Assesing of career adaptability for students and their preference work in digital era Via Rasch Model

Siti Aminah[1], Nur Hidayah[1], Fattah Hanurawan[1],
Henny Indreswari[1] Li Lei[2], and Juster Donal Sinaga[3]

[1] Universitas Negeri Malang, Malang, Indonesia
[2] Hainan Medical University, Haikou, Hainan, China
[3] Universiti Putra Malaysia, Selangor, Malaysia
siti.aminah.2201119@students.um.ac.id

Abstract. This study examines students' career adaptability and their preference for work in the digital era. The Career Adapt-Ability Scale Short Form (CAAS-SF) is used as a measuring tool. This study involved 660 students (mean age = 20.25, SD = 2.10), consisting of 543 female and 117 male students. The reliability of CAAS SF is 0.88. The findings of this study indicate that students' career adaptability is moderate level (mean measure = +1.21, SD = 1.41, SE = 2.74). Based on gender, male students are more career adaptable than female students. (M = +1.73; F = +1.09). The non-exact major group aspect had a higher Career adaptability (+1.21) than the exact group (+1.17). Regarding age range, the 21–25-year-olds are the most career adaptable. Another finding is that students who prefer to work in conventional settings are the most adaptable (+1.36), followed by hybrid (+1.14) and remote (+1.17). In the interest of fieldwork aspects, students who want to work in engineering have the highest career adaptability (+1.74). Lastly, according to birth order, middle children are the most career adaptable (+1.33). Therefore, students need to be prepared for their futures to have career adaptability. In the meantime, students at universities are responsible, especially with regard to making decisions about their future careers. Career counseling intervention for students in higher education is needed to increase their career adaptability. This article also discusses the demographic differences in percentages focused on the student's career adaptability.

Keywords: Career Adaptability, Preference Work, Digital Era, Rasch Analysis, Indonesian.

1   Introduction

Changes in the global economy, business competition, and technological advances in the workplace are changing employers' business performance requirements and career development needs. Every industry and sector that experienced unprecedented business changes due to the pandemic drastically disrupts global labor markets and jobs [1] [2] [3]. The global COVID-19 pandemic has changed people's views of the labor market and prioritized work-life balance and working conditions [4]. After the pandemic, this

affects career choices. Working from home affects how people view the new workplace and working style [5] [6] [7].

Modern career development in a globalized technological age is characterized by increased career mobility, shifts in job forms and occupations, more frequent career transitions, virtual and contingent work, and alternative work arrangements [8]. The 2020s will expand the time and place of work. Humans and robots can work together remotely or in person [9] [10] [11] [12]. Furthermore, careers with a set of careers and individual work experiences are selected through variance in continuity over time, across multiple social spaces, and a sense of significance [13] [14] [15]. Career change trends require job seekers and employees to be more self-directed, flexible, agile, and adaptable [16] [17]. These conditions require people to handle unpredictable career changes. Adaptability helps people handle extreme changes. Career adaptability has become a hot topic in the career field [18], but research on digital-era career adaptability, especially in Indonesia, is scarce. Indonesian students are career-adaptable, according to research [19]. Career adaptability should be studied by demographic factors like gender, age, birth order, interest in the field, and work setting preference in the digital age.

Therefore, this research investigates student career adaptability and career-setting tendencies in the digital era. This research provides insight into the development of human resources capable of contributing to the Sustainable Development Goals (SDGs). In addition, this research contributes to career counseling services at University by considering comprehensive aspects of assisting students' career planning.

2   Literature Review

2.1   Preference work in the digital era

The digital era is the biggest change since the industrial revolution. One of the most revolutionary periods, when world knowledge multiplied every minute, consolidating digital living, doing, and working. Technology has changed life, teaching, and social interaction. Digitalization, mobility, AI, automation, data analytics, and business intelligence are the new norms [20]. Digitization is also creating new markets, businesses, and work styles [21]. The era of vertical digital companies that hire full-time workers to work eight hours a day in the same place has changed. Since employees need to stay connected via smartphones, tablets, and other technologies, work can be done anywhere. Additionally, companies are becoming more horizontal.

The introduction of this new work model can provide major advantages such as increased productivity, reduced costs, mobility, crowd-sourcing, flexibility, and increased capacity to adapt to complex markets. Its ultimate goal is to break down communication barriers, transforming the employee experience by driving efficiency, innovation, collaboration, communication, and connectivity. Employees must also be able to keep up with the pace that characterizes technological progress, guided by the transverse competencies of adaptability, critical thinking, creativity, flexibility, emotional intelligence, intercultural, and virtual [22]. The digital generation values flexibility, emotional intelligence, challenges, new ways of working, clear career paths, work-life

balance, recognition, feedback, mobility, and collaborative workspaces. Flexibility in scheduling, roles, and locations led to hybrid and remote work. Performance and youth retention are linked to the work environment. They also help this generation be more productive, engaged, well-being, happy, and healthy. The good thing about this generation is that they value career change.

2.2   Student's Career Adaptability

One of the psychosocial constellations that denote individual resources for dealing with current tasks and anticipating developments, job transitions, and job traumas, which are, to some extent, large or small, and change individual social integration, is career adaptability [23]. Adaptability can also be conceptualized as self-regulatory tendencies and operated as learning goal orientation, proactive personality, and career optimism. These are some of the other sources that describe adaptability [24].

Career adaptability includes care, control, curiosity, and conscience [25] [26]. Career adaptability addresses adulthood preparation for career decision-makers in all aspects [27]. Starting with caring—being aware and oriented toward career planning—and focusing on motivation to prepare for future career assignments. Then, career control—responsibility, toughness, and assertiveness—will be determined. The next dimension is curiosity, which involves risk-taking and seeking new information, and career competencies, is another factor. Lastly, the self-confidence component is confidence in one's ability to overcome career challenges and solve future issue [28] [29] [30] [31].

College students are crucially developing. Students this age who can solve unexpected workplace issues have an advantage over other job applicants. In this case, education and experience are highly valued on the job market and contribute to professional success [32]. Career success is seen as a positive outcome of career decisions, behavior, and work experiences [33] [34]. Career adaptability is essential to career development because it aids adjustment and proactive career behavior [35] [24].

2.3   Research questions

Following the discussion on career adaptability and their preference work in the digital era, four research questions guide this paper:

1. RQ1: What are the levels of career adaptability among Indonesian students?
2. RQ2: How does the career adaptability of students differ based on demographic characteristics?
3. RQ3: How do students' preference for workplace and their career adaptability compare?
4. RQ4 What are the key challenges in improving career adaptability among students entering the workforce during the digital age?

3   Method

3.1   Procedure

This study used a cross-sectional study in order to determine the factors that contribute to students at the university on career adaptability. The purpose of this study is to identify the factors that contribute to this issue [36]. This research focuses on students in Universities across 20 provinces in Indonesia. In this study, the sampling technique used is simple random sampling. Participation in this study was entirely voluntary, and no personal information from respondents would be disclosed to third parties under any circumstances.

3.2   Participants

1,128 students from 20 provinces in Indonesia were selected. Furthermore, data cleaning was carried out to check the consistency of the respondents with the assumption that there were no outliers [37] and resulted in 660 students. Student demographics are shown in Table 1.

Table 1. Demographic data of students (N= 660)

Demographics	Frequency	Total (%)	Mean Measure	Reliabilities	F Test	Prob > F
Gender			1.21	0.90	20.05	0.0001
- Male	117	17.73	1.73	0.88		
- Female	543	82.27	1.09	0.90		
Birth order			1.21	0.90	0.91	0.4341
- First child	255	38.64	1.24	0.90		
- Middle Child	141	21.36	1.33	0.90		
- Last Child	222	33.64	1.09	0.89		
- Only child	42	6.36	1.17	0.89		
Age range			1.21	0.90	3.41	0.0171
- 16-20 year old	430	65.15	1.15	0.89		
- 21-25 year old	215	32.58	1.30	0.91		
- 26-30 year old	7	1.06	0.17	0.70		
- > 30 year old	8	1.21	2.31	0.73		
Major			1.21	0.90	0.01	0.9045
- Exact	24	3.64	1.17	0.82		
- Non-Exacta	636	96.36	1.21	0.90		
University status			1.21	0.90	0.00	0.9763
- Public University	501	75.91	1.21	0.89		
- Private University	159	24.09	1.20	0.91		
Interest fieldwork			1.21	0.90	0.83	0.5841
- Economic business	94	14.24	1.21	0.89		
- Creative Industry	41	6.21	1.13	0.91		
- Service work	25	3.79	1.52	0.90		
- Health	13	1.97	0.73	0.81		
- Sport	11	1.67	0.86	0.86		

- *Education*	329	49.85	1.24	0.90	
- *Art*	27	4.09	0.72	0.88	
- *Engineering*	2	0.30	1.74	0.84	
- *Information tech-nology*	28	4.24	1.36	0.89	
- *Entrepreneur*	90	13.64	1.22	0.90	
Work setting interest			1.21	0.90	0.63	0.5296
- *Remote Work*	162	24.55	1.34	0.90	
- *Hybrid Work*	412	62.42	1.20	0.89	
- *Conventional Work*	86	13.03	1.13	0.91	

3.3   Instrumentation

Career adaptability was assessed by Career Adapt-Ability Scale Short-Form (CAAS SF) [38]. The CAAS SF consist 12 items in four dimensions such as concern, control, curiosity, and confidence. Each of the four dimensions is assessed by 3 items. Participants responded to each item using a 5-point Likert-type scale ranging from 1 = *not strong* to 5 = *strongest*.

WINSTEPS version 5.1.5.1 was utilized to determine the instrument's validity and reliability that transformed raw ordinal data (Likert-type data) into logit (log odd unit) via the logarithm function, based on the frequency of responses that appeared as the probability [39] [40]. Internal reliability scores for the instrument are displayed in Table 2. The Person Reliability index of 0.98 indicates that the consistency of responses from individuals was "excellent". The same logic of interpretation applies to the Item Reliability measures of 0.88, which are also classified as "good" indicates that both the item and the individual are extremely trustworthy. The value of the Cronbach Alpha coefficient (0.89) indicated that the interaction between the respondents and the items was "good". High reliability is attributed to instruments with "good" psychometric internal consistency [41]. As a result, the CAAS SF can be considered a reliable instrument for use with diverse respondent groups.

The CAAS SF instrument had a good measure of unidimensionality (48.5%), where the index of raw variance was above the threshold of 40%. [42]. This indicates that the instrument can accurately measure students' career adaptability. In addition, the outfit mean-square statistics for both person and item are close to 1.0, and a significant chi-square score indicates that the data fit the model [43]. In addition, the analysis of rating scales (Table 3) revealed that the four rating scales given to students, from weakest to strongest, were easily understood with a threshold rating scale of 1.4 to 5.0 [42].

Table 2. Summary Statistic of person and items

Psychometric properties	Person	Item
N	660	12
Outfit mean square		
Mean	0.99	0.99
SD	035	0.05
Separation	2.74	8.04
Reliability	0.98	0.88
Alpha Cronbach	0.89	

|	
Chi-square	15424.70
Raw variance explained by measure	48.5%

Note: p ** < 0.01

Analysis of data utilizing the Rasch measurement model particularly, the rating scale Rasch Model is appropriate for measuring the latent trait that evaluates human opinion/ perception/ attitude [43] [41]. Using Rasch analysis, the result can explain item difficulty level with precise measurement (item calibration), detect item fit, and measure the knowledge creation level of the respondent [44].

Table 3. Statistic of rating scale analysis

Category	Frequency (%)	Data category count used (%)	Rasch-Andrich threshold measure (%)	SE
Not Strong	1	78	None	--
Somewhat Strong	11	889	-3.33	0.12
Strong	39	3056	-1.14	0.04
Very Strong	35	2749	1.25	0.03
Strongest	14	1148	3.22	0.04

In this study, the Person Separation index (2.74), as shown in Table 2, and the Item Separation index (8.04), demonstrate the CAAS SF's excellent spread across the spectrum of respondents and items. These criteria validate the CAAS SF as a valid and reliable instrument for assessing the career adaptability of students.
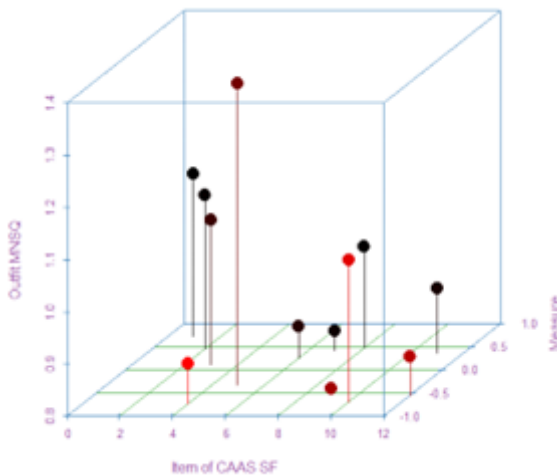
Fig. 1. Scatterplots **CAAS SF**

The scatterplot in Fig 1 is made using Winsteps and R Studio, which explains the relationship between invalid items and the characteristics of the items with their measurements. The MNSQ outfit shows no items below 0.5 and above 1.5, meaning the measurement is precise and accurate. Figure 1 also illustrates the distribution of items 1–12, and the maximum size distribution value is 0.5, with a range of 0.1 to 1.0.

3.4   Data Analysis

The Rasch model relates student conditions or responses to item characteristics. The Rasch model can assess the level of career adaptability based on the level of ability to answer respondents' items. The results of data collection were analyzed using the Rasch WINSTEPS 5.1.5.1 analysis [44]. The software mathematically converts the raw ordinal data (Likert-type data) into logit (log odd units) based on the frequency of responses that appear as probabilities through calibration of item difficulty and individual ability [41]. A two-dimensional (person and item) rating scale model was developed to identify responses about career adaptability based on student demographic profiles. All of our research and data analysis outcomes are accessible to the general public via the subsequent hyperlink:. https://bit.ly/3OrT7FO_OSF.

4   Results

4.1   RQ1. What is the student's career adaptability in Indonesia?

The career adaptability of students was evaluated first. Table 4 reveals that the average measure (logit) value for each individual was 1.21 logit. This demonstrates that every student was adaptable in their chosen careers. Students' levels of career adaptability vary greatly, as indicated by a standard deviation of 1.41. In terms of the item's mean measure (logit) value, the mean is 0.00 logit and the standard deviation is 0.50. This suggests a broad range of measures across the logit scale for item difficulty level.

Table 4. Result of Students' Career Adaptability

Descriptive statistics	Person	Item
N	660	12
Measures		
Mean	1.21	0.00
SD	1.41	0.50
Standard error	0.06	0.15

The left-hand side illustrates the distribution of student responses based on their logit score, ranging from high adaptability (logit score > +2.62) to low career adaptability (logit score +0.2) from the far left. Based on mean and standard deviation

values, the respondent's distribution of the person logit score is divided into three cate-gories, from high career adaptability at the top-left to low career adaptability at the bottom-left (as shown in Fig 2).
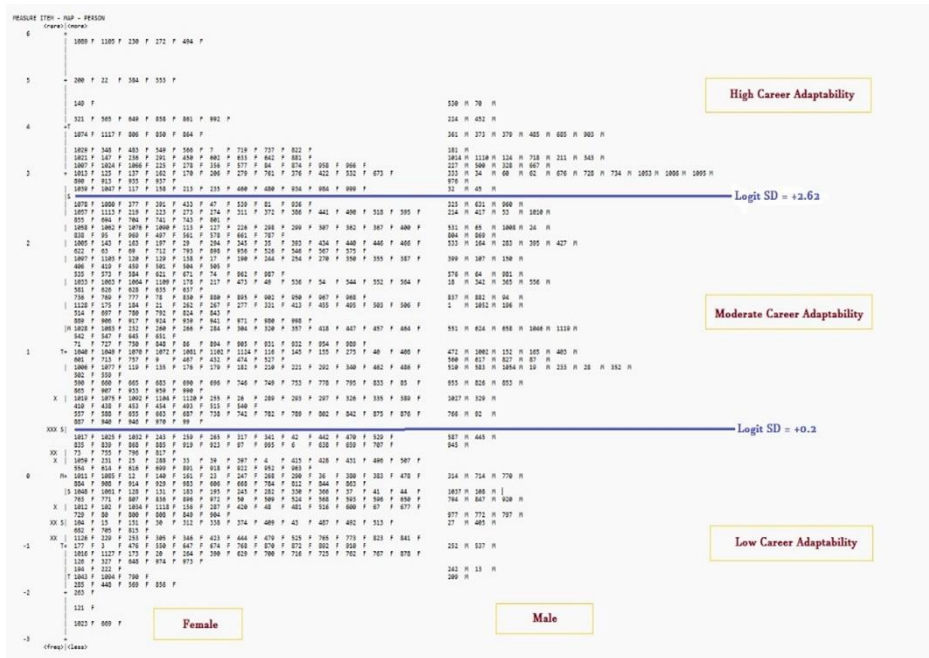

Fig. 2. Rasch Wright Person logit map of CAAS SF based on gender

4.2   RQ2 How does the career adaptability of students differ based on demographic characterictics?

Findings for RQ2 are shown in Table 5; students' career adaptability according to their demographics such as gender, age group, birth order, age range, major, university sta-tus, interest fieldwork, and preferred work setting in the digital era were categorized into three levels of adaptability (high to low) using (logit) value as a person.

Table 5. Students' career adaptability according to demography, only 35 out of 117 male students (30%) and 78 out of 543 female students have high career adaptability. Most of the male students, 66 (56%), and female students, 330 (61%), were only able to adapt to their careers. Figure 2 shows almost the same number of male and female students at the moderate level.

A closer look at the students' birth order found firstborns at 44 out of 255 students, and only children (7 out of 42) had the same percentage (17%) in the high career adapt-ability category. The last child student scored slightly more, with 41 out of 222 (18%). Middle-child students were only 21 out of 141 (15%) in the high category. Overall, students who are first children (58%), middle children (66%), last children (57%), and only children (67%) have moderate career adaptation skills. Meanwhile, based on age,

only 70 out of 430 students aged 16–20 years (16%) and 37 out of 215 students aged 21–25 years (17%) have high career adaptability. More than 50% of students with different age ranges are in the moderate category.

Finally, an analysis of students' preferred work settings found that 34 out of 162 students (21%) were interested in remote work, 65 out of 412 students (16%) were interested in hybrid work, and 14 out of 86 students (16%) were interested in conventional jobs with high career adaptability. More than 50% of students are interested in remote work, 98 (60%) in hybrid work, and 251 (61%) are only in the moderate category. Similar findings were also found for students interested in a conventional work environment, with 47 students (55%) having career adaptability.
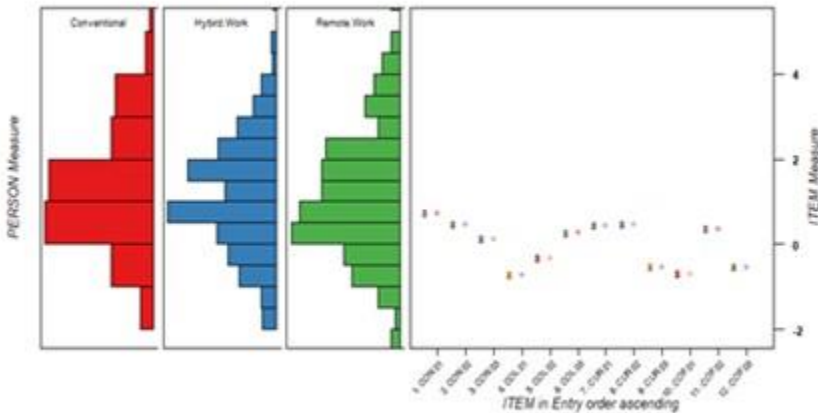
Table 5. Students' career adaptability according to demography

Demographic	High LVP > +2.62	Moderate +2.62 > LVP > +0.2	Low LVP < +0.2
Gender			
- Male	**35 (30%)**	66 (56%)	16 (14%)
- Female	**78 (14%)**	330 (61%)	135 (25%)
Birth order			
- First child	44 (17%)	149 (58%)	62 (24%)
- Middle Child	21 (15%)	93 (66%)	27 (19%)
- Last Child	**41 (18%)**	126 (57%)	55 (25%)
- Only child	7 (17%)	28 (67%)	7 (17%)
Age range			
- 16-20 year old	70 (16%)	262 (61%)	98 (23%)
- **21-25 year old**	**37 (17%)**	128 (60%)	50 (23%)
- 26-30 year old	2	2	3
- 30 year old	4	4	-
Major			
- Exact	2 (8%)	16 (67%)	6 (25%)
- Non Exacta	111**(17%)**	380 (60%)	145 (23%)
University status			
- Public University	89 **(18%)**	293 (58%)	119 (24%)
- Private University	24 (15%)	103 (65%)	32 (20%)
Interest field work			
- Economic bussiness	16 (17%)	52 (55%)	26 (28%)
- Creative industry	11 **(27%)**	21 (51%)	9 (22%)
- Service work	3	15 (60%)	7
- Health	3	7	3
- Sport	1	8	2
- Education	50 (15%)	201 (61%)	78 (24%)
- Art	3 (11%)	16 (59%)	8 (30%)
- Engineering	-	2	-
- Information technology	5	22 (79%)	1
- Interpereneur	21 (23%)	52 (58%)	17 (19%)

Preferred work setting			
- Remote Work	34 **(21%)**	98 (60%)	30 (19%)
- Hybrid Work	65 (16%)	251 (61%)	96 (23%)
- Conventional Work	14 (16%)	47 (55%)	25 (29%)

4.3 RQ3 How do students' preference for workplace their career adapatbility compare?

The distribution of students' preferences for workplace settings, ranging from conventional to remote work, was subjected to a rigorous analysis utilizing Winsteps and R Studio. Figure 3 elucidates the distribution, highlighting that the majority of students fall within the moderate category across various workplace settings. This finding underscores the necessity for pertinent interventions to elevate students' career adaptability levels from moderate to high. Such enhancements are imperative in the digital age, where adaptability and flexibility are crucial in navigating career transitions across diverse workplaces. A scrutiny of the data presented in the table reveals that conventional work settings have the highest mean measure, surpassing that of hybrid and remote work settings; however, it is noteworthy that this difference does not reach statistical significance.

Fig. 3. Student's career adaptability and their favored workplace preference for workplace

4.4 RQ4: What are the key challenges in improving career adaptability among students entering the workforce during the digital age

Table 6 classified the items according to their difficulty level or logit value. The classification of the items into four difficulty levels was done by dividing the distribution of the item logit score based on mean and standard deviation values. There were 1 item (8.33%) in the very difficult category (LVI > 0.50); 6 items (50%) in the difficult

category (+0.50 LVI 0.00); 1 item (8.33%) in the easy category (0.00 LVI -0.50); and 4 items (33.33%) in the very easy category (LVI -0.50 logit) as rated by students.

Table 6. Career Adaptability engagement item calibration

Construct/ dimension	Difficulty Level			
	Very difficult	Difficult	Easy	Very Easy
Concern	CON01	CON02,	-	-
Control	-	CON03	COL02	COL01
Curiosity	-	COL03	-	CUR03
Confidence	-	CUR02, CUR01 COF02	-	COF03, COF01

Overall, students rated all dimensions in the difficult category; 6 out of 12 items fell in this category. Meanwhile, only the confidence, curiosity, and control dimensions are in the easy and very easy categories. This shows students face problems in terms of all dimensions. This is surprising for college students.

On the concern dimension, we found items that are in very difficult and difficult categories. One item was rated very difficult by students (CON01, thinking about what my future will be like). Another item was rated as difficult are CON02: preparing for the future, and CON03: becoming aware of the educational and vocational choices that I must make. Furthermore, on the control dimension, item COL03 (counting on myself) is considered difficult by students. These results indicate that students have difficulty relying on themselves when facing career changes. But they still have the ability to be responsible and make their own decisions.

The next dimension is curiosity, namely the division of questions into difficult and very easy categories. Two items in the difficult category were rated by CUR02 (investigating options before making a choice) and CUR01 (looking for opportunities to grow as a person) students. Students do not yet have complete information to seek opportunities and understand various career options before making a decision. However, students have the ability to observe several different methods of doing things.

Finally, the self-confidence dimension shows that students have a tendency to be careful when doing something and work within their abilities, as indicated by items COF01 (taking care to do things well) and COF03 (working up to my ability) who are able to be in the very easy category for students. What's interesting is that students seem to have difficulty learning new skills. This was obtained from item COF02 (learning a new skill), which is included in the difficult category.

Fig 4 is an item-person map of the study. On the right side of the map shown is each item's level of difficulty, ranging from "very easy" to agree by the respondents in the bottom right (logit score -0.50 of items COL01 and COF01) to "very difficult" to agree by the respondents in the top right (logit score +0.50 of item CON01).
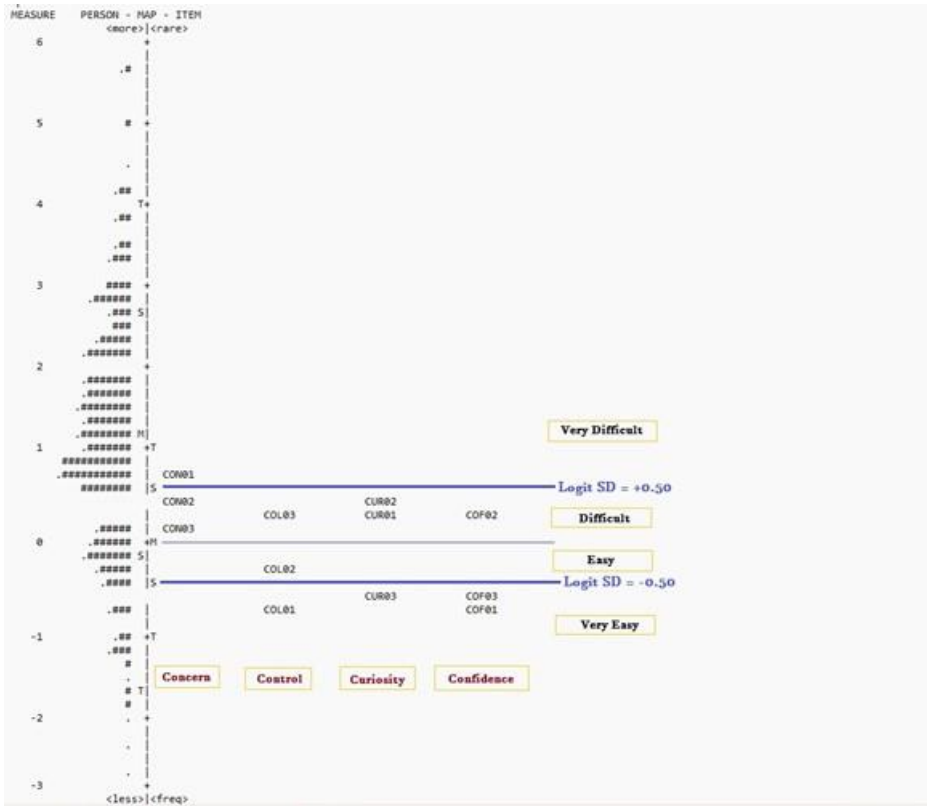
Fig. 4. Rasch Wright item-person map of CAAS SF

5   Disscusion

This study aims to hide students' career adaptability and their career preferences in the digital age and specifically assess their ability to adapt to changes and career transitions based on gender, birth order, age, major, university status, areas of interest, and work preferences in the digital age. First, students at public universities are slightly more adaptive to career changes than students at private universities. These results suggest that both private and public university students need to broaden the objective of profiling the most critical skills possessed by successive students to increase employment opportunities to deal with uncertain situations [45].

Second, on the concern dimension, students have difficulty with future planning. Future planning is correlated with self-awareness and the presence of suitable helpers. At the university level, efforts to help students plan for the future are essential, as are efforts to help students form clearer and more focused career goals so that students can proactively seek development opportunities [25], which contribute to the skills and resources individuals can use when managing their careers.

In addition, this study demonstrates that students face obstacles when it comes to self-reliance. Dimensional control was the basis for this discovery. Students' reliance is influenced by a career-unfriendly environment. Nonetheless, this study revealed that students already possess responsibility and decision-making ability. This circumstance affords students the chance to positively fulfill a variety of job responsibilities [46].

On the curiosity dimension, students struggle with researching options prior to making decisions and seeking self-development opportunities. These findings contradict previous research that suggests the evolution of technology in the current digital era facilitates access to information about available jobs and new learning and advancement opportunities [13]. This aspect requires full consideration because it can aid individuals in overcoming youth-related issues and preparing for varying labor market demands and competition [47].

Lastly, the confidence dimension demonstrates that students struggle to acquire new information. In other respects, students already have the capacity to consider things carefully and act accordingly. These findings demonstrate that, for individuals in the digital era, this aspect must be enhanced in order to establish a sustainable career. Individuals view lifelong learning, autonomy, skill enhancement, agility, and adaptability to change and technology as crucial for career sustainability [48].

This study also found that male students more adaptable in career compared to female students. According to birth order, the first child is the most adaptable. The age range between 21 and 25 possesses the highest adaptability. This age corresponds to the career development stage. This age falls within the millennium category. They have begun to accept change, flexibility, and mobility; rather than searching for a job for life, they are searching for the right job to facilitate personal career values and work goals as the new norm for psychological job security [13] [12] [49].

Another intriguing finding of this study is that students with a preference for conventional work have greater career adaptability than those with hybrid and remote work preferences. These results are consistent with the conditions of job interest in the digital era, which prioritize proper integration between career development that supports workplace culture and meaningful work experiences that enable individuals to increase their experience, skills, and knowledge [13]. In addition, flexible work arrangements have a significant impact on high work adaptability. Individuals who have the opportunity for flexible career management or a balance between work and professional development have subjective career success criteria [16].

5.1   Limitations

This research has several limitations. First, the study was only conducted at undergraduate level colleges, limiting the sample size to younger people. Therefore, the fracture study can be expanded. Second, this study collected data from students who were mostly in their first semester so as to ensure the data is representative and generalizable, future studies could include more students of different grades or races. To explain the findings, qualitative data such as interviews are needed. Future research on career adaptability could also examine the role of other factors. According to this research,

universities should help students adapt to career changes in the digital era to avoid career planning problems by adopting the mission and concept of further education and training to meet the needs of the digital era [49].

6   Conclusion

The overall findings of this study reveal that students have moderate career adaptability. However, further analysis shows that the career adaptability of advanced students is only in categories based on gender, birth order, age, majors, university status, areas of interest, and preferred job settings in the digital era. Regarding preference for work settings in the digital era, students who prefer remote work settings have higher career adaptability than those who are interested in hybrid work and conventional work. Implementation of career adaptability in the digital era is essential for preparing for student careers, so proper assistance is needed through career counseling at the university to help students prepare for the workforce.

Disclosure of Interests.   The authors have no competing interests to declare that are relevant to the content of this article.

References

1. P. Caligiuri, H. De Cieri, D. Minbaeva, A. Verbeke, and A. Zimmermann, "International HRM insights for navigating the COVID-19 pandemic: Implications for future research and practice," *J. Int. Bus. Stud.*, vol. 51, no. 5, pp. 697–713, 2020, doi: 10.1057/s41267-020-00335-9.
2. B. Hancock, S. Lund, and B. Schaninger, "Grabbing hold of the new future of work | McKinsey," 2021. [Online]. Available: https://www.mckinsey.com/business-functions/organization/our-insights/grabbing-hold-of-the-new-future-of-work.
3. K. M. Kniffin *et al.*, "COVID-19 and the workplace: Implications, issues, and insights for future research and action.," *American Psychologist*, vol. 76. American Psychological Association, Kniffin, Kevin M.: Dyson School of Applied Economics and Management, S. C. Johnson College of Business, Cornell University, Warren Hall 111, Ithaca, NY, US, 14853, kmk276@cornell.edu, pp. 63–77, 2021, doi: 10.1037/amp0000716.
4. S. Baert, L. Lippens, E. Moens, P. Sterkens, and J. Weytjens, "How Do We Think the Covid-19 Crisis Will Affect Our Careers (If Any Remain)?," 2020. doi: 10.2139/ssrn.3584927.

5. L. Waizenegger, B. McKenna, W. Cai, and T. Bendz, "An affordance perspective of team collaboration and enforced working from home during COVID-19," *Eur. J. Inf. Syst.*, vol. 29, no. 4, pp. 429–442, 2020, doi: 10.1080/0960085X.2020.1800417.

6. L. Colley and S. Williamson, "Working during the Pandemic: From resistance to revolution?," *UNSW Canberra Public Serv. Res. Gr. CQUniversity*, no. October, pp. 1–27, 2020, [Online]. Available: unsw.adfa.edu.au/public-service-research-group.

7. Slack, "'Report: Remote work in the age of covid-19', Slack, Understanding the remote work surge, 'normally' work from home," *Slack*, 2020. https://slack.com/blog/collaboration/report-remote-work-during-coronavirus.

8. M. Coetzee and A. Deas, Redefining the Psychological Contract in the Digital Era: Issues for Research and Practice. 2021.

9. McKinsey Global Institute, "A Labor Market That Works : Connecting Talent With Opportunity in the Digital Age," London, 2015.

10. McKinsey Global Institute, "Technology and the Future of Work," London, 2016. doi: 10.3362/9781780446615.001.

11. McKinsey Global Institute, "Independet Work: Choice, Necessity, and The Gig Economy," London, 2016. doi: 10.1177/0950017018762088.

12. Risesmart, "The employee relationship economy . Boomeranging and frequent there is an ' employee relationship economy ' on the rise .," 2018.

13. M. Coetzee and A. M. G. Schreuder, *Careers: An organisational perspective 6th Edition*. Cape Town: Juta, 2021.

14. A. Hirschi, "The Fourth Industrial Revolution: Issues and Implications for Career Research and Practice," *Career Dev. Q.*, vol. 66, no. 3, pp. 192–204, Sep. 2018, doi: https://doi.org/10.1002/cdq.12142.

15. A. De Vos and B. I. J. M. Van der Heijden, *Handbook of research on sustainable careers*. 2015.

16. D. T. (Tim) Hall, J. Yip, and K. Doiron, "Protean careers at work: Self-direction and values orientation in psychological success.," *Annu. Rev. Organ. Psychol. Organ. Behav.*, vol. 5, pp. 129–156, 2018, doi: 10.1146/annurev-orgpsych-032117-104631.

17. R. W. Lent, "Future of work in the digital world: Preparing for instability and opportunity.," *Career Dev. Q.*, vol. 66, pp. 205–219, 2018, doi: 10.1002/cdq.12143.

18. H. Chen *et al.*, "Career adaptability research: A literature review with scientific knowledge mapping in web of science," *Int. J. Environ. Res. Public Health*, vol. 17, no. 16, pp. 1–21, 2020, doi: 10.3390/ijerph17165986.

19. T. Mahfud, Y. Mulyani, R. Setyawati, and N. Kholifah, "The Influence of Teaching Quality, Social Support, and Career Self-Efficacy on the Career Adaptability Skills: Evidence from a Polytechnic in Indonesia," *Integr. Educ.*, vol. 26, no. 1, pp. 27–41, 2022, doi: 10.15507/1991-9468.106.026.202201.027-041.

20. G. Leonhard, *Technology vs. Humanity. Fast Future Publishing*. United Kingdom: Fast Future Publishing, 2016.

21. E. Yang, Y. Kim, and S. Hong, "Does working from home work? Experience of working from home and the value of hybrid workplace post-COVID-19," *J. Corp. Real Estate*, vol. 25, no. 1, pp. 50–76, 2023, doi: 10.1108/JCRE-04-2021-0015.

22. A. Davies, D. Fidler, and M. Gorbis, *Future work skills 2020*. 2011.

23. M. L. Savickas, "Career adaptability: An integrative construct for life-span, life-space theory.," *Career Dev. Q.*, vol. 45, pp. 247–259, 1997, doi: 10.1002/j.2161-0045.1997.tb00469.x.

24. L. R. Tolentino, P. R. J. M. Garcia, S. L. D. Restubog, P. Bordia, and R. L. Tang, "Validation of the Career Adapt-Abilities Scale and an examination of a model of career adaptation in

the Philippine context," *J. Vocat. Behav.*, vol. 83, no. 3, pp. 410–418, 2013, doi: https://doi.org/10.1016/j.jvb.2013.06.013.

25. M. L. Savickas *et al.*, "Life designing: A paradigm for career construction in the 21st century," *J. Vocat. Behav.*, vol. 75, no. 3, pp. 239–250, 2009, doi: 10.1016/j.jvb.2009.04.004.

26. C. S. Johnston, E. C. Luciano, C. Maggiori, W. Ruch, and J. Rossier, "Validation of the German version of the Career Adapt-Abilities Scale and its relation to orientations to happiness and work stress," *J. Vocat. Behav.*, vol. 83, no. 3, pp. 295–304, 2013, doi: https://doi.org/10.1016/j.jvb.2013.06.002.

27. Z. Chen, S. Solberg, and A. Ye, "Chinese Youth Career Adaptability: Contextual Influences and Pathways to Positive Youth Development," *Youth Soc.*, pp. 1–26, 2018, doi: 10.1177/0044118X18784058.

28. P. Celik and M. Storme, "Trait Emotional Intelligence Predicts Academic Satisfaction Through Career Adaptability," *J. Career Assess.*, vol. 26, no. 4, pp. 666–677, 2018, doi: 10.1177/1069072717723290.

29. M. Coetzee and N. Harry, "Gender and hardiness as predictors of career adaptability: An exploratory study among Black call centre agents," *South African J. Psychol.*, vol. 45, no. 1, pp. 81–92, 2015, doi: 10.1177/0081246314546346.

30. A. B. de Guzman and K. O. Choi, "The relations of employability skills to career adaptability among technical school students," *J. Vocat. Behav.*, vol. 82, no. 3, pp. 199–207, 2013, doi: 10.1016/j.jvb.2013.01.009.

31. H. Zacher, "Career adaptability predicts subjective career success above and beyond personality traits and core self-evaluations," *J. Vocat. Behav.*, vol. 84, no. 1, pp. 21–30, 2014, doi: 10.1016/j.jvb.2013.10.002.

32. S. E. Sullivan and M. B. Arthur, "The evolution of the boundaryless career concept: Examining physical and psychological mobility," *J. Vocat. Behav.*, vol. 69, no. 1, pp. 19–29, 2006, doi: 10.1016/j.jvb.2005.09.001.

33. P. A. Heslin, "Conceptualizing and evaluating career success," *J. Organ. Behav.*, vol. 26, no. 2, pp. 113–136, 2005, doi: 10.1002/job.270.

34. W. H. N. Thomas, T. E. Lillian, L. S. Kelly, and C. F. Daniel, "Predictors of Objective and Subjective Career Success: a Meta-Analysis," *Pers. Psychol.*, vol. 58, no. 2, pp. 367–408, 2005.

35. M. L. Savickas and E. J. Porfeli, "Career Adapt-Abilities Scale: Construction, reliability, and measurement equivalence across 13 countries," *J. Vocat. Behav.*, vol. 80, no. 3, pp. 661–673, 2012, doi: https://doi.org/10.1016/j.jvb.2012.01.011.

36. J. W. Craswell, Research Design Qualitative, Quantitative, and Mixed Methods Approaches 4th Edition, vol. 4, no. 1. SAGE Publications Ltd, 2014.

37. W. Widhiarso and B. Sumintono, "Examining response aberrance as a cause of outliers in statistical analysis," *Pers. Individ. Dif.*, vol. 98, pp. 11–15, 2016, doi: https://doi.org/10.1016/j.paid.2016.03.099.

38. C. Maggiori, J. Rossier, and M. L. Savickas, "Career Adapt-Abilities Scale–Short Form (CAAS-SF): Construction and Validation," *J. Career Assess.*, vol. 25, no. 2, pp. 312–325, 2017, doi: 10.1177/1069072714565856.

39. W. J. Boone, M. S. Yale, and J. R. Staver, *Rasch analysis in the human sciences*. 2014.

40. B. Sumintono and W. Widhiarso, "Aplikasi Model Rasch Untuk Penelitian Ilmu-Ilmu Sosial," 2014.

41. T. G. Bond and C. M. Fox, *Applying the Rasch Model*. Routledge, 2021.

42. W. P. J. Fisher, "Rating scale instrument quality criteria," *Rasch Meas. Trans.*, vol. 211, p. 1095, 2007.

43. G. J. Engelhard, Invariant Measurement: Using Rasch Models in the Social, Behavioral and Health Sciences. New York, NY.: Routledge, 2013.

44. J. M. Linacre, "A user's guide to winsteps ministeps rasch-model computer programs [version 5.2.3]," *Winstep.com*, 2022. .

45. A. M. . Rahmat, A. H. . Mohd Adnan, and N. M. Mohtar, "Industry 4.0 Skillsets and 'Career Readiness': Can Malaysian University Students face the Future of Work?," *Proc. Int. Invent. Innov. Creat. Conf.*, vol. 2019, no. 2019, pp. 28–37, 2019.

46. A. Hirschi, A. Herrmann, and A. C. Keller, "Career adaptivity, adaptability, and adapting: A conceptual and empirical investigation," *J. Vocat. Behav.*, vol. 87, no. October 2019, pp. 1–10, 2015, doi: 10.1016/j.jvb.2014.11.008.

47. Y. Haibo, G. Xiaoyu, Z. Xiaoming, and H. Zhijin, "Career Adaptability With or Without Career Identity: How Career Adaptability Leads to Organizational Success and Individual Career Success?," *J. Career Assess.*, pp. 1–15, 2017, doi: 10.1177/1069072717727454.

48. B. I. J. M. Van der Heijden and A. De Vos, "Sustainable careers: Introductory chapter," in *Handbook of Research on Sustainable Careers*, V. A. De. and H. I. J. M. Van der, Eds. Cheltenham: Edward Elg, 2015, pp. 1–19.

49. L. Witcher, "Successful companies will be those that embrace the new employee economy," *Talent42*, 2018. https://www.tlnt.com/articles/successful-companies-will-be-those-that-embrace-the-new-employee-economy (accessed Jun. 18, 2023).