviors that intend to maximize time while performing specific goal-oriented activities. Similarly, Macan et al. (1990) describes an employee who manages time well as a person who is setting goals and priorities in a productive way, is good at planning and scheduling, exhibits a preference for organization, and perceives time control. Empirical studies on time management have shown that successful time management strategies help employees to experience less stress during their work, and as a result, to be more efficient, more satisfied, and healthier (e.g., Richards, 1987; Schuler, 1979). It has also been found that time management training can help employees invest quality time in high-priority activities (Orpen, 1993). In higher education, efficient time management has been linked positively to academic achievement but also lowered stress symptoms (Macan et al., 1990).

Persuasion

In the Robles (2012) study, communication and integrity have been ranked highest in the hierarchy of soft skills. According to Perlloff (2017), though, communication and honesty combined define the construct of persuasion. When someone is persuasive, they exhibit reciprocation (i.e., listening to

persuader's psycho-social needs), cooperation (i.e., creation of shared goals), and consensus (i.e., seeking agreements). Perloff (2017) further defined persuasion as a process in which a communicator attempts to convince other people to alter attitudes or behaviors through communication and should not be mistaken with manipulation. Unlike manipulative people, persuasive people exhibit honesty and have virtuous motives (Perloff, 2017). Moreover, persuasion is related to communication competence, psychological safety, and workforce civility (Jena & Pradhan, 2020).

The measurement and evaluation of soft skills have been the least challenging (Cook, 2016), muddled by vague operational definitions and a unified theoretical framework (Gibb, 2014). Based on Georges (1996), the methodological challenges may have pushed away researchers to adopt these constructs, resulting in an overall abandonment from empirical pursuits. The most popular soft skills assessment method in personnel selection is interviewing. However, interviews present drawbacks when used as a selection method due to many factors that could impact the process in an adverse way (e.g., interviewer bias, social desirability, etc.). For example, subjective evaluations are made due to the interviewer's biases or poor interviewing skills; emphasis is given to the negative characteristics of the candidate, and interviews are not as valid and reliable as when using standardized instruments. Moreover, interviews are time-consuming and expensive (Cook 2016; Dipboye, Macan & Shahani-Denning 2012; Johns, Teo & Harrington 2007).

Several psychometric scales are available in the literature regarding the assessment of soft skills. However, almost all of them are measuring single skills. For example, for the assessment of adaptability, there is the Job Adaptability Inventory (JAI; Pulakos et al., 2000), which measures eight different factors: handling emergencies or crises, handling work stress, solving problems creatively, dealing with uncertain and unpredictable work situations, learning work tasks technologies, interpersonal adaptability, cultural adaptability, and physical adaptability. Similarly, Charbonnier-Voirin and Roussel (2012) developed a 19-item scale assessing five factors: creativity, reactivity in the face of emergencies or unexpected circumstances, interpersonal adaptability, training effort, and managing work stress. There are also domain-specific instruments, such as the de Jong and de Ruyter's scale (2004), evaluating bank employees' ability to comply with their client's needs, and the Chen, Thomas, and Wallace's scale (2005) assessing the adaptability pilots when flying.

Measures of collaboration exist almost exclusively in healthcare. For example, Hagedoorn et al. (2009) developed a scale that assesses collaboration between nurses and family caregivers and assesses clients' perceptions of trust in nursing care, accessibility, and influence on decision-making. Orchard et al. (2012) developed the Interprofessional Team Collaboration Scale (AITCS), which assesses interprofessional team collaboration in health professionals. It measures the three dimensions, namely, partnership/ shared decision making, cooperation, and coordination. Additionally, Thomson, Perry, and Miller (2009) developed a scale measuring collaboration in inter-organizational relations and, more specifically, governance, administration, autonomy, mutuality, and norms and managing work stress. Finally, Gajda (2004) developed the Strategic Alliance Formative Assessment Rubric (SAFAR), an assessment tool measuring collaboration in certain domains, including strategies/tasks, leadership/decision making, interpersonal and communication characteristics.

The assessment of creativity in the workplace is less straightforward than other soft skills. Today, the most popular method of assessing creative behavior in organizational settings is based on supervisor ratings (George & Zou, 2001). On the other hand, although there are several psychometric scales measuring creativity, most of them focus on one aspect of creativity, that of innovation, ignoring the usefulness component that research has shown equally important for a comprehensive assessment of creativity. The Employee Creativity Scale (Ettlie & O'Keefe, 1982) and the Person-Environment Fit Scale for Creativity (Duan & Li, 2020) are illustrative examples of this category. One of the few available scales assessing creativity in the workplace was developed by George and Zhou (2001). The Creative Performance Scale (CPS) is a unidimensional scale measuring both aspects of creativity.

For the assessment of time management, several scales exist. For example, Macan et al. (1990) created The Time Management Behavior Scale (TMBS), a scale measuring four relevant factors: setting goals and priorities, mechanics planning and scheduling, preference for organization, and perceived control

of time. In addition, bond and Feather (1988) have developed the Time Structure Questionnaire (TSQ), which consists of 26 items and evaluates five dimensions: purpose, routine, and planning, tendency not to think about missed opportunities, organization/motivation, and activity patterns, and persistence and maintenance of activities. Finally, the Time Management Questionnaire (TMQ; Britton & Tesser, 1991) evaluates time management according to three different structural dimensions: short-range planning, time attitudes, and long-range planning.

Persuasion is the only soft skill for which it seems that there is a lack of standardized assessment tools. The only scale we managed to identify was the Workplace Persuasion Scale (WPS). This scale is based on the theoretical framework developed by Jena and Pradhan (2018), who conceptualize workplace persuasion as a construct encompassing three distinct dimensions: reciprocation, cooperation, and consensus.

As mentioned earlier, soft skills are predominantly measured via single-trait scales. Very few multidimensional scales measuring a constellation of soft skills are available, making their assessment ineffective in terms of cost and time. The Future Work Skills Scale (FWSS; Chacón-Cuberos, 2021) assesses nine soft and hard skills asking respondents to evaluate the extent to which they think they possess each of them using a rating scale ranging from being bad to excellent with regard to utility. The Multidimensional 21st-century Skills Scale (Cevik & Centruk, 2019) is a tool developed for adolescent and early adulthood students in the 15– 25 age group. It assesses five distinct soft skills: knowledge & technology literacy skills, critical thinking and problem-solving skills, entrepreneurship & innovation skills, social responsibility, and career consciousness. One drawback of both tools is that they do not focus only on assessing soft skills but also evaluate hard skills. In such a way, they employ narrow lenses in assessing soft skills since they ignore important qualities that help individuals effectively deal with the challenges of their professional and everyday life.

From the above, it is evident that the assessment of soft skills has been met with limited success regarding developing a comprehensive tool that combines some of the most important skills that individuals should have in the 21st century. Therefore, the purpose of this study is to develop a standardized, valid and reliable psychometric instrument that simultaneously evaluates five of the most important soft skills in the fields of education and labor industry.

2. MATERIALS AND METHODS

2.1. Item generation

The first aim of the study was to develop items measuring the five soft skills of the new test battery. For that, an expert research panel was assembled to generate an initial pool of items for each scale (Hinkin, 1995). The panel consisted of 4 Subject Matter Experts (SMEs), all experienced psychologists in the field of test development. Initially, a thorough literature review was conducted to define an operational definition for each soft skill. For example, for the adaptability scale, a definition provided by Pulakos et al. (2000) was preferred as it was the most comprehensive and well documented. According to the authors, an employee with high levels of adaptability is good at handling emergencies or crises, handles work stress effectively, solves problems in a creative way, deals effectively under uncertain and unpredictable work situations, learns new work tasks, technologies and procedures, and demonstrates interpersonal, cultural and physically oriented adaptability.

For the collaboration scale, Orchard et al. (2012) proposed the chosen operational definition, which conceptualizes collaboration as a skill that promotes and encourages partnership, shared decision-making, cooperation, and coordination among colleagues. For the workplace creativity scale, Amabile's (1983) theoretical framework was decided, defining creativity as mainly novelty and usefulness of ideas. For time management scale, the operational definition provided by Macan et al. (1990) was utilized, which stated that an employee manages time well when he/she is productively setting goals and priorities, is good at planning and scheduling, exhibits a preference for organization, and perceives control of time. Finally, for the persuasion scale, the theoretical work of Jena and Pradhan (2018) was

adopted, stating mainly that an employee is persuasive when he/she exhibits reciprocation, cooperation, and consensus.

The main goal of the SMEs was to develop a large number of items for each scale that reflect the operational definition of each measured construct. In the beginning, each SME worked independently and generated approximately 100 items per scale, following guidelines that maximize content validity and minimize measurement error (e.g., short sentences, easy to understand, avoiding emotional or sensitive wordings, no double meanings, etc.). Next, the experts' panel gathered together and discussed, evaluated, altered, and improved (if necessary) the generated items for each scale. At the end of this stage, 103 items for adaptability, 108 for collaboration, 71 for creativity, 76 for persuasion, and 83 for time management were selected to form the pilot versions for the five scales. A 5-point Likert-type scale was selected for all scales as a response scaling format, ranging from 1 (*not representative at all*) to 5 (*very representative)*.

2.2. Participants

Six independent samples in two different phases were used during the development process of the scale. In phase one, each pilot version was administered to a sample of respondents drawn from the target population. Sample 1 consisted of 496 participants and was used to evaluate the psychometric properties of the adaptability scale. Of them, 215 (43.3%) were males, and 279 (56.3%) were females. The mean age was 35.6 years (SD=13.2), ranging between 18 and 81 years. Sample 2 consisted of 434 participants and was used to examine the collaboration items. Of them, 155 (35.7%) were males, and 234 (53.9%) were females. The mean age was 31.1 years (SD=10.5), with a range between 19 and 67 years. Sample 3 was used to test the creativity items and consist of 363 participants. Of them, 284 (77.8%) were females, and 79 (21.6%) were males. The mean age was 39.1 years (SD=11.8), ranging between 20 to 72 years. Sample 4 consisted of 414 participants and was used to pilot the persuasion items. Of them, 335 (80.5%) were females, and 79 (19%) were males. The mean age was 33.5 years (SD=11.5), ranging between 19 to 64 years. Sample 5 consisted of 415 participants and was used to evaluate the time management items. Of them, 279 (67.1%) were females, and 129 (31%) were males. The mean age was 32.0 years (SD=11.5), ranging between 18 to 64 years. In phase two, a sixth sample consisted of 224 participants who completed the pilot version of the SSAB, as was derived from the first phase of the study and was used to examine the factor structure of the scale via confirmatory factor analysis (CFA). Of them, 163 (72.8%) were females, and 61 (27.2%) were males. The mean age was 34 .09 years (SD=9.48), ranging between 18 to 67 years. In all samples, no other demographic characteristics were asked to ensure anonymity. Ethical approval for this study was obtained from the Research Ethics Committee, University of Crete (APPROVAL No 227/30.12.2019).

2.3. Analytic Strategy

To achieve the objectives of the study, a three-step approach was adopted. At the first step, the main aim was to select the items that conceptually reflect the construct and content of each of the five soft skills. For each scale, a unidimensional structure as the optimal model was targeted to ensure construct validity (DeVellis, 2012; Bandalos, 2018). To ensure that all selected items in each scale were robust indicators of each construct being measured, a sequential item selection approach was followed using exploratory factor analysis (EFA) in a stepwise fashion (Raubenheimer, 2004). With this approach, we examined and maximized each scale's cohesiveness by identifying and removing, one by one, those items that failed to load significantly (i.e., factor loading <.30) on the main unrotated factor solution. According to Kline (1994), the first unrotated factor could be seen as the single best summary of linear relationships exhibited in the data. Principal Axis Factoring (PAF) was adopted as the factor extraction method. The PAF is the most effective method for factor extraction, especially during the initial stages of test development. It does not require meeting specific statistical assumptions (e.g., multivariate normality) and is more effective in recovering the emergence of weak factors (Coughlin, 2013). To decide the number of meaningful factors that could represent best the items in each dataset, Parallel Analysis (PA; Horn, 1965) was applied. At the end of this step, the five unidimensional scales were grouped to form a multidimensional soft skills test battery.

At step 2, the factor structure of the Soft Skills Assessment Battery (SSAB) was examined via confirmatory factor analysis (CFA), using a new sample. Four different models were tested. First, a one-factor model with all items loading on a general factor was examined and served as a base model (Model 1). Next, model 2 was a five-factor model, which hypothesized five first-order intercorrelated latent variables. Third, model 3 was a second-order (hierarchical) factor model, with five latent variables as a function of one general soft skills factor. Finally, Model 4 was a bifactor model, with a general factor posited to account for the commonality of all manifest variables as well as five orthogonal (i.e., uncorrelated) specific factors representing the hypothesized unique influence of the specific factors on the subsets of the manifest variables above and beyond the effects of the general factor. In such models, each manifest variable is a reflective indicator of both a general factor and a more narrowly defined specific factor that is not correlated with the general factor. Thus, the variance of each manifest variable is decomposed into a larger number of separate components compared to what is done in standard CFA models (Reise, Moore, & Haviland, 2010).

In many ways, the bifactor model and the second-order model are very similar, but there are a few important differences worth noting (see Reise et al., 2010). For example, in the bifactor model, we can directly examine the strength of the relationship between the domain-specific factors and their associated items, as the relationship is reflected in the factor loadings. In contrast, these relationships cannot be directly tested in the second-order factor model as the domain-specific factors are represented by disturbances of the first-order factors. Reise et al. (2010) argued that a bifactor model that contains a single common trait but also allows for multidimensionality due to item content diversity provides a better foundational model for conceptualizing dimensionality by accounting for the common variance due to method. We used the Weighted Least Squares Mean and Variance (WLSMV) adjusted robust estimator given that the data were ordinal (Rhemtulla, Brosseau-Liard & Savalei, 2012) and likely did not fulfill the normality assumption. In all models, the variance of each latent factor was fixed to unity for model identification.

To evaluate model fit, the following goodness of fit indices were used a) the Root Mean Square Error of Approximation (RMSEA), b) the Standardized Root Mean Square Residual (SRMR), c) the Comparative fit index (CFI), and the Tucker–Lewis index (TLI). CFI and TLI values greater than .90 indicate an acceptable fit (with values >.95 being ideal). Additionally, RMSEA and SRMR values up to .08 indicate a reasonable fit to the data, while values less than .05 indicate excellent fit (Hu & Bentler, 1999). Given that all these indices are based on the chi-square statistic and the sensitivity of the test statistic with small samples (Herzog & Boomsma, 2009), we opted towards applying Bartlett's corrective procedure (Bartlett, 1950) in which the chi-square test is adjusted using a corrective factor, given simulation studies supporting its efficacy (Nevitt & Hancock, 2004). It should also be noted that all our examined models were non-nested (i.e., different number of latent variables, different number of indicators in each model). In such cases, under the WLSMV method of estimation, there is no statistical index (e.g., AIC or BIC) or other procedure (e.g., DIFFTEST) which could be used to test which model fits the data better. Thus, the most we could do was looking at each model's fit in descriptive terms (Muthén & Muthén, personal communication). All analyses at this point were conducted with the Mplus version. 8.6 (Muthén and Muthén, 1998-2021).

Finally, at step 3, initial validation and the evaluation of internal consistency of the SSAB scales were conducted. To evaluate the construct validity (i.e., convergent and discriminant) of the tool, the Fornell-Larcker procedure (Fornell & Larcker, 1981) was applied. To examine the internal validity of the scale, the Average Variance Extracted (AVE) and the Composite Reliability (CR) or omega indices were used. Evidence for convergent validity is demonstrated when a scale exhibits values of > 0.50 for AVE and > 0.70 for CR. On the other hand, if AVE's square root is higher than the highest correlation with any other latent variable, the scale exhibits evidence of discriminant validity.

We also used the Composite Reliability (CR) or omega index to estimate each scale's internal consistency. We preferred the composite reliability index (McDonald, 1999; Raykov, 2007) over the well-known alpha due to well-known limitations of ignoring tau-equivalence or representing a low-bound reliability estimate (Maydeu-Olivares, Coffman, & Hartmann, 2007; Sijtsma, 2009). Especially

the assumption of tau-equivalence appears unrealistic in empirical studies in social sciences since it presumes equal factor loadings for all manifest variables (e.g., McNeish, 2017).

3. RESULTS

Initially, we screened our data to verify that all necessary statistical assumptions of parametric analyses were met. Specifically, we examined the means and standard deviations, and items with a mean value of <1,5 or >3,5 were removed from the analysis due to low variability in test scores. In addition, skewness and kurtosis values for each item across scales were also examined. Items with values of >.2 on both indices were removed from the subsequent analysis (Cain, Zhang, & Yuan, 2017).

The first step of the analysis involved examining the dimensional structure of each scale via exploratory factor analysis (principal axis factoring). We began by extracting the first unrotated factor separately for each of the five item sets. We targeted the first unrotated factor for each hypothetical dimension because, in the beginning, we were simply interested in the best linear combination of variables - best in the sense that the particular combination of original variables accounts for more of the variance in the data as a whole than any other linear combination of variables. Therefore, the first factor may be viewed as the single best summary of linear relationships exhibited in the data (Kline, 1994). An item was removed from the analysis if it had either negative or low (<.30) factor loading or didn't load on the first unrotated factor. Next, a Parallel Analysis of eigenvalues (PA; Horn, 1965) was performed to conclude the number of retained factors when contrasted with those that emerged from random numbers. We preferred this method since it is more robust than other more popular criteria, such as Guttmann-Kaiser's criterion of eigenvalue > 1 or the Scree test (O'Connor, 2000).

The results from the analysis showed that in all five datasets, a single-factor model was suggested as the optimal model. To keep the final scale balanced across scales and to minimize measurement error due to fatigue or loss of interest, it was decided that each scale should contain 15 items (resulting in a total of 75 items for the whole scale). The 15 items comprising the final version of the adaptability scale had factor loadings ranging from 0.345 to 0.658. Additionally, uniquenesses values ranged between 0.568 and 0.873. Uniqueness is the percentage of variance unique to the variable and not explained by the factor(s) being measured. The lower the uniqueness of an item, the higher the relevance of the variable in the scale. The collaboration items had factor loadings ranging from 0.520 to 0.711, with uniquenesses values ranging between 0.495 and 0.729. The creativity items had factor loadings ranging from 0.575 to 0.766 and uniquenesses values ranging from 0.413 to 0.670. The time management items had factor loadings ranging from 0.454 to 0.670, with uniquenesses values ranging from 0.552 to 0.794. Finally, the persuasion items had factor loadings ranging from 0.402 and 0.746, with uniquenesses values ranging from 0.444 to 0.838. Additionally, internal consistency indices (i.e., omega and alpha) were estimated to evaluate the conceptual coherence of each unidimensional scale. The results from the analysis revealed that all scales exhibited internal consistency values well above the minimum accepted threshold of .70 (Nunnally & Bernstein, 1994), with values ranging from .812 (adaptability) to .927 (creativity). At the end of this step, the five unidimensional scales were grouped together to form the Soft Skill Assessment Battery (SSAB). Table 1 presents the psychometric characteristics of the SSAB scales.

Table 1. Descriptive statistics and internal consistency results for the final versions of the SSAB scales

Scale	Mean	SD	alpha	omega
Adaptability	4.07	0.471	0.812	0.824
Collaboration	4.35	0.473	0.892	0.893
Creativity	3.71	0.645	0.926	0.927
Time Management	3.85	0.608	0.869	0.872
Persuasion	3.11	0.617	0.863	0.870

At the next step, the factor structure of the SSAB scale was examined via CFA. Therefore, the scale was administered in a new sample. Four CFA models were estimated and compared to assess the factorial validity of the SSAB (i.e., a one-factor, a five-factor, a hierarchical, and a bifactor model). Before the main analysis, data screening techniques were conducted to ensure that all necessary statistical assumptions were met. Particularly, univariate and multivariate normality and the absence of outliers for each scale were examined. Using the NVM package from R, we found that all the skewness and kurtosis values were below the critical threshold (± 1.96), designating univariate normality. To examine whether the assumption of multivariate normality was met, the Mardia index of multivariate kurtosis was applied. The Mardia's skewness for this data set was 2,643.78 and the Mardia's kurtosis 6,572.71. Both values were well above the acceptable thresholds (i.e., 10 for multivariate skewness and $p(p+2)$ for multivariate kurtosis, which for our data was 5,775), indicating that the data were not multivariate normally distributed (Mardia, Kent, & Bibby, 2003). The Weighted Least Squares Mean and Variance (WLSMV) robust estimator was used due to the data's ordinal nature (i.e., Likert-type data). WLSMV is specifically designed for categorical data (e.g., binary or ordinal) in which neither the normality assumption nor the continuity property is considered plausible (Li, 2016). Finally, using the Mahalanobis distance statistic, no significant outliers were identified.

The results from the analysis are shown in Table 2. First, the one-factor model, where all items loaded on a general soft skill factor, was tested and pointed to unacceptable model fit. The five-factor solution provided better fit indices, with almost all fit indices above the critical thresholds (only the SRMR value was just borderline). The hierarchical (second-order) model also had an acceptable fit, although it produced lower fit indices than the five-factor model. Finally, the bifactor model produced the best fit, although the fit indices were not much higher than the five-factor model. Based on the principle of parsimony (Raykov & Marcoulides, 1999), which suggest that from two models with comparable overall fit indexes, the preferred model is the one that has fewer free parameters (i.e., more degrees of freedom), the 5-factor solution was deemed to be the most acceptable model.

Table 2. Fit indices for confirmatory factor analysis of the SSAB

Model	χ^2	*df*	CFI	TLI	RMSEA	SRMR
One-factor model	4691	2700	.817	.812	.058	.117
Five-factor model	3399	2690	.935	.933	.035	.089
Hierarchical model	3492	2695	.927	.925	.037	.094
Bifactor model	3266	2625	.941	.938	.033	.085

Note. CFI = Comparative Fit Index; TLI = Tucker – Lewis Index; RMSEA = Root Mean-Square Error of Approximation; SRMR = Standardized Root Mean-Square Residual; 90% CIs = 90% Confidence Intervals.

Finally, to provide initial evidence regarding the psychometric properties of the SSAB, the convergent and discriminant validity and the internal consistency of the five scales were examined using the Fornell-Larcker criterion (Fornell & Larcker, 1981) and the Composite Reliability (CR). The results of this analysis are presented in Table 3. First, results showed that all scales exhibited high levels of internal consistency since the CR was higher than the threshold of .70 in all scales, ranging from .851 (adaptability) to .911 (creativity). This finding suggests that all items composing the SSAB scales measure the intended construct. Next, convergent validity was examined based on scales' AVE values, using a cut-off point of .50. As shown in Table 3, the AVE values of all scales were below the recommended cut-off. However, as Fornell and Larcker (1981) have pointed, if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still supported.

The discriminant validity of the SSAB scales was assessed by comparing the square root of each AVE in the diagonal with the correlation coefficients (off-diagonal) for each construct in the relevant rows

and columns. To have evidence for discriminant validity, the AVE's square root of a scale should be higher than the correlations between factors. As can be seen from Table 3, this criterion was met for all but the adaptability scale, as all correlations between factors were higher than the square root of AVE (.534). A notable exception was the Collaboration-Creativity correlation coefficient (.604) which was also lower than the square root of AVE for the Collaboration scale (.593) but still within a margin of measurement error that is considered negligible difference (.011) (Rahim & Magner, 1995).

Table 3. Composite reliability, average variance extracted, square root of AVE, and matrix of correlations among *SSAB scales*

	CR	AVE	Ad	Co	Cr	Tm	Pe
Adaptability (Ad)	.851	.285	**.534**				
Collaboration (Co)	.890	.352	.684	**.593**			
Creativity (Cr)	.911	.408	.925	.604	**.639**		
Time Management (Tm)	.817	.268	.650	.538	.418	**.518**	
Persuasion (Pe)	.909	.406	.560	.225	.615	.268	**.637**

Note: CR = Composite Reliability, AVE = Average Variance Extracted; in bold the square root of AVE

4. CONCLUSIONS

Even though soft skills are very important in lifelong learning and professional career, their assessment has proven challenging, mainly due to a lack of agreement on the number and content of those skills that "*help people adapt and behave positively so that they can deal effectively with the challenges of their professional and everyday life" (*Haselberger et al. 2012, p.67). This ambiguity seems to have prevented so far experts from developing comprehensive psychometric tools to effectively measure such skills (Cook, 2016; Gibb, 2014). Therefore, this study attempts to develop and initially validate the Soft Skills Assessment Battery (SSAB), a tool designed to measure some of the most important soft skills, namely adaptability, collaboration, creativity, persuasion, and time management.

First, an exploratory strategy with no à priori assumptions regarding the nature and the number of meaningful factors was followed for each scale separately. Following the sequential item selection approach (Raubenheimer, 2004), consecutive EFAs were conducted, where items with low psychometric qualities (i.e., items with negative and low factor loadings on the first unrotated factor) being removed at each step. Next, to decide the number of meaningful factors that could represent best the items in each dataset, a parallel analysis (PA) was applied. In all five scales, a strong single-factor solution emerged. Evidence from the composite reliability index also suggested the coherence of each scale in measuring the intended construct. At the end of this phase, 15 items per scale were selected (75 in total).

The second analytic strategy was confirmatory in nature. The five unidimensional constructs developed during the first phase were grouped together to form the Soft Skills Assessment Battery (SSAB). At this step, four different models were tested and compared: a one-factor, a five-factor, a hierarchical factor, and a bifactor model. The one-factor model, which was served as a base model, provided an unacceptable model fit. Next, a hierarchical and a bifactor model were examined. Although both models are conceptually very similar (and both provided acceptable model fit), some scholars argue that the bifactor model provides more valuable information than the hierarchical model (see Reise et al., 2010). The results from the analysis showed that the five-factor and the bifactor models exhibited the highest fit indices among all contrasted models. However, the 5-factor solution was deemed the most acceptable model based on the principle of parsimony (Raykov & Marcoulides, 1999). In that way, the hypothesized five-factor structure of the SSAB, with five independent scales measuring key soft skills, was supported.

Finally, the Fornell-Larcker procedure was used to examine the convergent and discriminant validity of the SSAB. Several statistical indices were used, including the Average Variance Extracted, the square root of AVE, and the Composite Reliability. Results showed that all SSAB scales exhibited some degree of convergent validity, although most of them exhibited lower than expected AVE values. One possible explanation for this finding might come from the fact that all measured constructs are multidimensional. Thus, since all SSAB scales were targeted as unidimensional, their indicators are moderately correlated with their intended factor, resulting in lower AVE values. Technically speaking, AVE is a measure of the amount of variance that is captured by a construct relative to the overall variance of its indicators, and the higher the item factor loadings in a scale, the higher the AVE (Ab Hamid, Sami, & Mohmad Sidek, 2017). Moreover, to exhibit a scale, an acceptable AVE value (i.e., >.50) should be composed of items with factor loadings >.70 (Hair et al., 2010). However, such an assumption rarely occurs in empirical research, especially when multiple characteristics define the construct under development. Thus, although all scales are composed of items with acceptable factor loadings (>,40), their corresponding AVE values are less than perfect (< .50.).

In terms of discriminant validity, the Fornell-Larcker criterion showed that almost all SSAB scales provide evidence of discriminant validity and suggest that all factors in the battery are distinct and uncorrelated. However, only the adaptability scale faces discriminant validity issues since the square root of the AVE was lower than the correlations of the construct with the other latent constructs. One possible explanation might be that the adaptability scale shares several common characteristics with the rest of the scales. For example, Pulakos et al. (2000) define adaptability as a skill that allows individuals to deal effectively under uncertain and unpredictable situations, to handle crises and stress effectively, to solve problems in a creative way, τo learn new tasks and procedures easily, and to demonstrate high levels of interpersonal relationships. Most of these characteristics can also be found in creativity, collaboration, and persuasion, even in time management. This is also evident when intercorrelations among SSAB scales are inspected. As can be seen in Table 3, the adaptability scale is correlated moderate to high with all other scales, with correlations ranging from .560 (Persuasion) to .925 (Creativity). On the other hand, this is not a surprising finding, since adaptability is considered as one of the most influential soft skills in the work context (Charbonnier-Voirin & Rousel, 2012), which encompass several different work-related behaviors that help the employees to go beyond the simple completion of tasks listed in job descriptions and adjust their behaviors to the requirements of complex work situations and new events (Pulakos et al., 2000).

The SSAB has the important advantage that is, at least to our knowledge, the first assessment battery of some of the most important soft skills in education and industry. So far, only independent scales measuring various soft skills are available, making their assessment ineffective in terms of cost and time. The SSAB could play an important role in educational practice or career development since it could offer fast and low-cost important information on multiple skills that current literature has shown that play a key role in increasing academic performance and future employability (Clarke, 2017).

The results from the present study should be interpreted in light of certain limitations. The most important limitation is the lack of a sound conceptual framework regarding the number and the content of the soft skills necessary for a successful academic or professional development. Although the interest in how soft skills affect students' or employee's development has increased enormously during the last years, there is still no systematic study or review emphasizing on which soft skills play the key role for a successful academic or professional career as well as during social interactions in the society. This study suggests five of these soft skills as important determinants of future career development that could become a valuable tool to test administrators in education and employment industry. Still, future research should provide a more compelling framework for the assessment of soft skills.

Additionally, as the SSAB is still in the early stages of development, some limited points also need to be mentioned. First, a larger and more representative sample is needed to examine the factorial structure of the battery. This larger sample would help to justify better the robustness of the battery's factor structure. Additionally, there is a necessary need for further research on the psychometric properties (i.e., convergent and discriminant validity, test-retest reliability) of the SAAB to increase the psychometric quality of the tool. Invariance testing should also be examined across certain demographic

groups (e.g., gender, age, etc.). Finally, since the SSAB is a self-report measure, objective assessments of participants' soft skills may be necessary to validate their responses.

In closing, the SSAB is a test battery consisting of five independent scales measuring key soft skills that could establish a useful theoretical and empirical tool for assessing soft skills in different settings. This study provided initial evidence suggesting that the battery has satisfying psychometric properties regarding validity and reliability. However, further testing of the scale's psychometric properties is recommended by examining the extent to which these soft skills are related to other constructs from the educational and organizational framework.

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REFERENCES

1. Ab Hamid, M.R., Sami, W. & Mohmad Sidek, M.H. 2017, "Discriminant validity assessment: Use of Fornell & Larcker criterion versus HTMT criterion", *Journal of Physics: Conference Series*, vol. 890, doi: 10.1088/1742-6596/890/1/012163.
2. Adams, G.A. & Jex, S.M. 1997, "Confirmatory factor analysis of the time management behavior scale", *Psychological reports*, vol. 80, no. 1, pp. 225-226.
3. Amabile, T.M. 1983, "The social psychology of creativity: A componential conceptualization", *Journal of personality and social psychology*, vol. 45, no. 2, pp. 357-376.
4. Andrews, J. & Higson, H. 2008, "Graduate employability, 'soft skills' versus 'hard' business knowledge: A european study", *Higher Education in Europe*, vol. 33, no. 4, pp. 411-422.
5. Ayyildiz, P. & Yilmaz, A. 2021, "'Moving the kaleidoscope' to see the effect of creative personality traits on creative thinking dispositions of preservice teachers: The mediating effect of creative learning environments and teachers' creativity fostering behavior", *Thinking Skills and Creativity*, vol. 41, doi: 10.1016/j.tsc.2021.100879.
6. Bandalos, D.L. 2018, *Measurement theory and applications for the social sciences*, The Guilford Press, New York.
7. Bartlett, M.S. 1950, "Tests of significance in factor analysis ", *British Journal of Statistical Psychology*, vol. 3, no. 2, pp. 77-85.
8. Bedwell, W.L., Wildman, J.L., DiazGranados, D., Salazar, M., Kramer, W.S. & Salas, E. 2012, "Collaboration at work: An integrative multilevel conceptualization", *Human Resource Management Review*, vol. 22, no. 2, pp. 128-145.
9. Bond, M.J. & Feather, N.T. 1988, "Some correlates of structure and purpose in the use of time", *Journal of Personality and Social Psychology*, vol. 55, no. 2, pp. 321-329.
10. Britton, B.K. & Tesser, A. 1991, "Effects of time-management practices on college grades", *Journal of Educational Psychology*, vol. 83, no. 3, pp. 405-410.
11. Brown, T. 2015. *Confirmatory factor analysis for applied research* (2nd ed.), New York, Guilford.
12. Cain, M.K., Zhang, Z. & Yuan, K.-. 2017, "Univariate and multivariate skewness and kurtosis for measuring nonnormality: Prevalence, influence and estimation", *Behavior Research Methods*, vol. 49, no. 5, pp. 1716-1735.

13. Carey, L. J. & Flower, L., 1989. Foundations for creativity in the writing process. In: J. A. Glover & C. R. Reynolds (eds), *Handbook of creativity*, Springer, New York, pp. 283-304.
14. Cevik, M. & Senturk, C. 2019, "Multidimensional 21st century skills scale: Validity and reliability study", Cypriot Journal of Educational Sciences, vol. 14, no. 1, 11-28.
15. Chacón-Cuberos, R., Expósito-López, J., de la Guardia, J.J.R.-. & Olmedo-Moreno, E.M. 2021, "Skills for future work (H2030): Multigroup analysis in professional and baccalaureate training", *Research on Social Work Practice*, doi: 10.1177/10497315211002646.
16. Charbonnier-Voirin, A. & Roussel, P. 2012, "Adaptive performance: A new scale to measure individual performance in organizations", *Canadian Journal of Administrative Sciences*, vol. 29, no. 3, pp. 280-293.
17. Charbonnier-Voirin, A. & Roussel, P. 2012, "Adaptive performance: A new scale to measure individual performance in organizations", *Canadian Journal of Administrative Sciences*, vol. 29, no. 3, pp. 280-293.
18. Chen, G., Thomas, B. & Wallace, J.C. 2005, "A multilevel examination of the relationships among training outcomes, mediating regulatory processes, and adaptive performance", *Journal of Applied Psychology*, vol. 90, no. 5, pp. 827-841.
19. Claessens, B., van Eerde, W., Rutte, C. and Roe, R., 2007. "A review of the time management literature", *Personnel Review*, vol. 36, no. 2, pp.255-276.
20. Clarke, M. 2018, "Rethinking graduate employability: the role of capital, individual attributes and context", *Studies in Higher Education*, vol. 43, no. 11, pp. 1923-1937.
21. Collie, R.J., Granziera, H., Martin, A.J., Burns, E.C. & Holliman, A.J. 2020, "Adaptability among science teachers in schools: A multi-nation examination of its role in school outcomes", *Teaching and Teacher Education*, vol. 95, doi:10.1016/j.tate.2020.103148.
22. Cook, M. (2016), *Personnel Selection: Adding Value through People – A changing Picture*, John Wiley & Sons, Chichester.
23. Coughlin, K. B. 2013, 'An analysis of factor extraction strategies: A study of the relative strengths of Principal Axis, Ordinary Least Squares, and Maximum Likelihood factor extraction methods in research contexts that include varying ratios of categorical to continuous variables' PhD thesis, University of South Florida, Tampa.
24. de Jong, A. & de Ruyter, K. 2004, "Adaptive versus proactive behavior in service recovery: The role of self-managing teams", *Decision Sciences*, vol. 35, no. 3, pp. 457-491.
25. DeVellis, R.F 2017, *Scale development: Theory and applications*, Sage, Thousand Oaks, California.
26. Dipboye, R. L., Macan, T., & Shahani-Denning, C. 2012. 'The selection interview from the interviewer and applicant perspectives: Can't have one without the other.' In N. Schmitt (ed.), *The Oxford handbook of personnel assessment and selection*, Oxford University Press (pp. 323–352).
27. Duan, W. & Li, Y. 2020, "Convergent, discriminant, and incremental validities of person-environment fit scale for creativity in predicting innovative behavior", *The Journal of Creative Behavior*, vol. 54, no. 3, pp. 525-534.
28. El Mansour, B. & Dean, J. C., 2016. "Employability skills as perceived by employers and university faculty in the fields of human resource development (HRD) for entry level graduate jobs", *Journal of Human Resource and Sustainability Studies*, vol. 4, pp. 39-49.
29. Elias, M. J., Zins, J. E., Weissberg, R. P., Frey, K. S., Greenberg, M. T., Haynes, N. M., et al. 1997. *Promoting social and emotional learning: Guidelines for educators*. Alexandria, VA, Association for Supervision and Curriculum Development.
30. Ettlie, J. & O'Keefe, R. 2007, "Innovative attitudes, values, and intentions in organizations", *Journal of Management Studies*, vol. 19, no. 2, pp. 163 - 182.

31. European Centre for the Development of Vocational Training, 2021. CEDEFOP. [Online] Available at: https://www.cedefop.europa.eu/en/data-visualisations/skills-online vacancies/skills/occupations [Accessed 02 July 2021].
32. Fornell, C., & Larcker, D.F. 1981, "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research, v*ol. 18, no. 1, pp. 39–50.
33. George, J.M. & Zhou, J. 2001, "When openness to experience and conscientiousness are related to creative behavior: An interactional approach", *Journal of Applied Psychology*, vol. 86, no. 3, pp. 513-524.
34. Gajda R. 2004, "Utilizing collaboration theory to evaluate strategic alliances", American Journal of Evaluation, vol. 25, no. 1, pp. 65-77.
35. Georges, J.C. 1996, *"The myth of soft skills training. Training*", vol. 33 no.1, pp 48-50.
36. Gibb, S. 2014, "Soft skills assessment: theory development and the research agenda", *International Journal of Lifelong Education*, vol. 33, no. 4, pp. 455-471.
37. Gray, B. 1989, *Collaborating: Finding common ground for multiparty problems*, San Francisco, CA: Jossey-Bass
38. Gupta, Y. 2009, "Building a better business student", *BizEd*, vol. 9, no. 6, pp. 62-63.
39. Hagedoorn, E.I., Paans, W., Jaarsma, T., Keers, J.C., van der Schans, C.P., Luttik, M.L.A. & Krijnen, W.P. 2019, "Psychometric evaluation of a revised family collaboration scale", *Geriatric nursing*, vol. 40, no. 5, pp. 463-472.
40. Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. 2010, *Multivariate data analysis* (7 ed.), Prentice-Hall, Upper Saddle River, NJ.
41. Haselberger, D. et al., 2012. *Mediating soft skills at higher education institutions. Higher education institutions supporting soft skills achievement. Guidelines for the design of learning situations supporting soft skills achievement.* European Union: Education and Culture DG Lifelong Learning Programme. [Online] Available at: https://docs.wixstatic.com/ugd/67267c_df6eeb2f47664754a4085f3bdf4bc7bb.pdf [Accessed 10 July, 2021].
42. Hendarman, A. & Tjakraatmadja, J., 2012. "Relationship among soft skills, hard skills, and innovativeness of knowledge workers in the knowledge economy era". *Procedia - Social and Behavioral Sciences*, vol. 52, pp.35-44.
43. Herzog, W. & Boomsma, A. 2009, "Small-sample robust estimators of noncentrality-based and incremental model fit", *Structural Equation Modeling*, vol. 16, no. 1, pp. 1-27.
44. Hinkin, T.R. 1995, "A Review of scale development practices in the study of organizations", *Journal of Management*, vol. 21, no. 5, pp. 967-988.
45. Hodges, D. & Burchell, N. 2003, "Business graduate competencies: Employers' views on importance and performance", *Asia-Pacific Journal of Cooperative Education*, vol. 4, no. 2, pp. 16-22.
46. Horn, J.L. 1965, "A rationale and test for the number of factors in factor analysis", *Psychometrika*, vol. 30, no. 2, pp. 179-185.
47. Hu, L.-. & Bentler, P.M. 1999, "Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives", *Structural Equation Modeling*, vol. 6, no. 1, pp. 1-55.
48. Jacobs, B. & Karpova, E. 2020, "Skills and knowledge for merchandising professionals: The case of the south African apparel retail industry", *Clothing and Textiles Research Journal*, doi: 10.1177/0887302X20935516.

49. Jena, L.K. & Pradhan, S. 2020, "Workplace persuasion: Conceptual model, development and validation", *Global Business Review,* vol. 21, no. 2, pp. 567-585.

50. Johns, R., Teo, S. & Harrington, K. 2007. "Pick Me! Perceptual differences of graduate recruitment and selection methods", *Employment Relations Record*, vol. 7, no. 1, pp. 1–10.

51. Kapoor, H. & Kaufman, J. C., 2020. "Meaning-making through creativity during COVID-19", *Frontiers in Psychology.*, vol. 11, doi: 10.3389/fpsyg.2020.595990.

52. Kenaszchuk, C., Reeves, S., Nicholas, D. & Zwarenstein, M. 2010, "Validity and reliability of a multiple-group measurement scale for interprofessional collaboration". *BMC Health Services Research*, vol. 10, no. 83, doi: 10.1186/1472-6963-10-83.

53. Kline, P. 1994, *An easy guide to factor analysis*, Routledge, New York.

54. Lakker, D. R. & Powell, J. L., 2011, "The differences between hard and soft skills and their relative impact on training transfer", *Human Resource Development Quarterly*, vol. 2, no. 1, pp. 111-122.

55. Li, C.-. 2016, "Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares", *Behavior Research Methods,* vol. 48, no. 3, pp. 936-949.

56. Lim, C.S., Tang, K.N. & Tan, S.F. 2013, "Building rapport with pupils to enhance teaching: Implications from observing three primary excellent teachers", *Pertanika Journal of Social Science and Humanities,* vol. 21, no. 3, pp. 1093-1105.

57. Macan, T.H., Shahani, C., Dipboye, R.L. & Phillips, A.P. 1990, "College students' time management: Correlations with academic performance and stress", *Journal of Educational Psychology,* vol. 82, no. 4, pp. 760-768.

58. Majid, S., Liming, Z. Tong, S. & Raihana, Siti 2012, "Importance of soft skills for education and career success", *International Journal for Cross-Disciplinary Subjects in Education*, vol. 2, pp. 1036-1042.

59. Manca, S. & Delfino, M. 2021, "Adapting educational practices in emergency remote education: Continuity and change from a student perspective", *British Journal of Educational Technology*, vol. 52, no. 4, pp. 1394-1413.

60. Mardia, K.V., Kent, J.T., & Bibby, J.M. 2003, *Multivariate analysis,* Academic Press, London.

61. Maydeu-Olivares, A., Coffman, D.L., & Hartmann, W.M. 2007, "Asymptotically distribution-free (ADF) interval estimation of coefficient alpha", *Psychological Methods,* vol. 12, no.2, pp. 157–176.

62. McDonald, R.P. 1999, *Test theory: A unified treatment,* Lawrence Erlbaum Associates, New York.

63. McNeish, D. 2018, "Thanks coefficient alpha, We'll take it from here", *Psychological methods,* vol. 23, no. 3, pp. 412-433.

64. Muthén, L.K., Muthén, B.O. 1998-2016, *Mplus User's Guide,* 8th ed, Muthén & Muthén, New York.

65. Nevitt, J. & Hancock, G.R. 2004, "Evaluating small sample approaches for model test statistics in structural equation modeling", *Multivariate Behavioral Research,* vol. 39, no. 3, pp. 439-478.

66. Nunnally, J.C., & Bernstein, I.H. 1994, *Psychometric theory*, 3rd ed., McGraw-Hill, New York.

67. O'Connor, B.P. 2000, "SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test", *Behavior Research Methods, Instruments, and Computers,* vol. 32, no. 3, pp. 396-402.

68. Ohme, M. & Zacher, H. 2015, "Job performance ratings: the relative importance of mental ability, conscientiousness, and career adaptability", *Journal of Vocational Behavior*, vol. 87, no.4, pp.161-170.

69. Orpen, C. 1993, “The effect of time-management training on employee attitudes and behavior: A tield experiment”, *The Journal of Psychology*, vol. 128, pp. 393-396.

70. Orchard, C.A., King, G.A., Khalili, H. & Bezzina, M.B. 2012, "Assessment of Interprofessional Team Collaboration Scale (AITCS): Development and testing of the instrument", *Journal of Continuing Education in the Health Professions,* vol. 32, no. 1, pp. 58-67.

71. Pachauri, D. & Yadav, A. 2014. "Importance of soft skills in teacher education program" *International Journal of Educational Research and Technology*, vol. 5, pp 22-25.

72. Pang, E., Wong, M., Leung, C.H. & Coombes, J. 2019, "Competencies for fresh graduates’ success at work: Perspectives of employers", *Industry and Higher Education,* vol. 33, no. 1, pp. 55-65.

73. Pate, D. L., 2020. The top skills companies need most in 2020—and how to learn them. [Online] Available at: https://www.linkedin.com/business/learning/blog/top-skills-and-courses/the-skills-companies-need-most-in-2020and-how-to-learn-them [Accessed 20 July 2021].

74. Perloff, R. M., 2017. *The Dynamics of persuation. Communication and attitudes in the 21st century*, 6 ed, Taylor & Francis, New York.

75. Petrone, P., 2018. The skills companies need most in 2019 – and how to learn them. [Online] Available at: https://www.linkedin.com/business/learning/blog/top-skills-and-courses/the-skills-companies-need-most-in-2019-and-how-to-learn-them [Accessed 20 July 2021].

76. Ployhart, R. E. & Bliese, P. D., 2006. Individual adaptability (I-ADAPT) theory: Conceptualizing the antecedents, consequences, and measurement of individual differences in adaptability. In: C. S. Burke, L. G. Pierce & E. Salas (eds), *Understanding Adaptability: A Prerequisite for Effective Performance within Complex Environments*, Elsevier, Bingley, pp. 3-40.

77. Prasertcharoensuk, T. & Tang, K.N. 2016, "The effect of transformational leadership and teachers’ teaching behaviour on teaching efficiency", *Turkish Online Journal of Educational Technology*, vol. 2016, no. December Special Issue, pp. 826-833.

78. Pulakos, E.D., Arad, S., Donovan, M.A. & Plamondon, K.E. 2000, "Adaptability in the workplace: Development of a taxonomy of adaptive performance", *Journal of Applied Psychology,* vol. 85, no. 4, pp. 612-624.

79. Rahim, M.A. & Magner, N.R. 1995, "Confirmatory factor analysis of the styles of handling interpersonal conflict: First-order factor model and its invariance across groups", *Journal of Applied Psychology,* vol. 80, no. 1, pp. 122-132.

80. Rainsbury, E., Hodges, D., Burchell, N. & Lay, M., 2002. “Ranking workplace competencies: student and graduate perceptions”, *Asia Pacific Journal of Cooperative Education*, vol. 3, no 2, pp. 9-18.

81. Raubenheimer, J. 2004, “An item selection procedure to maximize scale reliability and validity”, *South African Journal of Industrial Psychology*, vol. 30, no.4 , pp. 59-64.

82. Raykov, T. & Marcoulides, G.A. 1999, "On desirability of parsimony in structural equation model selection", *Structural Equation Modeling,* vol. 6, no. 3, pp. 292-300.

83. Raykov, T. 2007, "Reliability if deleted, not 'alpha if deleted': Evaluation of scale reliability following component deletion", *British Journal of Mathematical and Statistical Psychology,* vol. 60, no. 2, pp. 201-216.

84. Reise, S.P., Moore, T.M. & Haviland, M.G. 2010, "Bifactor models and rotations: Exploring the extent to which multidimensional data yield univocal scale scores", *Journal of personality assessment,* vol. 92, no. 6, pp. 544-559.

85. Rhemtulla, M., Brosseau-Liard, P.É. & Savalei, V. 2012, "When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions", *Psychological methods,* vol. 17, no. 3, pp. 354-373.

86. Richards, J.H. 1987, “Time management: A review”, *Work & Stress*, vol. 1, no. 1, pp. 73-78.

87. Robles, M. M., 2012. Executive Perceptions of the Top 10 Soft Skills Needed in Today’s Workplace, *Business Communication Quarterly*, vol. 75, no. 4, pp. 453–465.

88. Runco, M. A. & Jaeger, G. J., 2012. “The standard definition of creativity”, *Creativity Research Journal*, vol. 24, no. 1, pp. 92-96.

89. Schuh, G. et al., 2014. “Collaboration moves productivity to the next level”, *Procedia CIRP*, vol. 17, pp. 3-8.

90. Schuler, R.S 1979, “Managing stress means managing time”, *Personnel Journal*, vol. 58, pp. 851-854.

91. Sijtsma, K. 2009, "On the use, the misuse, and the very limited usefulness of Cronbach's alpha", *Psychometrika*, vol. 74, no. 1, pp. 107-120.

92. Succi, C. & Canovi, M., 2020. “Soft skills to enhance graduate employability: comparing students and employers’ perceptions”, *Studies in Higher Education*, vol. 45, no. 9, pp. 1834-1847.

93. Tang, K. N., Ching, S. Y., & Mohd Shahid, S. A. 2015. "Quality teaching: Relationship to soft skills acquisition", *Procedia-Social and Behavioral Sciences*, vol 191, pp. 1934-1937.

94. Tang, K. N., Hashim, N. H. & Mohd Yunus, H. 2014. "Novice teacher perceptions of soft skills needed in today's workplace" *Procedia-Social and Behavioral Sciences*, vol. 177, pp. 284-288.

95. Tang, K.N. 2020, "The importance of soft skills acquisition by teachers in higher education institutions", *Kasetsart Journal of Social Sciences*, vol. 41, no. 1, pp. 22-27.

96. Thomson, A.M., Perry, J.L. & Miller, T.K. 2009, "Conceptualizing and measuring collaboration", *Journal of Public Administration Research and Theory*, vol. 19, no. 1, pp. 23-56.

97. Yu, H. & Zheng, X. 2013, “The impact of employee career adaptability: multilevel analysis”, *Acta Psychologica Sinica*, vol. 45, no. 6, pp. 680-693.

98. Zhu, F., Cai, Z., Buchtel, E.E. & Guan, Y. 2019, "Career construction in social exchange: a dual-path model linking career adaptability to turnover intention", *Journal of vocational behavior*, vol. 112, pp. 282-293.

99. Zins, J. E., Weissberg, R. P., Wang, M. C. & Walberg, H. J. (ed.) 2004. *Building academic success on social and emotional learning: What does the research say?* New York, Teachers College Press.