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Vocational Higher Accounting Education in the Digital Era: Critical Review Opportunities and Challenges

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Abstract. The digital era has changed the world. Some professions will be wiped out or will grow with technology, and the accounting profession is predicted to be one of the professions that will be significantly impacted. Some accounting tasks will be lost. Accounting vocational education should consider the competencies required in the digital era that must be included in the curriculum. Significant opportunities and challenges emerge from digital disruption and rapid technological development. This research methodology uses the literature review to evaluate the research on the competencies required in the digital era. This study also used primary source data through in-depth interviews and questionnaires given to users to find out the users' point of view on competencies required to face the digital era. This research is expected to provide input into the development of accounting vocational education curriculum in producing graduates who are ready to face the digital era in the industrial world.

Keywords: *accounting education, digital era, curriculum*

1 Introduction

The growth of globalization and technological developments leads to changes in society and industry. Accounting professions are predicted to be significantly affected by technological changes in the era of digitalization (Al-Htaybat et al., 2017). Globalization requires accountants to achieve the minimum standards of competency required by the International Accounting Education Standards Board of the International Federation of Accountants (IFAC) through International Education Standards for accounting (Helliar, 2013), and the development of technology in the digital era impacts carrying out the role of accounting. Sledgianowski et al. (2018) defines big data as a technology and information system that enables data analysis and reporting in businesses using different analytical techniques. Accounting firms and professionals recommend big data, and technology and information systems integrated in the accounting curriculum prepare accounting graduates to adapt to the data environment. However, Strong and Portz (2015) tested 36 specific competencies of information technology knowledge and found that accounting students have low levels of information technology (IT) knowledge despite completing accounting education.

Big data has four characteristics: volume, veracity, velocity, and variety (Zhang, Yang, & Appelbaum, 2015). High volume, high velocity, and high variety information assets show cost effective, innovative forms of information processes useful for decision making and automation processes. High volume, high velocity, and high variety implies the number of transactions or data from different sources is processed faster, while high veracity shows data accuracy and data reliability by considering the cost and benefits of data processing (Zang, Yang & Appelbaum, 2015; in Janvin, 2017). The accountant focuses more on veracity by considering the cost and benefit of data collection. Volume and velocity has always been considered by accountants with the use of enterprise systems to handle large transaction volumes and inter- and intra- company information flows. Big data view bigger variety data including data generated externally from various sources including websites, texts, internet, and other sources. Therefore, it is important for the current and future generations to be equipped with IT.

Janvin and Watson (2016) stated that, although the current data becomes larger and data analysis can be done with software, the main purpose of accounting is still to provide information for internal and external decision making. Watty et al. (2016) Accountants try to make sense of large volumes of business data, whether obtained through manual (paper-based system), computer, or enterprise systems. However, the effect of such technology changes must be anticipated by the accounting educator by understanding big data and business analysis. This provides an opportunity for educators to integrate big data issues in the curriculum.

Curriculum integration with emerging technologies is needed to face the industrial world in the digital era and can also meet AACSB accreditation standards. The AACSB A7 Standard has been revised to include the integration component of learning objectives to enhance skills and knowledge with IT in accounting and business including creation, sharing and reporting data and analysis (AACSB, 2016). Watty et al. (2016) show some faculty are resistant to adopting new technologies in the curriculum.

Technological changes require the university to change the curriculum, learning processes, and methods to generate the knowledge and skills required in carrying out future professional activities so that curriculum and teaching methods can be tailored to new situations (Stanciu, 2015). According to Al-Htaybat et al. (2018), the curriculum should be evaluated so that graduates are ready to face the world of work that requires classic/stable and comptemporary/innovative skills. Participants in the study stated that the technology included in the curriculum is integrated in all subjects and not only in a single course.

Lawson et al. (2014) creates an integrated competency framework based on the achievements of accounting learning in two categories. One category is accounting competencies that enable accountants to integrate management and analytical methods supported by technology to formulate or execute successful strategies. This competence is obtained through the principles of accounting, intermediate accounting and advance financial accounting, accounting management, cost accounting, auditing, taxation, and accounting information systems such as enterprise resource planning, extensible business reporting language, and other ASI courses integrated into curriculum. The second category is foundational in technological competency or broad management such as knowledge of spreadsheet modeling, using technology to access big data for financial statement analysis, using IT, knowledge of the purpose of information systems and big data such as hardware and software, and other issues such as computer security and business continuity. The Sledgianowski study (2017) provides an example of an integrated information system and technological competence that can be used by educators to help their students achieve these competencies.

Hassall et al. (2003) studied the vocational skill gap for management accountants from the perspective of stakeholders' perspectives and discovered that communication skills, group working, IT, and problem solving skills are important. Sledgianowski (2017) declared that educators should facilitate integrated information systems and technological competencies relevant to big data and business analysis into the accounting curriculum. Instructional resources are very limited in advance financial accounting and taxation.

The digital era requires educators to incorporate new accounting tasks and positions within the company because tasks and positions are lost with the era of globalization. Al-Htaybat et al. (2018) states the need for an adjustment of the accounting curriculum and changes in emphasis from classic skills such as problem solving to contemporary skills such as new technologies to develop practical skills.

This research provided input into the preparation of accounting curriculum for vocational education by incorporating classical and contemporary elements related to technological developments aimed at improving the hard and soft skills required of accounting vocational graduates that are in accordance with industry needs and relevant to technological developments and the revolution in the era digital.

2. Literature Review

2.1 Digital Revolution

Digital revolution as described in Claro et al. (2018) began in the 1980s relating to computer literacy and an emphasis on new technologies and programs. Additional ability and competencies technology is needed to meet the competency in the 21st century. It is stated that not only technical capability is required but also required ICT capability. In the world of education, the need for ICT continues to grow, not only in terms of literacy skills such as reading, writing and mathematics but also the ability to solve non-routine problems and be able to handle the complaints information in digital concepts (Levy & Murnane, 2007).

According to Claro, et al.. (2018) there are three common forms of digital literacy: 1) the ability to use, operate, and solve technological problems such as spreadsheets; 2) working with information such as searching, accessing, evaluating, and organizing information including producing and communicating information; and (3) understanding digital technologies in the form of critical thinking, opportunities and challenges of technology, and digital media in real-world problems. So the concept of digital literacy is changing from technical capabilities and applications to a wider perspective, including critical thinking skills to solve problems.

The uses of data analytics are currently growing rapidly and start taking over the basic work done by accountants (recording transactions, processing transactions, sorting transactions), as has been done by graduates of accounting vocations. Big data usage can improve cost efficiency and work effectiveness from the

industry side (Al-Htaybat & von Alberti-Alhtaybat, 2017; Warren et al., 2015). Accounting practices will benefit greatly from incorporating technological developments more coherently and comprehensively, so that every element of accounting will be improved.

2.2 Stakeholders in Accounting Education

Helliar (2013) declared that accounting stakeholders consist of several parties. The first is the IFAC and the International Accounting Education Standards Board, who establish the competences needed in the field of accounting. IFAC is an international organization that protects the public interest and prepares the International Standards on auditing, ethical standards and education standards. Another professional body is ACCA, which is large and powerful. The second is professionals such as public accountants. Third, accountants are individual accountants and practitioners, or organizational actors, who work in businesses and hiring accountants as preparers of financial information or financial information, which have different interests. Fourth is education groups that organize education and produce graduates, and fifths is the general public.

2.3 Accounting Education in the Digital Era

Education is about acquiring a body of knowledge and the theory and practice of teaching, but an education should also be an enlightening experience (Oxford English Dictionary). Learning is about generating ideas, reflecting on experiences, applying knowledge, solving problems, or theorizing (Culpin & Scott, 2011).

It is not just about teaching technical knowledge such as double-entry bookkeeping or variance analysis or calculating net present values. A teacher can transfer information or a teacher can develop a person and his or her conceptions of the world. Students may start out as passive learners of the curriculum, but to develop a real mastery of accounting, the students need to be able to apply the concepts to solve real-life problems in varying contexts.

In the world of education, there are still many who consider the application of IT in the curriculum as insufficient (Watty et al. 2016) and believe that accountants underestimate the technological competence required in the face of the digital era.

Accounting vocational education faces significant opportunities and challenges from digital disruption and rapidly evolving technology. According to Al-Htaybat et al. (2018) skills such as problem solving, critical thinking, analytical abilities, decision making, and evaluation as well as accounting principles such as double-entry bookkeeping and skills relevant to accounting standards are indispensable. In addition, the ability of data analysis and statistical knowledge is also needed to face the digital era.

The results of Hassal et al. (2003)'s research show the need for employers to develop vocational skills. Employers and students suggested that the development of vocational skills should be integrated into the accounting curriculum. A vocational skill base is required by chartered accountants for vocational skills by testing students and employers through surveys. Management accounting not only requires technical knowledge to do the job but requires other knowledge. According to CIMA employers, communication is most needed, whereas according to CIMA students, time management is the most needed. Another group of respondents stated that the most important skills are teamwork, IT, and problem solving skills, yang terpenting adalah teamwork, IT, and problem solving skills.

Research by Sledgianowski et al. (2017) found very limited instructional resources for advance financial accounting and taxation. Educators should facilitate integrated information systems and technological competencies relevant to big data and business analytics in the accounting curriculum. To support Lawson et al.'s (2014) research, this study recommends a number of ways for educators to jointly examine the integration of competencies and adjust to the competencies that accommodate the priorities of associations and accounting firms that emphasize the big data. The curriculum has been compiled with big data elements and business analysis. Educators can arrange a roadmap to bridge analysis gaps and integrate the competency. The focus on curriculum prepares students for long-term career demand.

3. Methods

The research methodology uses literature review and primary data through a questionnaire and deep interview approach as used in Watty et al. (2016) viewed from the user perspective. The questionnaire contains some of the things studied in the user's perceptions regarding accounting-specific expertise and other support skills in dealing with the digital era. The results are then ranked from the most needed sequence from the user's point of view. Data is sent to 21 users of accounting vocational graduates from 2016-2017. The question is intended to see the user's view of the adaptation of the curriculum needed to face the digital era. Data is

processed using descriptive statistics from the results of the questionnaire, while the in-depth interviews was conducted with descriptive analysis.

4. Results

The required competencies of accounting vocational education in dealing with the industrial world in the digital era in this study are seen from the results of tracing from previous research and from user input of graduate accounting vocations.

The review literature is used to look at the results of previous research by some researchers on the competencies required in dealing with the digital era, including, according to Sledgianowski et al. (2017), competencies like business analytics, integrated information systems, and technological competencies relevant to big data in financial accounting, managerial accounting, cost accounting, intermediate financial accounting, auditing, accounting information system, and others. Al-Htaybat et al. (2018) found that the competencies required were problem solving, contemporary skills such as technologies and illustrated developments practically. Lawson et al. (2014) analyzed various competencies:

Accounting Competencies
External reporting & analysis
Planning, analysis & control
Taxation, compliance, and planning
Information Systems Assurance & Internal Control
Professional value ethics and attitudes

Broad management competencies
Leadership
Ethics
Process management & improvement
Governance, risk & compliance
Additional core business competencies

Foundational competencies
Communication
Qualitative
Analytical thinking & Problem solving
Interpersonal
Technological

Hassal et al. (2003) analyzed questionnaires distributed to CIMA employers and students whose results gave statements on vocational skills development related to key required competencies of the highest and lowest order:

Communication Skills

1. Present and defend points of view and outcomes of their own work, verbally, to colleagues, clients and superiors
2. Present and defend points of view and outcomes of their own work, in writing, to colleagues, clients and superiors
3. Listen effectively to gain information and to understand opposing points of view

Other Skills, Value, and Knowledge

4. Have a comprehensive and global vision of the organization

Time Management

5. Organize the workloads to meet conflicting demands and unexpected requirements
6. Select and assign priorities within coincident workloads
7. Organize the workloads to recognize and meet tight, strict, and coinciding deadlines

Problem Solving Skill

8. Integrate multidisciplinary knowledge to solve problems

Group Working Skill

9. Organize and delegate tasks
10. Assume leadership positions when necessary

IT is number 20-22. Use the relevant software and knowledge of information sources. While CIMA sequence the competence for vocational skill development are as follows:

1. Use relevant software

2. Knowledge of information sources
3. Have knowledge of the accounting profession
4. Work with others in teams
5. Have a commitment to lifelong learning
6. Awareness of social and ethical responsibilities
7. Organize the workloads to recognize and meet tight, strict and coinciding deadlines
8. Ability to develop methods of effective learning
9. Select and assign priorities within coincident workloads
10. Listen effectively to gain information and to understand opposing points of view

Stanciau and Bran (2015) stated that the corporate IT environment is increasingly complex and dynamic so that professionals in accounting and finance must improve their IT expertise to align with the dynamic of IT in companies, and the university must adapt its curriculum with basic knowledge and technical skills to meet the needs of the industrial world and work with national and international associations and adapting in teaching methods.

Based on the literature review, we concluded the competencies needed to face the digital age are (1) technological competencies or information systems, (2) problem solving, (3) data analysis (including statistical knowledge), (4) critical thinking, (5) communication, (6) management competencies (leadership, teamwork, etc), and (7) professional value ethics and attitudes. Claro et al. (2018) found that ability and competence specific to technology (technical and ICT) are needed to meet the competency in the 21st century, including three common forms of digital competency: 1) ICT operating (ability to use, operate, and solve technological problems such as spreadsheets); 2) working with information such as searching, accessing, evaluating, and organizing information including producing and communicating information; and 3) understanding digital technologies in the form of critical thinking, opportunities, and challenges of technology and digital media in real-world problems.

The concept of digital knowledge is changing from technical capabilities and applications to a wider perspective, including critical skills to solve problems. The uses of data analytics is currently growing rapidly and start taking over the basic work done by accountants (recording transactions, processing transactions, sorting transactions), as has been done by graduates of accounting vocations. Big data usage can improve cost efficiency and work effectiveness from the industry side.

4.1 Perceptions of Graduate Users

The study of accounting vocational education in the digital era is seen from graduate students' perspectives on the essential competencies of the field. The results were obtained through questionnaires and in-depth interviews of 21 graduate users conducted from 2016 through 2017. The user questionnaire consisted of five users from the manufacturing industry, four from the government, three from the banking industry, two from the consulting industry , and seven from a public accounting firm.

The average respondent stated that the curriculum, subject, and material must be dynamically adjusted to the changes, especially changes in the era of digitalization, and technical skills must be balanced with soft skills so that the technical expertise is more complete and industry ready. Students need strong IT skills, and the average graduate user respondents stated that the students should be equipped with considerable software knowledge to adapt to different technology devices between companies.

The main competencies needed in the curriculum of the Vocational Education Accounting University of Indonesia according to the respondents of the graduate users are technical skills (core-accounting competencies) and soft skills. The technical skills are financial accounting standards, financial statement analysis, IT, financial management, financial reporting, and taxation and auditing. Soft skills involve the personality and interpersonal abilities. Soft skills, sorted from highest to lowest according to the respondent's answers, are high motivation, easy adaptability and cooperation, discipline, ability to work under pressure, honesty, communication in Bahasa Indonesian and English, confidence, leadership, and ethics.

Based on in-depth interviews, technical competence in the field of accounting is still needed, especially for knowledge of accounting standards, analysis, and IT. Students should learn more than one accounting software to be able to adapt to a variety of software. Technical skills must be balanced with soft skill so that student competence better fits the industry.

5. Conclusion

Technological changes are having an increasingly a large impact on industry development in the digital era. Universities must constantly adapt curriculum and lecture materials dynamically to follow the changes that occur in the digital era. Technical competence in the field of accounting is still needed, especially for knowledge of accounting standards, analysis and IT skills in the curriculum. Previous research and input from users of vocational accounting suggest the student should learn more than one accounting software to better adapt to changing software. Technical skills must be balanced with soft skills so that student competence better fits the industry. This study has limitations in the number of user respondents. Future research can increase the number of respondents, expand the scope to other stakeholders' point of view, and conduct an in-depth analysis of the development of each field of science in accounting in the face of industry 4.0.

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