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AN INVESTIGATION ON DIGITAL COMPETENCE OF ACCOUNTING UNDERGRADUATE STUDENTS IN THE PRIVATE HIGHER EDUCATION INSTITUTES

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Abstract

Nowadays, accountants in the digital economy and globalized world need digital competence or soft skills more than technical or hard skills. Therefore, DigComp 2.0 investigated accounting students' digital competence. Data were collected by an online questionnaire from accounting undergraduate students of two private universities and then were analyzed. It was found that accounting students had more digital competence but less on digital content creation. However, there was a significant difference in digital safety between freshmen with juniors and seniors. Our study suggests that accounting students' digital competence must be promoted and advanced both curriculum and institution level.

Keywords: Digital competence, DigComp 2.0, Accounting student, Private Higher Education Institute

Introduction

The transformation of traditional economic forms to digital forms impacts on employment because Artificial Intelligence is used instead of human workforces. At the same time, digital technologies are developed to be advanced and innovative. Therefore, in this situation, a highly qualified human workforce is scarce. In addition, industry 4.0 is the era that needs human resources in workplaces or workers that have competencies in new literacies including digital literacy, technology literacy, and human literacy (Lestari, & Santoso, 2019). Consequently, the competencies that relate to digital technology need to be explicitly studied. Particularly, it's essential to develop an up-to-date curriculum in higher education, and includes the improvement of people who are involved in facilitating technological advancement in order to accord with the needs of a digital economic system (Berishvili, Strekalova, & Khramtsova, 2019).

European Council determined 8 competency domains in lifelong learning and one of its skills is digital competence. It's the competence that people must correctly, validate, critically, and responsibly use digital information. Simultaneously, it's the need to interact with technologies for learning, working, and participating communities. Therefore, digital competence consists of (1) information literacy and data literacy, (2) communication and collaboration, (3) creation of digital content such as map creation, (4) security such as knowledge of well-being in the digital world and securities of the cyber world, (5) The solution of various problems such as dimensions of economic, social, and person (Carretero, Vuorikari, & Punie, 2017).

However, "Digital Competence" has included in the 21st –century skills as well as digital literacy, digital skills, electronic skills, Internet skills, and media literacy. These words indicate that people nowadays work with technologies (Van Laar, Van Deursen, & Van Dijk, 2019, pp. 3462-3463). Digital skills of information communication, collaboration, critical thinking, and creation lead to problem-solving that are similar to European Council's digital skills (Van Laar et al., 2019, pp. 3464-3466).

The World Bank Centre for Financial Reporting Reform (CFRR) (Borgonovo, Friedrich, & Wells, 2019) foresees the importance of accountants to have competence from the potentials of the sustainable financial report, and do guidelines in education and training management to accountants in the digital and globalized economy, the competence which can be categorized into (1) technical competency, and (2) enabling competency. The enabling competency is composed of (1) professional and ethical behavior, (2) problem-solving and decision-making, (3) communication, (4) self-management, (5) teamwork and leadership. The issues that must consider in competence development are (1) Technological changes such as software and system, artificial intelligence, cryptocurrencies and blockchain, cloud computing, and data analytics, such as, digital barcode scanner which can check warehouse agent and movement, or digitized cards that enable instantaneous, contactless payment. These technologies will be a part of city daily life in which technological advancement., (2) Globalization such as the expectation of accountants meets the need of a multi-races organization to support strategic planning, (3) Communicative changes such as social media and email confidence, and sending messages such as a consumer has the power to directly contact a company, and the risk of reputation in case of user dissatisfaction., and (4) Increasing expectation of accountability and ethical action such as an increasingly large amount of corporate social responsibility, and also the increasing expectation of corporate responsibility to communities and stakeholders. From the above, digital competence

consequently is one of the competencies that accountants are needed. Particularly, private university students that they should have to be concerned because of they are going into the workforce sectors, like the other kind of university students.

Research Questions

1. How are accounting students' digital competencies?
2. How are accounting students' digital competencies when compared to their background?

Objectives

This research aims to evaluate accounting students' digital competencies, and to compare accounting students' digital competencies to their class level.

Literature review

The textbooks, theses or dissertations, and working papers have not been taken to review since (1) almost academicians and researchers use journal articles and proceedings to create research projects and publish new findings, and (2) manageable objectives such as the reasons of Asonitou, & Kavoura, (2019).

Almost all enterprises use the Internet to interact with their customers in transactions of finance, tax declaration, or statistical reports. In which the accountants have to play important roles of responsibilities to these activities (Georgieva, 2019). The accountants still need knowledge or technical skills, as well as soft skills such digital competencies (Gullo, 2019; Moll, & Yigitbasioglu, 2019; Kokina et al., 2019). Gullo (2019) explained that accountancy field, soft skills and technical skills are important that need to be integrated into accounting curriculum and learning. Young and smart accountants' qualification from the many studies above needs both technical skills and soft skills (Gullo, 2019; Kokina et al., 2019; Moll & Yigitbasioglu, 2019). According to the study of Stancheva-Todorova (2019) which found that Industry 4.0 is changing the structure and scope of accountants' qualification profile called "accountant 4.0". They must have knowledge and skills including (1) digital technologies, (2) big data and Data analytics, (3) robotics and Artificial Intelligence, (4) cyber security, (5) tax implication, and (6) legal and regulatory requirements, which knowledge and skills are integration of interdisciplinary to various skills and competences. This paper emphasized on soft skills more than technical skills. Accordingly, the seven 21st-century digital skills that consist of technical, information management, communication, collaboration, creativity, critical thinking, and problem-solving skills. These skills in the worlds of education and employment need for individuals to function effectively as students, workers, and citizens and they can be developed through practice (Van Laar et al., 2019).

Competence means the individual who has the abilities to act in a wide variety of situations. Those abilities indicate the sufficiency of knowledge, skills, and attitudes. Digital competence is one of the key competences for lifelong learning which all individuals need for personal fulfillment and development, employability, social inclusion, sustainable lifestyle, successful life in peaceful societies, health-conscious life management, and active citizenship (Orosz et al., 2019). Digital competence involves the confident, critical, and responsible use of, and engagement with, digital technologies for learning, working, and participating in

societies. Simultaneously, there is the endeavor to harness the potential of digital technologies to innovate education and training practices, improve access to lifelong learning (Carretero, Vuorikari, & Punie, 2017). Many parts of the world try to create the digital competences / skills framework that those frameworks differentiate in detail (Carretero, Vuorikari, & Punie, 2017; Gekara et al., 2019; Lyons et al., 2019; Law et al., 2018).

The Digital Competence Framework for Citizens (DigComp 1.0, 2.0, and 2.1) which were elaborated by the Human Capital and Employment Unit (Joint Research Centre) on behalf of the Directorate General for Employment, Social Affairs and Inclusion of the European Commission (Carretero, Vuorikari, & Punie, 2017). DigComp 2.0 is divided into 5 Competence areas and each competence area is divided into competences as shown in Table 1.

Table 1 DigComp 2.0 digital competences

Competence areas	Competencies
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content
	1.2 Evaluating data, information and digital content
	1.3 Managing data, information and digital content
2. Communication and collaboration	2.1 Interacting through digital technologies
	2.2 Sharing through digital technologies
	2.3 Engaging in citizenship through digital technologies
	2.4 Collaborating through digital technologies
	2.5 Netiquette
	2.6 Managing digital identity
3. Digital content creation	3.1 Developing digital content
	3.2 Integrating and re-elaborating digital content
	3.3 Copyright and licenses
	3.4 Programming
4. Safety	4.1 Protecting devices
	4.2 Protecting personal data and privacy
	4.3 Protecting health and well-being
	4.4 Protecting the environment
5. Problem solving	5.1 Solving technical problems
	5.2 Identifying needs and technological responses
	5.3 Creatively using digital technologies

DigComp (1.0, 2.0 and 2.1) can bridge the gap between the education sphere and the expectations of the labour market (Orosz et al., 2019). Meanwhile, every cooperation needs the young and smart accounts to possess high quality of both soft skills and technical skills. Therefore, this framework can show the appropriate indicators to various companies where there are prevailing accountants in every companies. According to the Government policies of technology and innovation development on finance, accounting and electronic commerce have to be up-to-date and enhance the abilities on international competition. Therefore, the improvement of accounting students' knowledge, skills, qualifications to support the digital era is necessary to improve learning

system for accounting students to be able to take advantage of digital accounting change (Tirasiwat, 2018, pp. 586-588).

Research methods

Data were collected from accounting students of two private higher education institutes by an online questionnaire and 93 responses from two private universities. The 30 items-questionnaire was created from the 21 DigComp 2.0 competences. The data were analyzed by using SPSS version 23.0 to analyze (1) percentage, frequency, mean, (where instead of 1=least, 2=less, 3=moderate, 4=more, and 5=most) and standard deviation, and (2) One-way ANOVA. Then, findings were presented in tables with discussion.

Findings and Discussion

Findings were presented in the light of which obvious answers are useful according to the purpose of the study respectively.

Table 2 Mean and Standard deviation of Digital Competence of Accountancy Undergraduate Students discriminated by competence area and its total

	Digital competence areas	Mean	S.D.	Competent level
1	Information and data literacy	4.03	0.72	more
2	Communication and collaboration	3.97	0.76	more
3	Digital content creation	3.46	0.97	moderate
4	Safety	3.96	0.85	more
5	Problem solving	3.97	0.77	more
	Total	3.90	0.66	more

According to the data in Table 2, it is found that the total mean is at a more level of digital competence (Mean = 3.90). When considering competence areas, it was found that four areas are at the more level such as information and data literacy (Mean = 4.03), communication and collaboration (Mean = 3.97), problem-solving (Mean = 3.97), and safety (Mean = 3.96) respectively, where digital content creation is at a moderate level. According to Zhyvets (2019) found that education of accountants and their further continuous professional training need more development of digital technologies, particularly the use of existing software and cloud services. According to the qualitative answers, almost accounting students have positive attitude in electronic media, they said "should have advice of electronic media use", "will more exploit media from social media" and "seeking information by digital devices makes convenience and timeliness". The technical skills are still needed as one response said "should have training on the special knowledge of the professional".

Information and data literacy are at the most level accordance with Imene, & Imhanzenobe (2020) that found that future accountants and accounting processes are likely to be more complicated with information technology and technological trends in meeting users' information needs. Hence, they must be sophisticated those improvements. Meanwhile the accountants' roles changed from IT therefore they must shift in both hard skills and soft skills (Surianti, 2020).

Digital competence on communication and collaboration and problem-solving are needed at the same level that consistency with a research (Bowles, Ghosh, & Thomas, 2020) found that communication, collaboration and relationships, and problem-solving and decision making are the importance of the capabilities for accountants' both current and future roles.

Table 3 Distribution of data related to comparison of Competence areas according to class level analyzed by ANOVA

Variables	Source of variance	Sum of squares	Degree of freedom	MS	F	Sig.
Information and data literacy	Between group	2.307	3	.769	1.514	.216
	Within group	45.711	90	.508		
	Sum	48.017	93			
Communication and collaboration	Between group	.579	3	.193	.328	.805
	Within group	52.902	90	.588		
	Sum	53.481	93			
Digital content creation	Between group	.604	3	.201	.208	.891
	Within group	87.238	90	.969		
	Sum	87.842	93			
Safety	Between group	5.818	3	1.939	2.838*	.042
	Within group	61.512	90	.683		
	Sum	67.330	93			
Problem solving	Between group	.730	3	.243	.402	.752
	Within group	54.546	90	.606		
	Sum	55.277	93			
Total	Between group	1.159	3	.386	.878	.456
	Within group	39.586	90	.440		
	Sum	40.745	93			

* $P < .05$

Reviewing the data in Table 3, it was found that accounting students' digital competences that differentiated by class level has shown significant differences at 0.5. So, they were tested paired-class level by Scheffe's method as shown in Table 4. The issues on safety are important among cyberians when they send or share information that always leaves marks. Consequently, Identity also is important. Gallego-Arrufat, Torres-Hernández, & Pessoa (2019) found that the participants did not use strong passwords, and ignored concepts such as identity, digital "footprint" and digital reputation. According to Sürmelioğlu, & Seferoğlu, (2019) found that students have a high level of digital footprint awareness, but they have a low level of digital footprint experience.

Table 4 Scheffe's mean comparison of class levels that are difference on digital competence in safety

Mean	Class level	Freshman	Sophomore	Junior	Senior
4.2807	Freshman	-			
4.0556	Sophomore	.22515	-		
4.1154	Junior	.16532	.05983	-	
3.6792	Senior	.60154*	.37639	.43622*	-

* $P < .05$

According to the data in Table 4, it is shown that senior students had significantly lower digital competence in safety than freshmen and juniors. The issues on safety are important among cyberians when they send or share information that always leaves marks. Consequently, Identity also is important. Gallego-Arrufat, Torres-Hernández, & Pessoa (2019) found that the participants did not use strong passwords, and ignored concepts such as identity, digital "footprint" and digital reputation. According to Sürmelioglu, & Seferoglu, (2019) found that students have a high level of digital footprint awareness, but they have a low level of digital footprint experience.

On the other hand, there is no significant difference between paired-class level tests. Although the accounting students have learned more digital safety, they will still need more soft skills such as teamwork, tolerance, and problem-solving (Domingos, Sarmiento, & Duarte, 2019) because the soft skills will bridge the gap between machines and people and also customers while the technical or hard skills, accounting students must know how to interact with programs, AI, robotics, and generally with the digitalization process since many tasks will become hybrid human-robot tasks (Kruskopf et al., 2019). At the same time, accounting students must learn about ethics, security and privacy, and how to validate the relevance and usefulness of data that need to be embedded in subject-knowledge courses (Nelson, Courier, & Joseph, 2019). According to the qualitative answers, one said that should publish the protection methods from fake news in the campus.

Suggestion

1. The curriculum on accountancy must be developed in the light of digital competence that is focused on safety, security, privacy and digital identity.
2. The curriculum on accountancy must be integrated between higher education institutions and corporates to boost more soft skills for accounting students.
3. The campuses should have to manage the appropriate digital learning sphere for their students such as facilities and training, etc.
4. The further research should be studied on (1) digital competence of the accounting students in other kind of higher education institution, and (2) digital safety in accounting students.

Conclusion

Accounting students' digital competence must be promoted and advanced both curriculum and institution level. Explicitly, they still have more soft skills and particularly, digital safety. The collaboration of

higher education institutions and corporates will cause students to experience real situations and also learn how to communicate and collaborate to solve their problems. It means that all digital competence areas can be only created by the collaboration. The integration of digital competence creation will make learning sustainable.

References

- Asonitou, S., & Kavoura, A. (2019, December). Accounting education, technology and entrepreneurship: Current trends and future outlook. *The Malopolska School of Economics in TarnÓw Research Papers Collection*, 44(4), 65-78.
- Berishvili, O., Strelakova, N., & Khramtsova, A. (2019). Key competences of industry professionals in the digital economy. *Advances in Intelligent Systems Research*, 167, 76-79.
- Borgonovo, A., Friedrich, B., & Wells, M. (2019). *Competency-based accounting education, training, and certification: An implementation guide*. Washington, DC: The World Bank.
- Bowles, M., Ghosh, S., & Thomas, L. (2020). Future-proofing accounting professionals: Ensuring graduate employability and future readiness. *Journal of Teaching and Learning for Graduate Employability*, 11(1), 1-21.
- Carretero, S., Vuorikari, R., & Punie, Y. (2017). *DigComp 2.1: The digital competence framework for citizens with eight proficiency levels and examples of use*. Luxembourg: Publications Office of the European Union.
- Domingos, A., Sarmento, M., & Duarte, M. (2019). A multivariate analysis of the general skills developed in accounting higher education. *International Review of Management and Business Research*, 8, 381-400.
- Ferrari, A. (2013). *DIGCOMP: A framework for developing and understanding digital competence in Europe*. Luxembourg: Publications Office of the European Union.
- Gallego-Arrufat, M.-J., Torres-Hernández, N., & Pessoa, T. (2019). *Competence of future teachers in the digital security area*. Retrieved from https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Competence+of+future+teachers+in+the+digital+security+area&btnG=
- Gekara, V., Snell, D., Molla, A., Karanasios, S., & Thomas, A. (2019). *Skilling the Australian workforce for the digital economy*. Adelaide, SA: NCVET.
- Georgieva, D. (2019). Digital competences of accountants within the context of the fourth industrial revolution. MPRA Paper No. 98289. Retrieved from https://mpra.ub.uni-muenchen.de/98289/1/MPRA_paper_98289.pdf
- Gullo, M. (2019). Bridging the gap in accounting education and application through the development and use of soft skills. Retrieved from <https://digitalcommons.brockport.edu/honors/263/>
- Imene, F., & Imhanzenobe, J. (2020). Information technology and the accountant today: What has really changed?. *Journal of Accounting and Taxation*, 12(1), 48-60.
- Klochkova, E., Serkina, Y., Prasolov, V., & Movchun, V. (2020). The Digitalisation of the economy and higher education. *Space and Culture, India*, 7(4), 70-82.

- Kokina, J., Gilleran, R., Blanchette, S., & Stoddard, D. (2019). Accountant as digital innovator: Roles and competencies in the age of automation. Retrieved from <https://ssrn.com/abstract=3449720>
- Kruskopf, S., Lobbas, C., Meinander, H., Söderling, K., Martikainen, M., & MLehner, O. (2019). Digital accounting: Opportunities, threats and the human factor. *ACRN Oxford Journal of Finance and Risk Perspectives*, Special Issue Digital Accounting, 8, 1-15.
- Law, N., Woo, D., de la Torre, J., & Wong, K. (2018). A global framework of reference on digital literacy skills for. In *Indicator*, 4, 2. Montreal, Canada: UNESCO Institute for Statistics.
- Lestari, S., & Santoso, A. (2019). The roles of digital literacy, technology literacy, and human literacy to encourage work readiness of accounting education students in the fourth industrial revolution era. *KnE Social Sciences*, 513–527-513–527.
- Lyons, A., Kass-Hanna, J., Zucchetti, A., & Cobo, C. (2019). Leaving no one behind: Measuring the multidimensionality of digital literacy in the age of AI and other transformative technologies. In *the future of work and education for the digital age*. (pp. 1-17). Tokyo: Think 20 Japan19.
- Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *The British Accounting Review*, 51(6), 100833.
- Nelson, K., Courier, M., & Joseph, G. W. (2019). An investigation of digital literacy needs of students. *Journal of Information Systems Education*, 22(2), 2.
- Oesterreich, T. D., & Teuteberg, F. (2019). The role of business analytics in the controllers and management accountants' competence profiles. *Journal of Accounting & Organizational Change*, 15(2), 330-356.
- Oggero, N., Rossi, M. C., & Ughetto, E. (2019). Entrepreneurial spirits in women and men. The role of financial literacy and digital skills. *Small Business Economics*, 1-15.
- Orosz, B., Kovács, C., KaruoviĆ, D., Molnár, G., Major, L., Vass, V., ... & Námesztovszki, Z. (2019). Digital education in digital cooperative environments. *Journal of Applied Technical and Educational Sciences*, 9(4), 55-69.
- Ramachandran, R. (2019). Big Data Analytics and the Management Accountant. *The Management Accountant Journal*, 54(5), 40-43.
- Shao, S., & Yao, B. (2019). *Analysis on the Cultivation of Modern Apprenticeship Talents in Yunnan Under the Digital Economy*. Paper presented at the 5th International Conference on Arts, Design and Contemporary Education (ICADCE 2019).
- Stancheva-Todorova, E. (2019). are accounting educators ready to embrace the challenges of industry 4.0. *Industry 4.0*, 4(6), 309-312.
- Surianti, M. (2020). Development of Accounting Curriculum Model Based on Industrial Revolution Approach. *Development*, 11(2).
- SürmelioĖlu, Y., & SeferoĖlu, S. S. (2019). An examination of digital footprint awareness and digital experiences of higher education students. *World Journal on Educational Technology: Current Issues*, 11(1), 48-64.
- Tirasiwat, A. (2018). Digital accounting teaching and learning for preparedness of students in digital economy. In *National academic conference and academic performance presentation, the 2nd (June 8, 2018) of UTCC Academic Day*. Bangkok: University of the Thai Chamber of Commerce. (Thai)

- Torres-Toukoumidis, A., & Mäeots, M. (2019). Implementation of gasification strategies for the enhancement of digital competences. In Proceedings of the 13th International Technology, Education and Development Conference (pp. 9510-9518). Retrieved from <https://telearn.archives-ouvertes.fr/hal-02392225/document>
- Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2019). The sequential and conditional nature of 21st-century digital skills. *International journal of communication*, 13, 26.
- Zhyvets, A. (2019). Evolution of professional competencies of accountants of small enterprises in the digital economy of Ukraine. *Baltic Journal of Economic Studies*, 4(5), 87-93.