Digital Competence of Higher Vocational Accounting Students in the Context of Digitalized Accounting Work: A DigComp 2.2-Based Questionnaire Study

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Abstract: Digitalized accounting work requires vocational accounting students to develop digital competence beyond basic software operation. Based on DigComp 2.2, this study investigates the self-perceived digital competence of 390 students in accounting-related higher vocational programmes in China. The questionnaire was developed from the five DigComp 2.2 areas and contextualized with reference to national teaching standards, accounting talent requirements, and digitalized accounting work scenarios. Descriptive statistics were used to examine tool exposure, competence levels, and curriculum needs. The results show a generally positive level of digital competence, with an overall mean of 5.64 on a seven-point scale. Safety was the strongest area, while information and data literacy was relatively weaker. Students reported high exposure to Excel/WPS, Python, ERP systems, and generative AI, but lower recognized exposure to BI and RPA tools. The study suggests embedding digital competence into professional tasks and strengthening practice-based learning.
***Keywords*:** digital competence; vocational accounting education; DigComp 2.2; accounting students; digitalized accounting work

1. Introduction and Framework

Digital transformation has reshaped accounting work. ERP systems, electronic tax platforms, financial shared service platforms, BI tools, RPA, Python-based data processing, and generative AI are increasingly used in accounting tasks. Accounting graduates therefore need to collect, process, analyse, protect, and communicate financial data in digital environments.

This issue is relevant to technical and vocational education and training (TVET), where curriculum design is connected with occupational tasks. TVET is expected to respond to digital transformation and prepare learners for changing work (UNESCO, 2023). In China, the national teaching standard for Big Data and Accounting emphasizes the digital, networked, and intelligent transformation of accounting, auditing, and taxation services, and includes requirements related to cloud accounting platforms, ERP systems, financial robots, and financial data processing (Ministry of Education of the People's Republic of China, 2025). National accounting talent documents also regard digital technology as part of accounting professional competence (Chinese Institute of Certified Public Accountants, 2022; Ministry of Finance of the People's Republic of China, 2021).

Digital competence should not be reduced to software operation. Vocational accounting students need to judge data quality, collaborate online, create digital reports, protect sensitive information, and select tools for professional tasks. DigComp 2.2 provides a useful framework through five areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. Its updated examples include artificial intelligence, data privacy, and emerging digital practices (Vuorikari et al., 2022). This study applies and contextualizes DigComp 2.2 to vocational accounting education.

Zhao et al. (2021) found that digital competence in higher education is often assessed through policy-based frameworks and empirical surveys. Januszewski et al. (2024) found that programming, database handling, data analysis, and report setting remained weak areas among finance and accounting students.

This study addresses three questions:

(1) What is the overall level of students' self-perceived digital competence?

(2) What are their strengths and weaknesses across the five DigComp 2.2 areas?

(3) What do their tool exposure and curriculum feedback suggest for vocational accounting education?

2. Methodology

The questionnaire was administered through Wenjuanxing, an online questionnaire platform, and distributed to classes

over ten days. A total of 390 valid responses were collected from students in three accounting-related higher vocational programmes: Big Data and Accounting, Big Data and Auditing, and Statistics and Accounting.

The questionnaire included background information, a 25-item self-assessment scale, and curriculum feedback. The scale was based on DigComp 2.2, with five items in each competence area. The items were contextualized with reference to national teaching standards and covered ERP systems, financial software, electronic tax platforms, BI tools, Python, financial shared service platforms, data security, RPA, and generative AI-assisted learning. Students responded on a seven-point Likert scale. Descriptive statistics were used to describe digital competence, tool exposure, and curriculum needs.

3. Results

Students reported high exposure to common digital tools. Among the 390 respondents, 348 had used Excel/WPS (89.23%), 339 had learned or used Python (86.92%), and 281 had used ERP systems (72.05%). Spreadsheet software remained the most widely used tool, while Python and ERP systems also showed high exposure.

Reported exposure to visualization and automation tools was much lower. Only 166 students reported using BI tools (42.56%), and only 32 reported using RPA tools (8.21%). These figures should be interpreted as reported or recognized exposure rather than evidence that related courses were absent. Some tools are arranged at specific curriculum stages. BI-related learning is usually offered after basic data processing courses. Some students may also have completed RPA-related learning under terms such as financial robots, intelligent finance, or automation tasks, but may not identify these experiences as "RPA". Therefore, low reported exposure may reflect curriculum sequence, course naming, and students' conceptual recognition.

Generative AI had entered students' learning practices. A total of 205 students often used generative AI tools (52.56%), while 176 used them occasionally (45.13%). However, frequent use does not necessarily mean responsible or professional use. The key issue is whether students can evaluate AI-generated content, protect sensitive financial data, and combine AI outputs with accounting judgment.

Overall, students reported a relatively positive level of digital competence. The mean score of the 25-item scale was 5.64 on a seven-point scale.

Table 1. Descriptive Results of the Five DigComp 2.2 Competence Areas

Competence area	Item codes	Mean
Information and data literacy	IDL1–IDL5	5.51
Communication and collaboration	CC1–CC5	5.66
Digital content creation	DCC1–DCC5	5.57
Safety	S1–S5	5.80
Problem solving	PS1–PS5	5.64
Overall digital competence	25 items	5.64

Safety received the highest mean score of 5.80, indicating students' confidence in accounting ethics, data security, risk identification, sensitive data protection in AI use, and account management. Communication and collaboration ranked second, with a mean of 5.66, showing students' ability to use online collaboration tools and seek help through digital channels.

Problem solving had a mean of 5.64. Students showed confidence in seeking solutions, learning new tools, and selecting tools for accounting tasks. Digital content creation scored 5.57, indicating that students could create reports, tables, charts, and learning outputs. However, accounting-related digital content creation should further include dashboards, visual reports, and decision-support materials.

Information and data literacy had the lowest mean score of 5.51. Although still above the midpoint, this result is important because data literacy is central to digitalized accounting work. Students were relatively confident in acquiring and organizing financial data, but weaker in identifying inconsistent, missing, or abnormal data from different systems.

Curriculum feedback confirmed the central role of professional courses. A total of 351 students (90.00%) selected professional courses as one of the most helpful ways to improve digital competence. The most frequently selected contents needing strengthening were Excel data processing and Python data analysis.

4. Discussion and Implications

The findings show that students have a generally positive perception of their digital competence, but their competence

structure is uneven. Students are familiar with common tools and show strong safety awareness, while data quality judgment, BI application, RPA recognition, Python-based processing, and integrated tool use still need improvement.

The high score in safety is understandable in accounting education, which emphasizes ethics, confidentiality, risk awareness, and standardized operation. In digitalized accounting work, students may handle financial statements, tax data, payroll information, invoices, vouchers, customer information, and enterprise operation data. Safety competence is therefore closely connected with accounting professional requirements.

The lower score in information and data literacy deserves more attention. Digitalized accounting work depends on data collection, cleaning, verification, and interpretation. If students cannot judge data quality, source, consistency, and reliability, they may not produce reliable analysis even if they can operate software. For accounting students, data literacy should become a core part of professional competence.

The tool exposure results suggest that curriculum design should make tool concepts and workplace applications clearer. Lower reported exposure to BI and RPA does not simply mean that such courses were absent. It may reflect course sequence, terminology, and students' ability to recognize workplace tools. If students complete automation tasks but do not connect them with RPA, teaching should make the relationship between course activities, tool concepts, and workplace processes more explicit.

Python and generative AI also require careful interpretation. Many students had learned or used Python, but curriculum feedback still showed strong demand for Python data analysis. This means that exposure does not equal competence. Students may know basic syntax but lack confidence in using Python to clean accounting data, calculate indicators, or generate reports. Likewise, most students had used generative AI, but responsible use requires fact-checking, privacy protection, prompt design, and professional judgment.

Vocational accounting programmes should therefore avoid treating digital competence as scattered software training. Digital competence should be embedded into complete accounting workflows. For example, a financial statement analysis task can require students to collect data, clean and verify the dataset, calculate indicators in Excel or Python, visualize results through BI tools, generate a written report, and reflect on data security and AI-assisted writing. Such task-based learning can connect the five DigComp 2.2 areas with professional accounting practice.

Three implications can be drawn. First, programmes should build a progressive curriculum covering data security, spreadsheet foundations, responsible AI use, ERP, Python, BI visualization, financial shared service platforms, and integrated data analysis. Second, digital competence should be embedded into accounting tasks such as financial statement analysis, auditing, taxation, and management accounting. Third, practice-based learning should be strengthened through workplace-oriented cases, virtual simulation training, enterprise projects, and school-enterprise cooperation.

5. Conclusion

This study investigated the digital competence of vocational accounting students based on DigComp 2.2. Students reported a generally positive level of digital competence, with an overall mean of 5.64. Safety was the strongest area, while information and data literacy was relatively weaker. Students reported high exposure to Excel/WPS, Python, ERP systems, and generative AI, but lower recognized exposure to BI and RPA tools. They also needed further support in data quality judgment, Python-based processing, integrated tool use, and responsible AI application.

The study shows that the framework can be used not only as a general digital competence model, but also as a basis for analysing occupationally oriented digital competence in accounting education. The findings suggest that vocational accounting programmes should shift from isolated software training to task-based competence development.

This study focuses on aggregate descriptive diagnosis rather than inferential subgroup comparison. Therefore, it does not claim differences by grade, programme, or course-taking experience. Future research may include performance-based assessment, interviews, larger samples, inter-institutional comparisons, and more detailed analysis of how grade level and curriculum experience affect students' digital competence.

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