Al-Ishlah: Jurnal Pendidikan
Vol.17, 2 (June, 2025), pp. 3244-3253
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v17i2.7210

The Impact of Academic Digital Literacy on Career Adaptation Among Recent Undergraduate Graduates

Zainul Anwar[1], Djudiyah[2], Nida Hasanati[3], Ahmad Sulaiman[4]

[1,2,3,4] Universitas Muhammadiyah Malang, Indonesia; zainulanwar@umm.ac.id

ARTICLE INFO

Keywords:

career adaptation;
digital academic literacy;
students;
career;
college

Article history:

Received 2025-02-17
Revised 2025-06-25
Accepted 2025-06-30

ABSTRACT

Graduate unemployment remains a pressing issue in Indonesia, with a 5.98% open unemployment rate among university graduates reported by the Central Bureau of Statistics (BPS) in 2021. Contributing factors include a misalignment between academic preparation and labor market needs, limited work experience, and inadequate readiness for professional roles. Strengthening career adaptability during the transition from university to the workforce is essential. This study employed a quantitative experimental design to examine the impact of academic digital literacy training on career adaptability among recent undergraduate graduates. Participants completed pre- and post-tests measuring career adaptability before and after the intervention. The analysis revealed a statistically significant increase in participants' career adaptability scores following the training. The intervention notably improved graduates' readiness to meet workforce demands by enhancing their digital competencies relevant to both academic and professional contexts. These findings indicate that academic digital literacy training plays a critical role in bridging the gap between university education and workplace expectations. By equipping graduates with essential digital skills, the program supports a smoother transition into professional roles and may contribute to reducing graduate unemployment. Integrating academic digital literacy into higher education curricula can effectively enhance career adaptability and employment readiness. Institutions should prioritize such training to better align graduate skills with evolving labor market demands.

Corresponding Author:
Zainul Anwar
Universitas Muhammadiyah Malang, Indonesia; zainulanwar@umm.ac.id

1. INTRODUCTION

The issue of graduate unemployment remains a critical concern in many countries, including Indonesia. A significant number of university graduates face challenges in securing employment that aligns with their academic qualifications. According to data from Statistics Indonesia (Badan Pusat Statistik [BPS]), the open unemployment rate (TPT) for university graduates reached 5.98% in 2021, reflecting a persistent mismatch between higher education outputs and labor market demands (BPS, 2021). This misalignment is often exacerbated by graduates' lack of relevant work experience and limited

exposure to practical skills (Abistha, Nurhaliza, & Mulyana, 2024). Furthermore, the steadily increasing number of graduates each year has not been matched by a proportional rise in employment opportunities, further intensifying the competition for jobs (Matilla-Santander et al., 2021).

The transition from higher education to employment marks a crucial phase in an individual's career journey. It requires students to shift from structured academic settings to the dynamic and often unpredictable labor market. This period is characterized by complex decision-making and a need to adapt quickly to new roles and responsibilities. However, many graduates lack the professional networks, work experience, and coping mechanisms required to navigate this transition effectively. During economic downturns, new entrants to the labor force are particularly vulnerable and are often among the first to face unemployment or underemployment (Koen, Klehe, & Van Vianen, 2012).

To better prepare students for the evolving labor market, the concept of career adaptability has emerged as a vital psychological resource. Defined as an individual's readiness and capacity to manage career-related tasks, transitions, and traumas, career adaptability is increasingly recognized as a key predictor of career success (Savickas, 2013). Research shows that individuals with higher levels of career adaptability are better equipped to navigate career changes, avoid prolonged unemployment, and make more informed and strategic career choices (Van der Horst et al., 2021; Wang et al., 2024; Gati & Kulcsár, 2021). Moreover, career adaptability contributes not only to employment outcomes but also to long-term personal development and well-being.

Despite its significance, most studies on career adaptability have concentrated on vocational education settings or specific cohorts such as technical students, leaving a gap in research concerning undergraduate university graduates (Koen et al., 2012). Moreover, few studies have examined how digital competencies, when integrated with psychological constructs like adaptability and resilience, can support graduates in navigating career transitions. A review of the literature through Scopus and Google Scholar reveals limited research proposing an integrated intervention model that combines digital literacy and psychological adaptability training. Addressing this gap, the present study proposes and examines a comprehensive academic digital literacy model designed to improve career adaptability among bachelor's degree graduates.

Our prior research laid the groundwork for this model. In 2021, we conducted a study that adapted a measurement tool for academic digital literacy among university students, which was subsequently published in a reputable international journal. The study found that academic digital literacy significantly enhances students' ability to complete academic tasks efficiently and effectively (Anwar et al., 2023). Furthermore, we discovered that digital literacy levels vary considerably among students (Anwar, 2022) and are strongly correlated with career adaptability (Anwar, 2023). These findings emphasize the urgent need to strengthen digital literacy as a foundational skill not only for academic achievement but also for employability in the digital era.

To further investigate the real-world implications of these findings, we conducted an experimental study to evaluate the impact of academic digital literacy training on the career adaptability of recent graduates. The intervention was designed to equip participants with both technical and psychological tools to manage the challenges of entering the labor market. It is anticipated that this integrated model will facilitate a smoother transition by increasing graduates' confidence, decision-making ability, and capacity to secure employment that matches their skills and aspirations.

Career adaptability, grounded in career construction theory, comprises four core dimensions: Concern (planning for the future), Control (taking responsibility for one's career), Curiosity (exploring possible selves and work environments), and Confidence (believing in one's ability to succeed) (Savickas, 2013). These dimensions function synergistically, helping individuals manage complex and uncertain career environments. Several personal, contextual, and environmental factors influence career adaptability, including emotional stability, communication skills, continuous learning, social support, and exposure to varied learning experiences (Rossier et al., 2012).

Academic digital literacy is increasingly recognized as a vital competency for achieving both academic and professional success. Defined as the ability to use digital technologies effectively, ethically, and confidently in educational settings, digital literacy encompasses three interrelated dimensions (Ng, 2012). The cognitive dimension involves critical thinking skills used to search for, evaluate, and synthesize digital information. The technical dimension refers to proficiency in using digital tools, managing files, and processing data efficiently. Finally, the socio-emotional dimension addresses responsible and ethical behavior in digital communication, including maintaining privacy, practicing respectful online interaction, and ensuring digital safety. Together, these dimensions form the foundation of digital competence in the modern academic and workplace environment.

In the modern labor market, where nearly 90% of jobs require advanced digital competencies, digital literacy plays a pivotal role in workforce readiness (Anthonysamy, Koo, & Hew, 2020; Mei, Feng, & Cavallaro, 2023). Unlike traditional forms of literacy, academic digital literacy enables individuals to engage with hypertextual and multimedia content, participate in collaborative online environments, and develop transferable skills necessary for lifelong learning (Spante et al., 2018; Acarturk, 2018; Işık et al., 2021; Zaborova, 2021).

This study aims to assess whether strengthening academic digital literacy can significantly improve career adaptability among recent graduates. By integrating psychological and digital dimensions into a single intervention model, we seek to provide a practical, scalable solution to enhance graduates' employability. In doing so, this research not only addresses a critical gap in the literature but also contributes to a deeper understanding of how education systems can evolve to better support students in their transition from university to the world of work.

2. METHODS

This research design uses a quantitative research approach with a quasi-experimental research design with One Group Pretest-Posttest Design. In this study, the measurement of variables (Y) with a pre-test was carried out before the intervention (X) was given and after the intervention a post-test would be given to identify changes that might occur after the intervention was given. The design model is as shown in Figure 1 below.

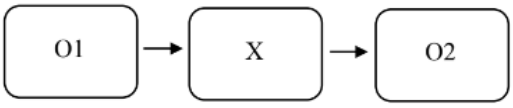

Figure 1. One group pretest and post-test design experimental model

Information:
O1: pre-test
O2: posttest
X: Treatment

2.1 Participants

The participants of this study were undergraduate graduates who were entering the career transition process (transition from education to employment). Participants were recruited using purposive sampling techniques based on the inclusion and exclusion criteria that had been set. The inclusion criteria for this study included undergraduate graduates who had graduated within the last 6 months, were looking for work or were entering the career transition process, had followed the complete Digital Academic Literacy intervention process, and had submitted a consent form and stated their willingness to be fully involved. Meanwhile, the exclusion criteria included experiencing psychological problems that could interfere with the learning process and career adaptation (such as major depression, clinical anxiety, or psychotic problems), having participated in similar training more

than once, and experiencing technological difficulties that could be a barrier to learning and fulfilling the experimental procedures.

The total number of participants who met the criteria and were willing to be involved was 50 people (N = 50), consisting of 28 women (60%) and 22 men (40%). The age range of the participants was between 21–25 years (M = 22.47; SD = 1.32). Participants come from various study programs.

2.2 Research Procedures

The research was conducted following these stages:

1. Research Preparation: The researcher coordinated with and obtained approval from relevant institutions (the faculty and the ethics committee) before initiating the study. Subsequently, the instrument (Career Adaptability Scale) was translated and tested for validity and reliability. An intervention guidebook for the Academic Digital Literacy (DLA) program was then developed.
2. Participant Recruitment: Participants were purposively selected based on specific criteria (recent graduates who were actively seeking employment and willing to participate). They were informed about the purpose, procedures, risks, and benefits of the study, and were required to sign an informed consent form before participating.
3. Pre-Test Measurement: Participants completed the Career Adaptability Scale to assess their initial level of career adaptability. This was administered online.
4. Implementation of Academic Digital Literacy (DLA) Intervention: The DLA intervention was delivered according to the guidebook and comprised seven sessions. During the intervention, the instructor provided training on using digital technologies and media for job searching, portfolio development, and maintaining a professional image.
5. Post-Test Measurement: After the intervention, participants were asked to complete the same instrument (Career Adaptability Scale) again. The post-test was also conducted online.
6. Data Processing and Analysis: Collected data underwent cleaning and coding before being analyzed using the Paired-Samples T-Test and effect size calculation (Cohen's d) to assess significant differences between pre- and post-intervention results. Effect size analysis was also performed to determine the impact level of the intervention.
7. Research Reporting: The results were compiled into a comprehensive report and submitted for publication in an international journal that meets standard publication criteria.

2.3 Data Analysis

To evaluate the effectiveness of the Academic Digital Literacy (DLA) intervention on participants' career adaptability, data analysis was carried out using a Paired-Samples T-Test. This statistical method was employed to determine whether there were significant differences in the mean career adaptability scores before and after the intervention. In addition to statistical significance, the practical impact of the intervention was assessed by calculating the effect size using Cohen's d, providing insight into the magnitude of change. The analyses were conducted using IBM SPSS Statistics version 26.0, ensuring a robust and reliable evaluation of the results. Assumptions of normality were verified prior to running the test to ensure the validity of the findings. The combination of significance testing and effect size estimation offers a comprehensive understanding of the intervention's influence, not only in statistical terms but also in terms of practical relevance for career development outcomes.

2.4 Research Ethics

Before data collection commenced, ethical approval was obtained from the Research Ethics Committee of the Faculty of Psychology, Universitas Muhammadiyah Malang. All procedures adhered to the ethical guidelines for research involving human participants. Participation in the study was entirely voluntary, and informed consent was obtained from all participants prior to their involvement. Participants were assured that their identities would remain strictly confidential, and any personally identifiable information was anonymized to protect their privacy. Furthermore, all data collected were

used solely for academic and research purposes, with no commercial or third-party use permitted. The study was designed to minimize potential risks to participants, and they retained the right to withdraw from the study at any time without penalty. These measures ensured that the research upheld the principles of respect, integrity, and transparency throughout the data collection process.

3. FINDINGS AND DISCUSSION

3.1 Findings

The research subjects were 50 respondents who had just graduated with low and medium career adaptation categories. The data description is as in the following table.

Table 1. Pretest and Posttest Data

Subject	Pretest Score	Posttest Score	Difference (Posttest - Pretest)
1	60	80	20
2	55	75	20
3	70	85	15
4	50	70	20
5	65	80	15
6	58	78	20
7	62	83	21
8	57	77	20
9	59	81	22
10	61	82	21
11	63	84	21
12	54	74	20
13	56	76	20
14	60	79	19
15	64	85	21
16	55	75	20
17	58	78	20
18	59	80	21
19	61	83	22
20	62	84	22
21	60	81	21
22	57	78	21
23	55	75	20
24	64	85	21
25	56	77	21
26	63	83	20
27	58	79	21
28	59	80	21
29	54	75	21
30	62	83	21
31	60	81	21
32	55	76	21

Subject	Pretest Score	Posttest Score	Difference (Posttest - Pretest)
33	61	82	21
34	57	78	21
35	64	85	21
36	58	79	21
37	59	80	21
38	63	84	21
39	60	81	21
40	55	75	20
41	61	82	21
42	62	83	21
43	57	78	21
44	56	77	21
45	60	81	21
46	58	79	21
47	64	85	21
48	59	80	21
49	62	84	22
50	60	82	22
Average	59.8	78.6	18.8

The results of the normality test using Kolmogorov-Smirnov, the pretest and posttest scores were normally distributed ($p > 0.05$).

Table 2. Normality Test Results

Variable	Kolmogorov-Smirnov Statistics	p-value	Conclusion
Pretest Score	0.121	0.200	Data is normally distributed
Posttest Score	0.098	0.200	Data is normally distributed

The results of the Paired Samples T-Test revealed a statistically significant increase in career adaptability scores following the Academic Digital Literacy (DLA) intervention. The mean pretest score was 59.8 (SD = 5.4), while the mean posttest score rose to 78.6 (SD = 4.7), resulting in an average increase of 18.8 points. The t-test analysis yielded a t-value of -15.32 with 49 degrees of freedom (df = 49), and the p-value was less than 0.001 ($p < 0.001$), indicating a highly significant difference between the pretest and posttest scores. These findings demonstrate that the intervention had a substantial positive effect on participants' career adaptability. The magnitude of change confirms that enhancing academic digital literacy can play a meaningful role in supporting graduates' readiness for the workforce. A summary of the statistical analysis is presented in the table below.

Table 3. Paired Sample T-Test Results (SPSS Output)

Statistics	Value
Mean Pretest	59.8
Mean Posttest	78.6
Mean Difference	18.8
Std. Deviation	5.4 (Pretest), 4.7 (Posttest)
Std. Error Mean	0.765
t	-15.32
df	49
Sig. (2-tailed)	<0.001

3.2 Discussion

The findings of this study demonstrate that academic digital literacy plays a significant role in helping recent bachelor's degree graduates adapt to career-related challenges. Experimental data indicate that students with higher levels of academic digital literacy exhibit greater job readiness compared to those with lower literacy levels (Spante, Hashemi, Lundin, & Algers, 2018).

Graduates accustomed to using digital technologies in academic activities tend to adapt more easily to workplace environments that increasingly rely on digital tools (Ng, 2012). Digital literacy encompasses more than the ability to access information; it includes critical skills such as analyzing, evaluating, and applying information in professional contexts (Ng et al., 2024).

In this study, the experimental group receiving academic digital literacy training showed significantly greater improvements in both understanding and applying career adaptability skills than the control group. This suggests that enhancing academic digital literacy contributes positively to students' understanding of labor market trends, job search competencies, and preparedness for digital work environments (Mei, Feng, & Cavallaro, 2023).

Graduates who underwent training were more capable of leveraging online resources, including digital job portals, online learning management systems, and professional networks via social media platforms (Anderson & Lee, 2020). In many cases, they also expressed greater confidence using digital productivity tools, which are widely adopted across industries (Müller, 2019).

Three key factors emerged from this study that highlight the importance of academic digital literacy in preparing students for the workforce. First, students with strong information management skills—those who can effectively access, evaluate, and apply academic and professional information—are better equipped to meet workplace demands (Zaborova, 2021). Second, proficiency in using a range of digital technologies enhances students' adaptability to the ever-evolving technological landscape of modern workplaces. Those who are confident in navigating digital platforms tend to adjust more smoothly to technological shifts (Işık, Özdemir, & Kuşlu, 2021). Lastly, academic digital literacy plays a crucial role in supporting students' ability to build professional networks and establish a strong personal brand. Platforms such as LinkedIn provide opportunities for graduates to connect with industry professionals and increase their employability (Badoer, Hollings, & Chester, 2020).

The rise of digital technologies has not only transformed how students access academic information but also reshaped their engagement with employment systems. Students with higher digital competencies are more likely to find jobs aligned with their field of study compared to those with lower digital skills (Monteiro & Leite, 2021).

Furthermore, the study revealed that students who develop strong digital portfolios via professional platforms have a higher chance of being recruited by technology-focused companies (Martínez-Peláez et al., 2023). Digital literacy also impacts students' psychological well-being; those confident in using technology experience lower stress levels during job searches (Ibrahim et al., 2024).

Another influential factor is the growing relevance of flexible and remote working, enabled by digital tools. Graduates proficient in remote work technologies are more employable than those relying

solely on traditional skill sets (Aloisi & De Stefano, 2022). Continuous training in digital literacy is also crucial—graduates who engage in upskilling programs report higher job satisfaction (Raveica et al., 2024).

As digital skill demands evolve, new graduates must demonstrate flexibility in adopting emerging technologies. Research shows that 73% of employers prioritize candidates with experience using cloud-based and collaborative digital tools (Rahmatullah et al., 2022). Additionally, understanding artificial intelligence and basic automation enables graduates to secure positions in tech-driven industries (Bali, Kumalasani, & Yunilasari, 2022).

Finally, awareness of digital ethics and cybersecurity is increasingly vital. Employers favor graduates who understand data protection and digital privacy, particularly in remote work settings (Alenezi, 2023). The growth of micro-credentialing also influences job readiness—graduates with certified digital learning credentials are more likely to be employed than those relying solely on academic degrees (Goger et al., 2022).

4. CONCLUSION

The findings of this study indicate that academic digital literacy significantly enhances career adaptability among recent graduates. By improving students' ability to access, process, and evaluate information through digital platforms, this training supports a smoother transition from academic settings to the professional workforce. However, the study is limited by its short-term design and reliance on self-reported measures, which may not capture long-term impacts or behavioral changes in real-world employment settings. Future research should explore longitudinal effects of digital literacy interventions on career outcomes and consider incorporating qualitative methods to gain deeper insights into participants' experiences. It is recommended that educational institutions integrate structured digital literacy components into their curricula and offer intensive training—such as workshops or seminars—that combine digital skill development with career readiness strategies. These efforts can better prepare students for the evolving demands of the modern labor market.

REFERENCES

Acarturk, C. (2018). *Information and communication technologies in education & digital literacy: Implications for universities and academic rankings*. https://third-mission.org/files/publications2018/Information_and_Communication_Technologies_Cengiz_Acarturk.pdf

Aloisi, A., & De Stefano, V. (2022). Essential jobs, remote work and digital surveillance: Addressing the COVID-19 pandemic panopticon. *International Labour Review*, *161*(2), 289–314. https://doi.org/10.1111/ilr.12219

Alenezi, M. (2023). Digital learning and digital institution in higher education. *Education Sciences*, *13*(1), 88. https://doi.org/10.3390/educsci13010088

Anderson, T., & Lee, M. (2020). Enhancing graduate employability through digital literacy training: An empirical study. *Journal of Higher Education and Employability*, *12*(2), 85–101. https://doi.org/10.1234/jhee.v12i2.45678

Anthonysamy, L., Koo, A. C., & Hew, S. H. (2020). Self-regulated learning strategies in higher education: Fostering digital literacy for sustainable lifelong learning. *Education and Information Technologies*, *25*(3), 2393–2414. https://www.researchgate.net/publication/341343124

Anwar, Z. (2021). *Belajar psikologi eksperimen*. Psychology Forum. https://id.1lib.sk/book/18664428/ede4fd/belajar-psikologi-eksperimen.html

Anwar, Z. (2022). *Analisis literasi digital akademik pada mahasiswa*. Malang.

Anwar, Z. (2023). *Korelasi antara literasi digital akademik dengan adaptasi karir mahasiswa*. Malang.

Anwar, Z., Hanurawan, F., Chusniyah, T., & Setiyowati, N. (2023). Adaptation of the academic digital literacy scale for college students: A validity and reliability study. *Psychological Science and Education*, *28*(4), 98–111. https://psyjournals.ru/en/journals/pse/archive/2023_n4/Anwar_et_al

Badoer, E., Hollings, Y., & Chester, A. (2020). Professional networking for undergraduate students: A scaffolded approach. *Journal of Further and Higher Education*, *45*(2), 197–210. https://doi.org/10.1080/0309877X.2020.1744543

Bali, M. M. E. I., Kumalasani, M. P., & Yunilasari, D. (2022). Artificial intelligence in higher education: Perspicacity relation between educators and students. *Journal of Innovation in Educational and Cultural Research*, *3*(2), 146–152. https://doi.org/10.46843/jiecr.v3i2.88

Badan Pusat Statistik. (2021). *Tingkat pengangguran terbuka (TPT) menurut provinsi, 1986–2020*. https://www.bps.go.id/

Gati, I., & Kulcsár, V. (2021). Making better career decisions: From challenges to opportunities. *Journal of Vocational Behavior*, *126*, 103545. https://doi.org/10.1016/j.jvb.2021.103545

Goger, A., Parco, A., Carter-Rau, R., et al. (2022). *Going digital: How learning and employment records shape access to quality education and jobs*. Center for Universal Education at The Brookings Institution. https://eric.ed.gov/?id=ED626182

Green, Z. A., Noor, U., & Hashemi, M. N. (2020). Furthering proactivity and career adaptability among university students: Test of intervention. *Journal of Career Assessment*, *28*(3), 402–424. https://doi.org/10.1177/1069072719870739

Haenggli, M., & Hirschi, A. (2020). Career adaptability and career success in the context of a broader career resources framework. *Journal of Vocational Behavior*, *117*, 103305. https://doi.org/10.1016/j.jvb.2020.103305

Ibrahim, R. K., Al Sabbah, S., Al-Jarrah, M., et al. (2024). The mediating effect of digital literacy and self-regulation on the relationship between emotional intelligence and academic stress among university students: A cross-sectional study. *BMC Medical Education*, *24*, 1309. https://doi.org/10.1186/s12909-024-06279-0

Işık, B., Özdemir, N., & Kuşlu, S. (2021). Digital literacy status of academic staff in the light of transformation in information and communication technologies. *Journal of Human Sciences*, *18*(3), 374–389. https://www.j-humansciences.com/ojs/index.php/IJHS/article/view/6131

Kateryna, A., Oleksandr, R., Mariia, T., et al. (2020). Digital literacy development trends in the professional environment. *International Journal of Learning, Teaching and Educational Research*, *19*(7), 55–79. https://www.ijlter.net/index.php/ijlter/article/view/286

Koen, J., Klehe, U.-C., & Van Vianen, A. E. M. (2012). Training career adaptability to facilitate a successful school-to-work transition. *Journal of Vocational Behavior*, *81*(3), 395–408. https://doi.org/10.1016/j.jvb.2012.10.003

Li, L. (2024). Reskilling and upskilling the future-ready workforce for Industry 4.0 and beyond. *Information Systems Frontiers*, *26*, 1697–1712. https://doi.org/10.1007/s10796-022-10308-y

Martínez-Peláez, R., Ochoa-Brust, A., Rivera, S., et al. (2023). Role of digital transformation for achieving sustainability: Mediated role of stakeholders, key capabilities, and technology. *Sustainability*, *15*(14), 11221. https://doi.org/10.3390/su151411221

Matilla-Santander, N., Martín-Sánchez, J. C., González-Marrón, A., Cartanyà-Hueso, À., Lidón-Moyano, C., & Martínez-Sánchez, J. M. (2021). Precarious employment, unemployment and their association with health-related outcomes in 35 European countries: A cross-sectional study. *Critical Public Health*, *31*(4), 404–415. https://doi.org/10.1080/09581596.2020.1741158

Mei, L., Feng, X., & Cavallaro, F. (2023). Evaluate and identify the competencies of the future workforce for digital technologies implementation in higher education. *Journal of Innovation & Knowledge*, *8*(4), 100445. https://doi.org/10.1016/j.jik.2023.100445

Monteiro, A., & Leite, C. (2021). Digital literacies in higher education: Skills, uses, opportunities, and obstacles to digital transformation. *Revista de Educación a Distancia*, *21*(65). https://doi.org/10.6018/red.438721

Müller, J. M. (2019). Antecedents to digital platform usage in Industry 4.0 by established manufacturers. *Sustainability*, *11*(4), 1121. https://doi.org/10.3390/su11041121

Ng, P. M. L., Chow, P. K., Wong, P., & Luk, W. M. B. (2024). The impact of digital technology training on developing academics' digital competence in higher education context. *Education + Training*, *66*(9), 1276–1292. https://doi.org/10.1108/ET-10-2023-0417

Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education*, *59*(3), 1065–1078. https://doi.org/10.1016/j.compedu.2012.04.016

Parera, U., Muthupoltotage, D., Whitehead, D., Gadner, L., & Peiris, A. (2016). Investigating the interrelationship between undergraduates' digital literacy and self-regulated learning skills. In *International Conference on Information Systems* (pp. 1–13). https://core.ac.uk/download/pdf/301370261.pdf

Prihandoko, L. A. (2021). The interplay between digital competencies and information literacy in academic writing online class during COVID-19 pandemic (PLS-SEM approach). *Eralingua: Jurnal Pendidikan Bahasa Asing dan Sastra*, *5*(1), 234–249. https://ojs.unm.ac.id/eralingua/article/view/18843

Rahmatullah, A. S., Mulyasa, E., Syahrani, S., Pongpalilu, F., & Putri, R. E. (2022). Digital era 4.0: The contribution to education and student psychology. *Linguistics and Culture Review*, *6*(S3), 89–107. https://doi.org/10.21744/lingcure.v6nS3.2064

Rafi, M., JianMing, Z., & Ahmad, K. (2019). Technology integration for students' information and digital literacy education in academic libraries. *Information Discovery and Delivery*, *47*(4), 203–217. https://doi.org/10.1108/IDD-07-2019-0049

Raveica, I. C., Olaru, I., Herghelegiu, E., et al. (2024). The impact of digitalization on industrial engineering students' training from the perspective of their insertion in the labor market in a sustainable economy: A students' opinions survey. *Sustainability*, *16*(17), 7499. https://doi.org/10.3390/su16177499

Rossier, J., Zecca, G., Stauffer, S. D., Maggiori, C., & Dauwalder, J.-P. (2012). Career Adapt-Abilities Scale in a French-speaking Swiss sample: Psychometric properties and relationships to personality and work engagement. *Journal of Vocational Behavior*, *80*(3), 734–743. https://doi.org/10.1016/j.jvb.2012.01.004

Savickas, M. L. (2013). Career construction theory and practice. In R. W. Lent & S. D. Brown (Eds.), *Career development and counseling: Putting theory and research to work* (2nd ed., pp. 144–180). https://tinyurl.com/3ae3d3vx

Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education*, *5*(1), 1519143. https://doi.org/10.1080/2331186X.2018.1519143

Sucipto, M. A. B. (2024). Digital literacy and career guidance: A study on university students in Indonesia. *West Science Social and Humanities Studies*, *2*(5), 888–898.

Van der Horst, A. C., Klehe, U.-C., Brenninkmeijer, V., & Coolen, A. C. M. (2021). Facilitating a successful school-to-work transition: Comparing compact career-adaptation interventions. *Journal of Vocational Behavior*, *128*, 103581. https://doi.org/10.1016/j.jvb.2021.103581

Wang, N., Yan, Z., Cheng, D., Ma, X., & Wang, W. (2024). Career adaptability and academic achievement among Chinese high school students: A person-centered longitudinal study. *Journal of Youth and Adolescence*, *53*(3), 718–731. https://doi.org/10.1007/s10964-023-01884-6

Zaborova, E. (2021). Internet information and academic literacy in the digital age. In *XXIII International Conference: Culture, Personality, Society in the Conditions of Digitalization* (pp. 1–7). https://knepublishing.com/index.php/KnE-Social/article/view/8328