The Relationship between Accounting Student Profiles and Knowledge and Skills in AI at Thai Private Universities

ความสัมพันธ์ระหว่างคุณสมบัติของนักศึกษาบัญชีกับความรู้และทักษะในด้านปัญญาประดิษฐ์ในมหาวิทยาลัยเอกชนไทย

Shanu Chinnamma Ajoy

Full time Lecturer, Accounting Department

Martin de Tours School of Management

and Economics, Assumption University

ชานู ชินนามมา อะจอย

อาจารย์ประจำ สาขาวิชาการบัญชี

คณะบริหารธุรกิจและเศรษฐศาสตร์ มหาวิทยาลัยอัสสัมชัญ

E-mail: shanu_c_p@yahoo.com ; Ph: +089-521-5516

Sornzawand Pachraponkamond

Full time Lecturer, Accounting Department

Martin de Tours School of Management and Economics, Assumption University

ศรสวรรค์ พัชราพรกระมล

อาจารย์ประจำ สาขาวิชาการบัญชี

คณะบริหารธุรกิจและเศรษฐศาสตร์ มหาวิทยาลัยอัสสัมชัญ

E-Mail: pabhassornsnc@au.edu ; Ph:+090-962-9072

Naruemol Tridechapol

Full time Lecturer, Accounting Department

Martin de Tours School of Management and Economics, Assumption University

นฤมล ไตรเดชาพล

อาจารย์ประจำ สาขาวิชาการบัญชี

คณะบริหารธุรกิจและเศรษฐศาสตร์ มหาวิทยาลัยอัสสัมชัญ

E-mail: naruemoltrd@au.edu ; Ph: +081-936-8766

Punnut Lee

Full time Lecturer, Accounting Department

Martin de Tours School of Management and Economics, Assumption University

ปัณฑ์ณัฐ แซ่ลี้

อาจารย์ประจำ สาขาวิชาการบัญชี

คณะบริหารธุรกิจและเศรษฐศาสตร์ มหาวิทยาลัยอัสสัมชัญ

E-mail: supapornlee@au.edu ; Ph: +081-487-1107

Abstract

Due to the rapid digital disruptions change in the digital age through all professions. The accounting professions can be used as an example for those rapid digital disruptions change towards accounting education. The objective of this study was to study the relationship between accounting student profiles and their knowledge and skills in Artificial Intelligence (AI) by using the questionnaire as an instrument to collect the data from 249 undergraduate accounting students from 15 private universities in Thailand. The data analysis was mean, standard deviation, factor analysis, one-way ANOVA, and simple regression analysis. The results found that the year of study was related to student knowledge in AI, however; it was not found related to student skills in AI. The Grade Point Average (GPA) was related to student skills in AI, however; it was not found related to their knowledge in AI. However, the expected salary was related to both knowledge and skills in AI. This study was also confirmed a statistical significance relationship between accounting student knowledge in AI and their skills in AI.

This study could be the guidelines for private universities, where offer the accounting degree, develop, train, and transform students to sustain in the rapid digital disruptions change in the digital age. Moreover, the private universities should concentrate on the technological change in order to face with digital disruptions change in the future.

Keywords: Accounting Students, Artificial Intelligence (AI), Knowledge in AI, Skills in AI

บทนำ

เนื่องจากการเปลี่ยนแปลงทางเทคโนโลยีอย่างรวดเร็วในยุคดิจิทัลการเข้ามาแทรกแซงของดิจิทัลมีต่อทุกสาขาอาชีพ รวมถึง วิชาชีพบัญชีที่ได้รับผลกระทบจากการเปลี่ยนแปลงดังกล่าวซึ่งส่งผลต่อการศึกษาในสาขาการบัญชี การวิจัยนี้ มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างคุณสมบัติของนักศึกษาบัญชีกับความรู้และทักษะของนักศึกษาทางด้าน ปัญญาประดิษฐ์ (AI) โดยใช้แบบสอบถามเป็นเครื่องมือในการเก็บรวบรวมข้อมูลจากนักศึกษาบัญชีในระดับปริญญาตรี จำนวน 249 คนจากมหาวิทยาลัยเอกชนในประเทศไทย 15 แห่ง ข้อมูลที่ได้ถูกนำมาวิเคราะห์ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน การวิเคราะห์องค์ประกอบ การวิเคราะห์ความแปรปรวนแบบทางเดียว และการวิเคราะห์การถดถอยอย่างง่าย ผลการศึกษา พบว่า ชั้นปีของนักศึกษาบัญชีมีความสัมพันธ์กับความรู้ทาง AI แต่ไม่มีความสัมพันธ์กับทักษะด้าน AI ระดับคะแนนเฉลี่ยสะสม มีความสัมพันธ์กับทักษะด้าน AI แต่ไม่มีความสัมพันธ์กับความรู้ด้าน AI ทั้งนี้ความคาดหวังของเงินเดือนที่จะได้รับจากการทำงาน มีความสัมพันธ์กับความรู้และทักษะด้าน AI รวมถึงการศึกษา พบว่าความรู้ทางด้าน AI และทักษะทางด้าน AI ของนักศึกษา มีความสัมพันธ์กันอย่างมีนัยสำคัญทางสถิติ

การศึกษานี้สามารถเป็นแนวทางสำหรับมหาวิทยาลัยเอกชนที่เปิดสอนหลักสูตรบัญชี ได้พัฒนาฝึกอบรม และเปลี่ยนแปลงนักศึกษาให้สามารถอยู่รอดได้ ต่อการเปลี่ยนแปลงทางเทคโนโลยีอย่างรวดเร็วในยุคดิจิทัล รวมถึงมหาวิทยาลัยเอกชน ควรให้ความตระหนักในการเปลี่ยนเปลี่ยนด้านเทคโนโลยี เพื่อที่จะเผชิญกับการเปลี่ยนแปลงในยุคดิจิทัลในอนาคตได้

ศัพท์สำคัญ: นักศึกษาบัญชี ปัญญาประดิษฐ์ (AI) ความรู้เกี่ยวกับปัญญาประดิษฐ์ ทักษะเกี่ยวกับปัญญาประดิษฐ์

Introduction

The goal of the higher education institutions in accounting education is to produce quality graduates. The educational inputs and the initiatives implemented by the institution contributes a very significant role in the provision of quality graduates. Input quality is the ability of people whose accomplishments are related to curriculum offered by the institution. The means, mode and educational approach will mold the graduates to meet the high standard of organizations. There are various factors and persons who involves in the development of quality learning. These consists of students, instructors, teaching modes, study resources, assessment of learning and instructional communication (Chrismastuti & Purnamasari, 2015).

In recent years, Artificial intelligence (AI) has made enormous development. Artificial intelligence's presence in the accounting business will undoubtedly alter and undermine existing development modes while also bringing innovation to the industry. Traditional accounting labor has the characteristics of repetition and cumbersomeness when it comes to the transformation and upgrading of the accounting sector. Artificial intelligence can alleviate the inefficiencies and low added value in the accounting profession, allowing accountants to focus on more creative work and adding more value to the firm. The application of artificial intelligence to the accounting sector will stimulate the industry's development and innovation, as well as increase firm competitiveness, which is extremely important (Luo, Meng & Cai, 2018) The influence of AI is very crucial and educational institutions must make sure that students are equipped with current skills (Anyoho, 2017).

The skills and professional knowledge required in accounting and developments about the information in the business world can be obtained from college education. According to Kavanagh and Drennan (2008), students should be aware that employers expect accounting graduates to have abilities in communication, analysis, professionalism, and teamwork. A good understanding of basic accounting skills and strong analytical skills is required along with business awareness and knowledge in the real world of work (Aryanti & Adhariani, 2020). Skills in AI represent an essential component of the employability capabilities portfolio, which are progressively expected by employers and highlighted within the overall agenda of higher education (Association of Chartered Certified Accountants , 2016). These skills are included namely word, excel, and statistics for data analysis, email for communication, WWW for information search, and many more (International Federation of Accountants, 2003). Technically knowledge in AI means the intelligence exhibited by machines, which differ from natural intelligence (Knowledge in artificial intelligence, 2020). Technical expertise in machine learning is the way to acquire the right skills needed by every organization. But these technological skills need to be complemented, as with data analytics, by having a thorough insight of the market context surrounding the data and the insight needed. In response to the new abilities in data analytics, the roles of accounting are changing. With strong awareness in business and high levels of numeracy, accountants are in a good position to work effectively with data analytics (Savery & Duffy, 1995). AI will speed up these trends. In business, there is high demand of college graduates who have a high technological skill level. Educational institutions are combining IT into accounting curriculum to meet the increasing demand.

This study applied social cognitive theory (SCT) and connectivism theory to develop the conceptual framework. For social cognitive theory, it describes how the people's learning can be developed based on three factors: environmental factors, personal factors, and behaviors (Bandura, 2002). Personal factors are any cognitive, motivational, emotional, personality, or demographic aspects characterizing an individual. SCT emphasizes the importance of two closely interrelated cognitive factors: self-efficacy and outcome expectations. Bandura (1986) defined self-efficacy" as "people's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses. (p. 391)." Outcome expectations refer to the amount to which an individual will engage in a particular conduct solely if he or she believes it will result in some desired outcomes (Compeau, Higgins & Huff, 1999). The interrelation between perceptions of efficacy and outcome expectations stated in SCT highlights the fact that people may be strongly persuaded and drawn to certain outcomes in relation to a particular action, but they are unlikely to engage in that behavior if they lack confidence in their own skills to execute at the appropriate level (Wise, 2002).

The term "personal data" refers to the individual information about people that has been recorded (McGuire, 2020). In the university population, the information about personal data usually includes gender, student status, GPA, or other information relevant to a specific purpose. One of the benefits of studying personal factors is that it helps develop a university's improvement and strategic plans. Personal information is considered as a measurement of how well the university meet the students' needs (McGuire, 2020). Thus, the personal factors could be considered as the important and interesting variable to be studied.

Connectivism theory, according to Siemens (2005), is a learning theory for the digital age that defines how learners create knowledge as they strive to understand their experiences. The starting point of connectivism is the individual. Personal knowledge is made up of a network that feeds into organizations and institutions, which then feed back into the network, allowing individuals to continue to learn (Siemens, 2005). Connectivism sheds light on the abilities and tasks that learners will need to succeed in the digital age. According to connectivism, the actions people engage in when conducting practices to learn are more akin to growing or developing themselves and their society in specific (connected) ways (Siemen, 2008). Connectivism, according to Cabrero and Román (2018), describes how people adapt to changing environments by forming new connections and recognizing patterns. Connectivism has also been associated with an increased ability to learn on the part of students. This is due in part to their increased ability to self-manage and in part to the more reliable worldview provided by connectivism. With respect to self-management, students in higher education learning environments prepare for the future when they become self-directed learners and more motivated by learning than performance (Sarnok & Wannapiroon, 2018; Jirasatjanukul & Jeerungsuwan, 2018). The challenge for learners to improve knowledge and skills would be the focus of connectivism (Kultawanich, Koraneekij & Na-Songkhl ,2015)

Student profiles can consist of age, gender, year-of-study, GPA, and expected salary. In this research, gender and age are not considered because many researchers have already studied gender in this area, and the age of the students is within a narrow range, which may not be able to classify the students into different groups clearly. Year-of-study is chosen because based on the results the curriculum of study for each year can be decided and modified. GPA is used as it reflects the knowledge that students gain during their studies. The knowledge and skills that students accumulate will be rewarded later when they enter labor market. University graduates expect to receive a fair salary that would be adequate to the skills and knowledge gained (Kurek & Gorowski, 2019).

There are several previous studies on the relationship between year of study and other dependent variables such as academic knowledge (Doran, Bouillon & Smith, 1991; Bardell, Hunter, Kent & Jain, 2003), academic performance (Papageorgiou, 2017), communication skills (Arquero, Hassall, Joyce & Donoso, 2007), attitude (Khan, Khawaja, Waheed, Rauf & Fatmi, 2006), internet and computer usage (Dorup, 2004), IT application skills (Stoner, 2009). No previous studies have been done on the relationship between year of study and skills and knowledge in AI under accounting discipline.

There are several previous studies on the relationship between GPA and other dependent variables such as the score of accounting subjects (Ayob & Selamat, 2011), accounting student performance (Waples & Darayseh, 2005), study skills (Pepe, 2012), student knowledge (Young & Fry, 2008), knowledge retention (Valdez, Namdar & Valuck, 2013). No previous studies have been done on the relationship between GPA and skills and knowledge in AI under accounting discipline.

There are also several previous studies on the relationship between expected salary and other dependent variables such as year of study (McMahon & Wagner, 1981), marketing knowledge utilizing technology or quantitative analysis (Schlee & Karns, 2017), unemployed graduates (Nabi, 2003), database skills and data analytics (Schlee & Karns, 2017). No previous studies have been done on the relationship between expected salary and skills and knowledge in AI under accounting discipline. Moreover, not much research has been done on the relationship between students' profiles on students' knowledge and skills in AI especially for accounting students studying in Thai private universities.

In response to the growing demand and importance of AI in accounting it is very important to develop a holistic accounting curriculum. Therefore, this study aims to find out "how is accounting students profile related to students' knowledge and their skills in AI. This study is expected to benefit accounting students, accounting teachers, and department of accounting.

Research Objectives

Research objectives are firstly to evaluate the relationship between student year-of-study and student knowledge and skills in AI, secondly to examine the relationship between student GPA and student knowledge and skills in AI, and finally to investigate the relationship between students expected salary and student knowledge and skills in AI.

Literature Review

Dependent Variable

Student Knowledge in AI

The capability of computers to do tasks that are usually thought to depend upon human intelligence is Artificial intelligence (AI) (Huang & Rust, 2018). Technically knowledge in artificial intelligence means the intelligence exhibited by machines, which differ from natural intelligence (Knowledge in artificial intelligence,2020). Intellectual scholars are typically associated with the skill of a digital computer on computer- controlled robot to carry out job (Copeland, 2020). Artificial intelligence which also includes knowledge representation and reasoning, is committed to represent data in a way that can be used by a computer system to resolve difficult problems, such as identifying a medical condition or having a dialog in a natural language (Knowledge representation and reasoning, 2020). The term is widely used in many fields of careers such as in marketing. In marketing, knowledge in AI affects every aspect of the marketing mix and its influence on both consumer value delivery as well as the marketing organization and management (Jarek & Mazurek, 2019). In engineering field AI is machine learning, deep learning, natural language processing, computer vision, and robotics (Rathi & Rathi, 2019). For accounting aspect, AI means the intelligence to manipulate accounting data to provide extremely accurate outputs which can replace and to certain extend replace human efforts (Tridechapol, Ajoy, Pachraponkamond & Lee, 2019) AI do not replicate human intelligence. The strengths and limits of AI need to be recognized. A good understanding for how humans and computers should work together has to be built (Institute of Chartered Accountants in England and Wales , 2018). Accounting educators are looking for creative techniques and best practices to adjust their programs and equip academics with current teaching materials as they face the challenge of preparing graduates for a successful career in a technology-driven environment (Stancheva-Todorova & Bongdanova, 2021). It is important to acquire knowledge in taxation system and electronics document (e-tax) submitted to the revenue department. Knowledge in e-withholding tax system, e-receipt system, and e-filing. The level of knowledge and understanding of block chain, cloud computing accounting software, information system- big data are important (Foong & Khoo, 2015).

Student Skills in AI

Skills in AI represent an essential component of the employability capabilities portfolio, which are progressively expected by employers and highlighted within the overall agenda of higher education (Association of Chartered Certified Accountants, 2016). These skills are included namely word, excel, and statistics for data analysis, email for communication, WWW for information search, and many more (International Federation of Accountants, 2003). Several previous research have explicitly studied skills in AI of accounting students, for example, Gazely and Pybus (1997), Stoner (1999), McCourt, Ballantine and Whittington (2003). Most of these studies found that skills in AI are a fundamental requirement for good profession, as an important issue of teaching and learning accounting for accounting educators and needs to be added in the accounting curriculum as necessary skills. The accounting career has persistently been solution-oriented, with advanced advancements bringing in unused issues and asking for unused courses of action. Accounting professions can refine their potential by being more beneficial and being a trend-setter of these courses of action (Peng & Chang, 2019). So, for students who are pursuing their studies in accounting it is important to develop their AI skills as they will be the future accountants. Accounting educators should change their mindset and develop the required skills and competences related to the smart technologies and their augmented business applications (Stancheva-Todorova, 2018). It is increasingly important for accountants to have a broader domain know-how, information technology-user skills,

better problem-solving competences, and an understanding of processes (Leitner-Hanetseder, Lehner, Eisl & Forstenlechner, 2021). Skills in using IT equipment, communication skills, data analytics skills and skills of development and application knowledge in cross sectional science, expertise in system, are integral part of the study. The latest technology should be integrated and utilized in the work. Therefore, accountants must equip with latest technology.

Independent Variables

Student Profiles (GPA, year of study, and expected salary)

Grade Point Average (GPA)

The average grades received by a student during his/her entire academic career is referred as Grade Point Average (GPA) (Potter, 2020). The grade for every subject encompasses knowledge, skills, and capacities more clearly in an education (Gachino & Worku, 2019). The results contribute to demonstrate diagnostic value of GPA to recognize performance of prospective employer that reflects the social, interactional, and semantic element in the workplace (Lyons & Bandura, 2017). Both significant progress measures during initial intermediate accounting class are cumulative GPA applied to evaluate all education achievement and diagnostic assessment used to indicate appropriate background of financial accounting (Waples & Darayseh, 2005). At national level, GPA indeed shows the average occupational conduct of all subjects linked to bachelor's degrees as a true picture of each course. To sum up, the GPA score can be verified as an employers' flexible signal for a qualification evaluation which, as a result of its core qualitative and quantitative contribution to employment, is not helpful in its relationship with competencies (Freire-Seoane, Pais-Montes & Lopiz-Bermudez, 2019)

Year of study

Four academic levels, known as freshman, sophomore, junior and senior typically separate a college career for an undergraduate student which is mentioned as Year of Study (Cortina, 2019). These various classifications of the students depend on the student's present phase and the amount of credit hours earned towards the degree. Knowledge involving international accounting standards has been given greater attention by junior and senior students than the freshmen and sophomore students. In addition, there are some variables like political problems, computer ability, and teamwork are significant for students in the fourth year as opposed to students in earlier years (Suttipun, 2012). Papageorgiou (2017) found that the profiles of first-year accounting students, especially their gender, ethnicity and learning before university have an impact on the educational achievement. Student year gaps have influenced the level of education and comprehension of electronic taxation differently (Khamta & Wattanakulchai, 2018).

Expected salary

Salary is defined as the amount paid to workers for working in an organization (Moy & Lee, 2002). The ANOVA study by Reissova and Simsova (2019) found that students anticipated salary which has impact on educational level but only if they are hired by a corporation. Anticipation of having higher salaries and greater opportunities in career are found with students having more relative competency (Brunello, Lucifora & Ebmer, 2004). The significant factor of educational decision-making is the potential anticipated income (Andonova & Blazevski, 2015). One of the key indicators to gain more pay is having knowledge from working (Schlee & Karns, 2017). Omar, Zakaria, Ismail, Sin and Selvakumar (2015) pointed out that the influences in career choices are initial pay, image of employer and working condition.

Conceptual Framework

Conceptual framework posits that student profiles such as year of study, GPA, and expected salary are related to knowledge and skills in AI of accounting students, as depicted in figure 1.
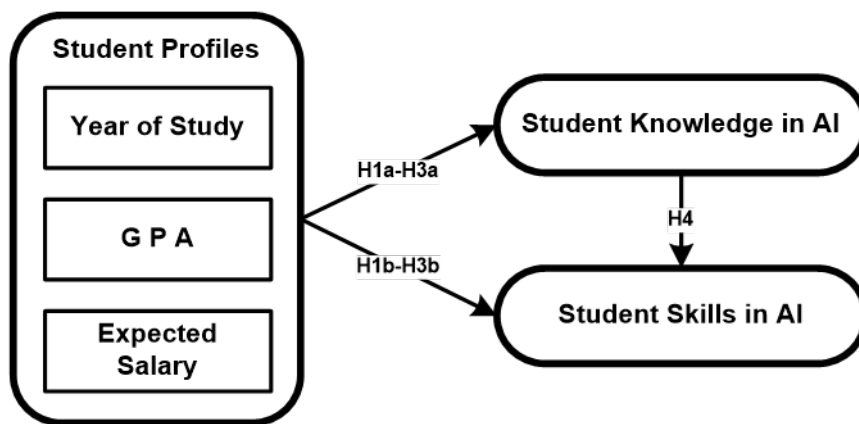

Figure 1: Conceptual Framework

Hypotheses Development

Prior research in accounting discipline indicates that academic performance is different among students' year of study (Loveday, 1993; Duff, 2004). For instance, a Singapore study, Koh and Koh (1999) reveals that not only that first-year student was associated with academic performance, but it also determined academic performance the whole three years of student' studies. The findings of Doran et al (1991) was that first-year student has less academic knowledge that other year of study of the students. Papageorgiou (2017) found that year of study of the student influenced on the academic performance. The communication skills of accounting students in senior year were significantly higher level of than junior year (Arquero et al., 2007). Stoner (2009)'s study, based on accounting students' IT application skills over a 10-year period, found that the students' skills in IT on entry to university have continued to improve over time.

Among previous studies from different disciplines, Bardell et al., (2003) showed that senior year medical students seem to have greater knowledge in identifying potential donors. Research conducted by Khan et al (2006) assessed the level of knowledge and attitudes regarding health research in a group of Pakistani medical students. The study revealed that the higher the seniority of students in the college their knowledge and attitudes improved significantly. The study by Chakradhar, Doshi, Reddy, Kulkarni, Reddy and Reddy (2016) showed that first year dental students have higher scores for their knowledge and practice compared to other year of training. Rosenthal (2003) suggested that people with more skills spent more time to practice. Dorup (2004) studied first year medical students' internet and computer usage, and their attitudes towards information technology. The result found that the skills of students on computers and the use of e-mail and internet improved greatly overtime. In order to expand on prior studies, this study focuses on knowledge and skills in AI in representing academic performance since the previous studies have not really addressed these issues. Thus, this study hypothesizes as follows:

H1a: Year of study is related to student knowledge in AI.

H1b: Year of study is related to student skills in AI

Prior research in accounting discipline indicates that academic performance is different among students' GPA. For instance, the research by Ayob and Selamat (2011) on 44 accounting students from two programs, that are Diploma in Accountancy (AC110) and Diploma in Accounting Information System (AC120) showed that GPA is positively and significantly related to the score of accounting subject. The elements that affect students' performance in the initial intermediate accounting class were studied by Waples and Darayseh (2005) where one of the variables was GPA. The two key factors identified for success in the first intermediate accounting class were a solid foundation in fundamental accounting knowledge and a high level of academic skill (as measured by cumulative GPA). Another study found that students with high GPAs are more skillful in many areas, e.g. studying consciously, participating actively in lessons, and developing good reading habits and techniques. They are well prepared for the exams, doing homework, and making use of written sources in the libraries, than those whose GPAs are low or medium-level (Tuckman, 2003). Pepe (2012) studied about the relationship between student skills and their GPA. It was revealed that the students with low GPAs have inadequacies in study skills compared to the students with high GPA. Study skills and academic success related positively. The study reveals that students with higher GPAs have higher study skills. There is a linear parallelism between study skills and GPA. Bardell, Hunter, Kent and Jain (2007)'s studied students with high GPAs who are taught in the same way as students with lower GPAs. The study was to prove whether higher GPA students will have higher perceptions of improved cognitive skills. The data reveals that there is a significant relationship between GPAs and students' perceived improvement in cognitive skills.

Among previous studies from different disciplines, Young and Fry (2008) examined the Metacognitive Awareness Inventory (MAI) to determine how it relates to broad and single measures of academic achievement in college students. Metacognition had two subcomponents which are Metacognitive knowledge and metacognitive regulation. The findings were that there was a relationship between GPA and students' knowledge of cognition factor. Also, there is a correlation between GPA and regulation of cognition factor. The study by Valdez et al., (2013) assessed the influence of the pre-pharmacy grade point average on knowledge retention of second-year pharmacy students. The results show that GPA had significant correlation with knowledge retention as determined by examination performance. In order to expand on prior studies, this study focuses on knowledge and skills in AI in representing academic performance since the previous studies have not really addressed these issues. Thus, this study hypothesizes as follows:

H2a: GPA is related to student knowledge in AI.

H2b: GPA is related to student skills in AI

Prior research in accounting discipline indicates that academic performance is different among students' expected salary. For instance, Smith and Powell (1990) reported data on the expected income of senior's colleges. The male and female respondents had informed expectations about their earnings differed sharply with respect to their expectations, where men expected more income than women. The study by McMahon and Wagner (1981) revealed that students have a realistic expected salary if they complete more years of formal schooling, even if their expected starting salaries do not differ sharply. Among previous studies from different disciplines, Schlee and Karns (2017) found that jobs expecting high salary shows a better framework in terms of conceptual marketing knowledge that utilizes technology or quantitative analysis such as internet marketing, metrics, statistics, budgeting, and forecasting than a lower salary. Nabi (2003) found that graduates who are underemployed has a lower opportunity for skill use and career experiences. They have less to offer employers, which in return ends up being paid less salaries. The study by Schlee and Karns (2017) showed that higher wages are related to database skills and data

analytics skills, the same for knowledge of statistical software, data mining, search engine optimization, customer relationship management (CRM), BI software, and dashboard software. Marketing graduates with these technical skills have a greater possibility of qualifying for higher paying entry-level jobs. In order to expand on prior studies, this study focuses on knowledge and skills in AI in representing academic performance since the previous studies have not really addressed these issues. Thus, this study hypothesizes as follows:

H3a: Expected salary is related to student knowledge in AI

H3b: Expected salary is related to student skills in AI

Kwafo (2019) studies shows that a higher proportion of the accounting students are prepared to learn and embrace AI skills and knowledge. The fundamental skills in database management are acquired by most students. The number of students who are unwilling to adopt AI skills and knowledge are few. The study by Jafar (2018) discussed soft skills of accounting graduates during their studies, and it revealed that to be hired, future accountants need better soft skills. For the accounting students, learning soft skills is linked with better intelligence and knowledge. Accountants' value will be enhanced due to the soft skills, which in turn are linked with better employability. Awayiga, Onumah & Tsamenyi (2010) study was based on the accounting knowledge and skills required by graduates. The survey was conducted by using accounting students and employers. The graduates professional and information technology skills were examined. The study revealed that graduates and employers rated analytical/critical thinking and the use of spread sheet as the major skills. The two groups had significant differences in the IT skills in word-processing and Windows. The study by Sithole (2015) investigated accounting students' IT skills and knowledge relevant to their roles in providing competent and professional services. The research revealed that in terms of word-processing and knowledge of communications software skills, students get better training. The understanding in accounting packages and spreadsheet ability of accounting graduates yet need improvement according to employers. The research by Strong and Portz (2015) revealed that as students have been using technologies like word processing, email, internet search and retrieval, image processing and electronic presentations from junior high school and therefore are more knowledgeable. Upon entering the accounting major, they have skills at these technologies. Among previous studies from different disciplines, the research by Hatlevik (2012) results showed that nursing students' viewpoint of coherence between theory and practice is directly influenced by reflective skills and theoretical knowledge, during the initial years. The results suggested that reflective thinking is not just a generic skill. It is a skill that is gained from relevant professional knowledge and experience. Schlee and Karns (2017) study supports how important it is for marketing graduates to obtain knowledge of data analysis (forecasting, marketing research, marketing metrics, and statistics) and technology skills. Thus, this study hypothesizes as follow:

H4: Student knowledge in AI is related to student skills in AI

Research Methodology

Sample and Data Collection

This study is empirical research. The target population is all accounting students who study at Thai private universities. Data collection was divided into two stages: first stage, using convenience sampling to select the universities as we distributed questionnaires to the representatives of each university in the meeting of the private university association; second stage, using judgmental sampling by asking those 15 universities to distribute the questionnaire to their accounting students. Total of questionnaires distributed was 500 sets and returned questionnaires was 249 sets, indicating 49.8% as response rate. The reason for choosing a private university to study is that it is highly competitive for all private universities. Therefore, they must be concerned more a+uality of their given education. Our research results could help them design a more competitive curriculum. Another reason for choosing these 15 private universities is that they are members of Association of Higher Private Education Institution of Thailand, representing the most active private universities in Thailand. For sample size justification, based on (Hair, Anderson, Babin & Black, 2010) they suggest using a ratio of 5:1 when using simple statistics to test a hypothesis. Therefore, this study has 32 item measures in total. The sample size was 249, meeting the requirement.

Table 1: Student Profiles (n = 249)

		Frequency	Percent
Gender	Male	38	15.3
	Female	211	84.7
Year of study	Freshman	35	14.1
	Sophomore	34	13.7
	Junior	71	28.5
	Senior	109	43.8
GPA	Less than 2.50	40	16.1
	2.50 – 2.99	61	24.5
	3.00 – 3.50	80	32.1
	Above 3.50	68	27.3
Expected Salary	Less than 15,000	7	2.8
	15,000 – 20,000	96	38.6
	20,001 – 25,000	66	26.5
	More than 25,000	80	32.1

The results in table 1 showed that the majority of the respondents are female (84.7%), fourth year student (43.8%), with cumulative GPA 3.00-3.50 (32.1%), and expected to earn monthly salary THB 15,000-20,000 after their graduation (38.6%).

วารสารวิชาการบริหารธุรกิจ 21

สมาคมสถาบันอุดมศึกษาเอกชนแห่งประเทศไทย
ในพระราชูปถัมภ์ สมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี
ปีที่ 11 เล่ม 1 ประจำเดือน มกราคม - มิถุนายน 2565

Measurement

The study of the Cronbach alpha coefficient and the factor analysis have been conducted to ensure that the two measures are accurate and appropriate for construction. The Cronbach alpha coefficients ranged from 0.842 to 0.953 for all measurements, exceeding 0.7 cut-off point and showing the relatively high internal consistence of the items at each measurement.

The factor analysis (Principal Component) was also conducted to ensure the two measures are one-dimensional. The factor loadings in all measurements ranged from 0.595 to 0.867 and the extracted variances were between 62.719% and 67.246% showing that all variables specified in each measurement loaded on one factor (unidimensional) with an eigenvalue above 1. In order to ensure the appropriate data for factor analysis, KMO and Ballet Test of Sphericity were monitored. It has shown satisfactory performance. With the relevant Bartlett Sphericity Test (p < 0.01) the KMO varied from 0.826 to 0.958, the data being adequate for factor analysis was demonstrated.

Generally, average variance extracted (AVE) is higher than 0.5 and composite reliability is higher than 0.7, indicating that the convergent validity is achieved. The results in table 2 showed that all variables in this study have composite reliability above 0.80 and AVE above 0.70 throughout, which shows that the latent constructs have a good convergence validity. In addition, SD ranged from 0.860 – 1.051 showing that the sample spread is less and close to the mean (more reliable).

Table 2: Descriptive of Measurement

Constructs	Factor Loadings	Means	SD
Student Knowledge in AI (α = .842, AVE=.786, CR=.892)	.595-.867	3.024-3.556	.906-1.051
Student Skills in AI (α = .953, AVE=.836, CR=.982)	.775-.866	3.827-4.290	.860-.969

Note: KMO (.826- .958); Variance extracted (62.719- 67.246%); Barlett's Test of Sphericity are all significant at p value = .000

The results in table 3 presented that student knowledge and student skills in AI were assessed for discriminant validity, indicating the extent in which the construct differ from one another statistically by using Fornell and Larcker (1981). As seen, the correlation value between knowledge and skills in AI was 0.191, which is significant at 0.01 level (2-tailed), was lower than the square root average variance extracted (AVE) of knowledge (0.886) and skills (0.914) where the cut-off point value was higher than 0.70, indicating that knowledge and skills in AI were different construct.

Table 3: Discriminant Validity

	Knowledge	Skills
Knowledge	.886	
Skills	.191**	.914

Note: **correlation is significant at the 0.01 level (2-tailed). *correlation is significant at the 0.05 level (2-tailed). The value on the diagonal is square root AVE.

Data Analysis and Results

The primary objective of this study was to examine the relationship between accounting student profile and their knowledge and skills in AI. Analysis of variance (ANOVA) was used to examine the relationship between independent variables and the dependent variables. The significance of the results is indicated by p-value, where the p value is less than 0.05, there is a significant relationship between the independent variable and dependent variable. The summary of the results showed in table 4 - 6.

For H1a, there was a statistically significant difference in means of knowledge in AI score among students with different year-of-study as indicated by one-way ANOVA (F value = 9.187, p = .000) with unequal variance assumed (Levene statistic = 11.057, p value = .000). A Dunnett T3 post hoc test showed that the freshy group has knowledge in AI statistically significantly lower than the sophomore group (p = .003), than the junior groups (p = .003), and than the senior group (p = .000). For H1b, there was no statistically significant difference in means of skills in AI score among students with different year-of-study as shown by one-way ANOVA (F value = .092, p = .964). Therefore, the results showed that there is a significant relationship between year-of-study and student knowledge in AI (H1a) but not with skills in AI (H1b).

For H2a, there was no statistically significant difference in means of knowledge in AI score among students with different GPA as indicated by one-way ANOVA (F value = .976, p = .405). For H2b, there was a statistically significant difference in means of skills in AI score among students with different GPA as evaluated by one-way ANOVA (F value = 8.646, p = .000) with unequal variance assumed (Levene statistic = 2.765, p value = .043). A Dunnett T3 post hoc test showed that the students with GPA higher than 3.5 had skills in AI statistically significantly higher than the students with GPA less than 2.50 (p = .000), than the students with GPA between 2.50-2.99 (p = .001), and than the students with GPA between 3.00-3.50 (p = .004). Therefore, the results revealed that there is a significant relationship between GPA and student skills in AI (H2b) but not with knowledge in AI (H2a).

For H3a, there was a statistically significant difference in means of knowledge in AI score among students with different expected salary as tested by one-way ANOVA (F value = 3.751, p = .012) with equal variance assumed (Levene statistic = 2.648, p value = .073). A Scheffe post hoc test showed that the students with expected salary between 20,000-25,000 has knowledge in AI statistically significantly higher than the students with expected salary higher than 25,000 (p = .028), but not with the students with expected salary less than 20,000 (p = .075). For H3b, there was a statistically significant difference in means of skills in AI score among students with different expected salary as evaluated by one-way ANOVA (F value = 3.421, p = .018) with equal variance assumed (Levene statistic = .520, p value = .595). A Scheffe post hoc test showed that the students with expected salary less than 20,000 have skills in AI statistically significantly lower than the students with expected salary between 20,000-25,000 (p = .009), but not with the students with expected salary more than 25,000 (p = .416). Therefore, the results showed that there is a significant relationship between expected salary on both student knowledge and student skills in AI (H3a and H3b).

Table 4: Hypotheses Testing Results for H1-H3 (ANOVA)

Hypotheses		F value	p value	Results
H1a	Year ➜ Knowledge	9.187	.000	Supported Hypothesis
H1b	Year ➜ Skills	.092	.964	NS
H2a	GPA ➜ Knowledge	.976	.405	NS
H2b	GPA ➜ Skills	8.646	.000	Supported Hypothesis
H3a	Expected salary ➜ Knowledge	3.751	.012	Supported Hypothesis
H3b	Expected Salary ➜ Skills	3.421	.018	Supported Hypothesis

The results from a Scheffe post hoc test as explained in detail above have been shown in table 5

Table 5: Hypotheses Testing Results for H1-H3
(ANOVA with Multiple Comparisons level of Knowledge and Skills)

Hypothesis	Categories	Knowledge	Skills	Conclusion
H1a-H1b	Freshman	2.709		Freshman has significantly less knowledge in AI than other groups.
	Sophomore	3.282	NS	
	Junior	3.365		
	Senior	3.442		
H2a-H2b	Less than 2.50		3.693	Students who have GPA less than 2.50 have significantly less skills in AI than students who have GPA more than 2.50
	2.50-2.99	NS	3.870	
	3.00-3.50		3.953	
	More than 3.50		4.342	
H3a-H3b	Less than 20,000	3.344	3.834	Students who expect salary less than 20,000 have less knowledge and skills in AI than students who expect salary between 20,000-25,000
	20,000-25,000	3.424	4.203	
	More than 25,000	3.088	4.037	

For H4, simple regression analysis was used to examine the relationship between student knowledge and student skills in AI. The t value = 3.056, p-value = .002 support the hypothesis, indicating that there is significant relationship between student knowledge in AI and their skills in AI.

Table 6: Hypotheses Testing Results for H4 (Simple regression analysis)

Hypotheses	Standardized Coefficient	t value	p value	Results
H4: Knowledge → Skills	.191	3.056	.002	Support hypothesis

Note: R square = 3.60%; F value = 9.342 at p value = .002; Durbin-Watson value = 1.668

Findings and Discussion

The survival of accounting profession continues to be threatened by Artificial Intelligence. With many years of education and practice, it disturbs the accounting professionals. Technology development and innovations affects the daily life of people. Society generally has the tendency to refuse to change from comforts that have been following traditionally. But the reality is that for the society, the use of internet is unavoidable. The future of technologies is for those who are ready to acquire the skills and knowledge required for it, by paying the price. Gaining the right knowledge and skills for the future is a result of their preparation. Twenty-first-century education is very demanding. Graduates are groomed based on curriculum, management and instruction. Therefore, Digital changes and global technology must be taken into consideration. The graduates' skills and competency in using electronic hardware and software to a very high extent contributes to the fame of the university and accounting program.

This study aimed to examine the relationship between accounting student profiles and their knowledge and skills in AI. The results of this study illustrated that year of the study was related to knowledge in AI which was in accordance with the prior studies (Bardell, et al., 2003; Khan, et al., 2006), GPA was related to skills in AI which was in accordance with the prior studies (Pepe, 2012; Bradley, et al., 2007) and expected salary was related to knowledge and skills in AI which were related to previous studies (Schlee & Karns, 2017; Nabi, 2003), and lastly student knowledge in AI has significant relationship to student skills in AI which was also consistent with the previous studies (Hatlevik, 2012; Strong & Portz, 2015).

Although the study did not find the relationship between year of the study with skills in AI, it was not consistent with previous findings (Davis & Nicholaou, 1992; Odusanya & Bamgbala, 2002). Davis and Nicholaou (1992) found that the senior students' skills had increased over the course of their studies. Odusanya and Bamgbala (2002) also found that the majority of senior years students have little computing skills comparing to the junior year's students. However, in the study of Chakradhar et al. (2016), although they found that first-year students have more knowledge and skills compared to students in other years when look at each question (item measure), they did not find any significant difference of the mean knowledge and skill scores based on year of study. The possible reason of no link between year of study and IT skills could be that the students who possess more IT skills need to have self-discipline since it requires more practice regardless of their year of study, as stated in Stoner's (2009) study. Similar to the previous findings (Young & Fry, 2008; Valdez et al., 2013) that there was no relationship between GPA and knowledge in AI. The potential cause of no relationship could be, even if grades were lower they still worked hard and were very much motivated, which leads to their personal and academic growth. GPA does not determine a person's intelligence or how hard working a student is. They might have started by taking difficult subjects. Students might have spent more time and effort in completing assignments at their best. With lesser grade point also has potential to perform well in their workplace and take it to the next level. To measure the ability of a student or the smartness of a student for college, GPA is not considered as a perfect measuring scale.

Implication and Future Research

Implication

Contribution of this research to accounting students, accounting lecturers and accounting program faculty members in the following aspects:

1 For Accounting Students: Although this study found that accounting students' AI knowledge gradually developed during their studies, students should aim for more AI knowledge outside the classroom as it will make them more competitive in the labor market. Likewise, this study found students with high GPA have more skills in AI. This finding could help students with low GPA be aware of what skill they lack so they could seek more practice. Moreover, the relationships between expected salary and IT knowledge and skills demonstrated that students who have the highest IT knowledge and skills expect a reasonable salary. This result could encourage students with high expectations of salary to gain more IT knowledge and develop more IT skills if they want to have a high salary. Lastly, the finding about the relationship between knowledge and skills in AI could help students plan their studies if they would like to have more skills in AI for a prosperous future.

2 For Accounting Lecturers: The findings could help them develop the contents of teaching, workshop, and practice in using computer and IT equipment which used in accounting, auditing, and related business job. The higher year of studying, the more and deeper detail in accounting information system and application. More senior and maturity of students, the better understanding in knowledge in AI. In addition, the high level of students' knowledge which be represented by year of their study, the more skills in AI that students earned through their GPA. Lecturers will be able to pay more attention to students with low GPA and give more assignments and more attention to improve their skills. Accounting lecturers not only teach accounting concepts, but they also have a role in developing students' moral and interpersonal skills. Increase the confidence of students with less expectation of salary in terms of setting them up for a good career, increasing their attractiveness to employers, and equipping them with skills and qualities that employers value. Lecturers should encourage students to explore career options early, with a focus on researching educational requirements and expected salaries for careers in the accounting field.

3 For Accounting Program Faculty Members: The findings could help people who are responsible for curriculum development implemented the digital accounting, auditing, taxation, and related business in the curriculum. Furthermore, acquired modern and advanced software and hardware used in teaching and learning to enhance and improve student knowledge and skills in AI. For example, this study's finding illustrates that students gradually develop their knowledge in AI during their studies, which confirms that the curriculum was designed appropriately so that the administrators could follow this direction when designing the curriculum. Another finding relating to GPA and skills in AI was the administrators could provide appropriate AI training skills for students with low GPA so that they could keep up with other groups. In addition, the administrators could provide knowledge about job interviews and job searching to prepare students for the real world. Finally, the administrators could design the courses by incorporating AI knowledge and skills based on the link between AI knowledge and AI skills.

Future Research

The results of this report suggest a range of further areas of research. The scope of research was limited only to a sample of accounting students. In order to get complete feedback from all stakeholders, the future research recommend expanding the scope by using sample from accounting lecturers and employers who will hire and use the accounting graduated.

This research only studied personal factors, according to social cognitive theory, thus, environmental factors and behaviors are suggested for future research. In addition, curriculum or subjects that would help students gain more knowledge and skills in AI could also be interesting variables for future research.

References

Association of Chartered Certified Accountants. (2016). *Professional Accountants-The Future: Drivers of Change and Future Skills.* Retrieved from pi-highlights-professional-accountants-the-future.pdf

Andonova, M., & Blazevski, N. M. (2015). Factors Influencing the Earnings Expectations among Macedonian Students: A Comparative Perspective with the EU Students. *Croatian Economic Survey, 17*(1), 71-110.

Anyoho, R. (2017). The History of Artificial Intelligence. Retrieved from http://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

Arquero, J. L., Hassall, T., Joyce, J., & Donoso, J. A. (2007). Accounting students and communication apprehension: A study of Spanish and UK students. *European Accounting Review, 16*(2), 299-322.

Aryanti, C., & Adhariani, D. (2020). Students' perceptions and expectation gap on the skills and knowledge of accounting graduates. *The Journal of Asian Finance, Economics, and Business, 7*(9), 649-657.

Awayiga, J. Y., Onumah, J. M., & Tsamenyi, M. (2010). Knowledge and skills development of accounting graduates: The perceptions of graduates and employers in Ghana. *Accounting Education: An International Journal, 19*(1-2), 139-158.

Ayob, S., & Selamat, S. (2011). *Determinants of student performance in management accounting.* Proceeding in 2nd International Conference on Business and Economic Research (2nd ICBER 2011). (pp.215-223). Retrieved from https://educationdocbox.com/Homework_and_Study_Tips/113142406-Determinants-of-students-performance-in-management-accounting.html.

Bandura, A. (1986). *Social Foundations of Thought and Action*. A Social Cognitive *Theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (2002). Social cognitive theory in cultural context. *Applied Psychology: An International Review, 51*(2), 269–290.

Bardell, T., Hunter, D. J., Kent, W. D., & Jain, M. K. (2003). Do medical students have the knowledge needed to maximize organ donation rates? *Canadian Journal of Surgery, 46*(6), 453-457.

Bradley, R. V., Sankar, C. S., Clayton, H. R., Mbarika, V. W., & Raju, P. K. (2007). A study on the impact of GPA on perceived improvement of higher-order cognitive skills. Decision Sciences *Journal of Innovative Education, 5*(1), 151-168.

Brunello, G., Lucifora, C., & Ebmer, R. W. (2004). The Wage Expectations of European Business and Economics Students. *The Journal of Human Resources, 39*(4), 1116-1142.

Cabrero, R. S., & Román, O. C. (2018). Psychopedagogical Predecessors of Connectivism as a New Paradigm of Learning. *International Journal of Educational Excellence, 4*(2), 29-45.

Chakradhar, K., Doshi, D., Reddy, B. S., Kulkarni, S., Reddy, M. P., & Reddy, S. S. (2016). Knowledge, attitude and practice regarding organ donation among Indian dental students. *International Journal of Organ Transplantation Medicine, 7*(1), 28-35.

Chrismastuti, A. A., & Purnamasari, V. (2015). The effectiveness of IT usage in accounting education. *International Journal of Humanities and Management Sciences, 3*(4), 253-258.

Compeau, D., Higgins, C. A., & Huff, S. (1999). Social cognitive theory and individual reactions to computing technology: A longitudinal study. *MIS Quarterly, 23*(2), 145-158.

Cortina, A. (2019). *What do freshman, sophomore, junior and senior mean?* Retrieved from https://www.mooxye.com/blog/en/what-do-freshman-sophomore-junior-and-senior-mean/

Copeland, B. J. (2020). Artificial intelligence. *Encyclopedia Britannica.* Retrieved from https://www.britannica.com/technology/artificial-intelligence

Davis, H., & Nicholaou, T. (1992). A comparison of the interviewing skills of first-and final-year medical students. *Medical Education, 26*(6), 441-447.

Doran, B. M., Bouillon, M., & Smith, C. G. (1991). Determinants of student performance in accounting principles I and II. *Issues in Accounting Education, 6*(1), 74–84.

Dorup, J. (2004). Experience and attitudes towards information technology among first-year medical students in Denmark: longitudinal questionnaire survey. *Journal of Medical Internet Research, 6*(1), e10, 1-7. doi: 10.2196/jmir.6.1.e10

Duff, A. (2004). Understanding academic performance and progression of first-year accounting and business economics undergraduates: The role of approaches to learning and prior academic achievement. *Accounting Education, 13*(4), 409–430.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50.

Foong, S. Y., & Khoo, C. H. (2015). Attitude, learning environment and current knowledge enhancement of accounting students in Malaysia. *Journal of Accounting in Emerging Economies, 5*(2), 202-221

Freire-Seoane, M. J., Pais-Montes, C., & Lopiz-Bermudez, B. (2019). Grade point average versus competencies: which are most influential for employability? *Higher Education, Skills and Work-Based Learning, 9*(3), 418-433.

Gachino, G. G., & Worku, G. B. (2019). Learning in higher education: towards knowledge, skills and competency acquisition. *International Journal of Educational Management, 33*(7), 1746-1770.

Gazely, A., & Pybus, L. (1997, April) Beyond the basic IT skills. *Proceeding of the 8th CTI-AFM Conference,* (pp. 52-58). Newport Gwent. Wales.

Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective* (7th ed.). Upper Saddle River, N.J.: Pearson Education.

Hatlevik, I. K. R. (2012). The theory-practice relationship: reflective skills and theoretical knowledge as key factors in bridging the gap between theory and practice in initial nursing education. *Journal of Advanced Nursing, 68*(4), 868-877.

Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research, 21*(2), 155-172.

Institute of Chartered Accountants in England and Wales. (2018). *Artificial intelligence and the future of accountancy.* London: ICAEW. Retrieved from https://www.icaew.com/-/media/corporate/files/technical/information-technology/thought-leadership/artificial-intelligence-report.ashx

International Federation of Accountants. (2003). *International Education Guideline 11: Information Technology for Professional Accountants.* New York: IFAC Education Committee.

Jarek, K., & Mazurek, G. (2019). Marketing and Artificial Intelligence. *Central European Business Review, 8*(2), 46-55.

Jirasatjanukul, K., & Jeerungsuwan, N. (2018). The Design of an Instructional Model Based on Connectivism and Constructivism to Create Innovation in Real World Experience. *International Education Studies, 11*(3), 12-17.

Kavanagh, M. H., & Drennan, L. (2008). What skills and attributes does an accounting graduate need? Evidence from student perceptions and employer expectations. *Accounting & Finance, 48*(2), 279-300.

Khan, H., Khawaja, M. R., Waheed, A., Rauf, M. A., & Fatmi, Z. (2006). Knowledge and attitudes about health research amongst a group of Pakistani medical students. *BMC Medical Education, 6*(1), 1-7. doi.org/10.1186/1472-6920-9-46.

Khamta, M., & Wattanakulchai, M. (2018). *Knowledge and Understanding in e-Taxation of Accounting Students in Digital 4.0 Era. 1-15.* Retrieved from http://dspace.rmutk.ac.th/handle/123456789/2538

Knowledge in artificial intelligence. (2020). In *Wikipedia.* Retrieved from https://en.wikipedia.org/wiki/Artificial_intelligence

Knowledge representation and reasoning. (2020). In *Wikipedia*. Retrieved from https://en.wikipedia.org/wiki/knowledge-representation-and-reasoning

Koh, M. Y., & Koh, H. C. (1999). The determinants of performance in an accountancy degree program. *Accounting Education: An International Journal, 8*(1), 13–29.

Kultawanich, K., Koraneekij, P., & Na-Songkhl, J. (2015). A Proposed Model of Connectivism Learning Using Cloud-based Virtual Classroom to Enhance Information Literacy and Information Literacy Self-efficacy for Undergraduate Students. *Procedia-Social and Behavioral Sciences, 191*, 87 –92.

Kurek, B., & Górowski, I. (2019). Who expects high salaries? A pilot survey of salary expectations and academic achievements of Accounting and Controlling students. *Zeszyty Naukowe Małopolskiej Wyzszej Szkoły Ekonomicznej w Tarnowie. 4*(44), 53-64. doi: 10.25944/znmwse.2019.04.5364

Kwafo, D. (2019). *The Impacts of Artificial Intelligence on Management Accounting Students: A Case Study at OULU Business School (OBS).* (Master Thesis). Finland, University of OULU.

Leitner-Hanetseder, S., Lehner, O. M., Eisl, C., & Forstenlechner, C. (2021). A profession in transition: actors, tasks and roles in AI-based accounting. *Journal of Applied Accounting Research, 22*(3), 539-556.

Loveday, P. M. (1993). Exemptions from first semester accounting and performance on the second semester course: An empirical study. *Accounting Education, 2*(2), 143–150.

Luo, J., Meng, Q., & Cai, Y. (2018). Analysis of the Impact of Artificial Intelligence application on the development of accounting Industry. *Open Journal of Business and Management, 6*(4), 850-856.

Lyons, P., & Bandura, R. P. (2017). GPA as a predictor of helpful behavior: an accounting student sample. *Education + Training, 59*(3), 280-291.

McCourt, L., P., Ballantine, J. A., & Whittington, M. (2003). Evaluating the validity of self-assessment: measuring computer literacy among entry-level undergraduates within accounting degree programmes at two UK universities. *Accounting Education, 12*(2), 97 – 112.

McGuire, D. (2020). *Demographic Data as a Measure of School Performance.* Retrieved from https://study.com/academy/lesson/demographic-data-as-a-measure-of-school-performance.html

McMahon, W. W., & Wagner, A. P. (1981). Expected returns to investment in higher education. *The Journal of Human Resources, 16*(2), 274-285.

Moy, J. W. & Lee, S. M. (2002). The Career Choice of Business Graduates: SMEs or MNCs? *Career Development International, 7*(6), 339-347.

Nabi, G. R. (2003). Graduate employment and underemployment: opportunity for skill use and career experiences amongst recent business graduates. *Education+ Training, 45*(7), 371-382.

Odusanya, O. O., & Bamgbala, O. A. (2002). Computing and information technology skills of final year medical and dental students at the College of Medicine University of Lagos. *The Nigerian Postgraduate Medical Journal, 9*(4), 189-193.

Omar, M. K., Zakaria, A., Ismail, S., Sin, J. S. L., & Selvakumar, V. (2015). Job selection preferences of accounting students in Malaysian private universities. *Procedia Economics and Finance, 31*, 91-100.

Papageorgiou, E. (2017). Accounting students' profile versus academic performance: a five-year analysis. *South African Journal of Higher Education, 31*(3), 209-229.

Peng, Y., & Chang, J. S. (2019, September). An Exploration on the Problems of Replacing Accounting Professions by AI in the Future. *Proceedings of the 2019 5th International Conference on Industrial and Business Engineering.* (pp. 378-382). Hong Kong, Hong Kong.

Pepe, K. (2012). A research of the relationship between study skills of students and their GPA. *Procedia-Social and Behavioral Sciences, 47*, 1048-1057.

Potter, K., (2020). What Is a GPA and Why Is It So Important? Retrieved from https://www.mastersportal.com /articles/2126/what-is-a-gpa-and-why-is-it-so-important.html

Rathi, D.S., & Rathi, S.K. (2019). Knowledge on Artificial Intelligence and Related Fields Among Engineering Students. *The International Journal of Engineering and Science, 8*(2), 3-10.

Reissova, A., & Simsova J. (2019). The value of education in the labor market. How realistic are student expectations? *Business and Economic Horizons, 15*(1), 20-36.

Rosenthal, R. (2003). Covert communication in laboratories, classrooms, and the truly real world. *Current Directions in Psychological Science, 12*(5), 151-154.

Sarnok, K., & Wannapiroon, P. (2018). Connectivism learning activity in ubiquitous learning environment by using IoE for digital native. *Veridian E-Journal, Silpakorn University (Humanities, Social Sciences and Arts), 11*(4), 405-418.

Savery, J. R., & Duffy, T. M. (1995). Problem based learning: An instructional model and its constructivist framework. *Educational Technology, 35*(5), 31-38.

Schlee, R. P., & Karns, G. L. (2017). Job Requirements for Marketing Graduates: Are There Differences in the Knowledge, Skills, and Personal Attributes Needed for Different Salary Levels? *Journal of Marketing Education, 39*(2), 69–81.

Siemens, G. (2005). Connectivism, A learning theory for the digital age. *International Journal of Instructional Technology & Distance Learning, 2*(1), 3-10.

Siemens, G. (2008). Learning and knowing in networks: Changing roles for educators and designers. *ITFORUM for Discussion, 27*(1), 1-26. Retrieved from https://www.academia.edu/2857165/Learning_and_knowing _in_networks_Changing_roles_for_educators_and_designers

Sithole, S. (2015). Information Technology Knowledge and Skills Accounting Graduates Need. *International Journal of Business and Social Science, 6*(8), 47-52.

Smith, H. L., & Powell, B. (1990). Great expectations: Variations in income expectations among college seniors. *Sociology of Education, 63*(3), 194-207.

Stancheva-Todorova, E. P. (2018). How artificial intelligence is challenging accounting profession. *Journal of International Scientific Publications Economy & Business*, 12, 126-141.

Stancheva-Todorova, E., & Bogdanova, B. (2021). Enhancing investors' decision-making–An interdisciplinary AI-based case study for accounting students. Proceeding in *AIP Conference*. AIP Publishing LLC. doi: 10.1063/5.0041612

Stoner, G (1999) IT is part of youth culture, but are accounting undergraduates confident in IT? *Accounting Education, 8*(3), 217-237.

Stoner, G. (2009). Accounting students' IT application skills over a 10-year period. *Accounting Education, 18*(1), 7-31.

Strong, J., & Portz, K. (2015). IT knowledge: What do accounting students think they know? Do you know more than I do? An exploratory study. *Review of Business Information Systems, 19*(2), 39-50.

Suttipun, M. (2012). Readiness of accounting students in the ASEAN Economic Community: An empirical study from Thailand. Proceeding of the 1st *Mae Fah Luang University International Conference.* Retrieved from http://mfuic2012. mfu. ac. th/electronic proceeding/Documents/00_ PDF/O-SSH/ O-SSH-03% 20Muttanachai% 20Suttipun. Pdf.

Tridechapol, N., Ajoy, S., Pachraponkamond, S., & Lee, P. (2019). The perception of accounting students towards digital accounting in artificial intelligence age. Proceeding of the *Accounting Education Conference: AccEC 2020 Innovative Learning and Teaching in Accounting.* (pp. 19-36). Bangkok: TAP-Net. Retrived from https://eservice.tfac.or.th/accec/uploads/data/1_eproceeding_1434044524.pdf

Tuckman, B. W. (2003). The effect of learning and motivation strategies training on college studentsi achievement. *Journal of College Student Development, 44*(3), 430-437.

Valdez, C., Namdar, R., & Valuck, R. (2013). Impact of pharmacy experience, GPA, age, education, and therapeutic review on knowledge retention and clinical confidence. *Currents in Pharmacy Teaching and Learning, 5*(5), 358-364.

Waples, E., & Darayseh, M. (2005). Determinants of students' performance in intermediate accounting. *Journal of College Teaching & Learning, 2*(12), 87-92.

Wise, J. B. (2002). Social cognitive theory: A framework for therapeutic recreation practice. *Therapeutic Recreation Journal, 36*(4), 335–351.

Young, A., & Fry, J. D. (2008). Metacognitive awareness and academic achievement in college students. *Journal of the Scholarship of Teaching and Learning, 8*(2), 1-10.