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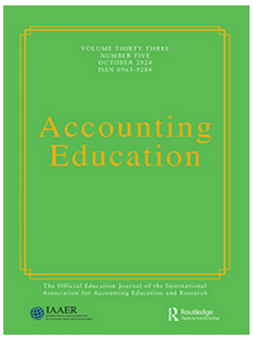

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Inclusion of blockchain in university accounting curricula: an overview of practices and strategies

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ABSTRACT

Blockchain is characterized as a disruptive technology in many sectors, including accounting and auditing. Despite blockchain's great potential, several studies point out that tangible applications in accounting and auditing are slow to develop and to become widespread. This article looks at the practices and strategies of blockchain education in university accounting courses. We study the curricula of the world's top 50 universities (Shanghai Ranking) and identify five types of course approaches: 1) The professional practice; 2) The dual or triple competency; 3) The entrepreneurship and business; 4) The sector-specific; 5) The critical thinking and holistic. We discuss these results in terms of isomorphism and distinctions between universities and propose an agenda for research on blockchain education in accounting.

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Blockchain; accounting; universities; curricula; institutional isomorphism

Introduction

Blockchain is characterized as a disruptive technology in many sectors, making business practice easier, including accounting and auditing. Academic and professional authors report that blockchain benefits these two fields by providing partial relief from financial statement audit duties; standardization of financial data formats; real-time access leading to real-time auditing; a reduction in the duties of accountants and financial managers over the long term; a decrease in annual audit preparatory work and easy tracking of the origin and history of operations; removal of some internal control functions (certification of live data); and facilitation of reporting (Desplebin et al., 2021).

Despite the significant potential of this technology (Desplebin et al., 2018), studies point out blockchain is not catching on quickly in accounting and auditing (Desplebin et al., 2021; Pimentel & Boulianne, 2020). One likely reason is the level of training that current and future accounting professionals receive on blockchain. This leads to

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questions about the state of blockchain education in the global university system. Recent research underlines the interest in this topic, notably by examining accounting professionals' knowledge of blockchain (Calderon & Stratopoulos, 2020), and experimental teaching of the new technology (Stratopoulos, 2020). To our knowledge, and despite the apparent interest, no studies have been conducted on the state of the blockchain education that accounting students can receive in university. Our research question is therefore: How is blockchain being taught to university accounting students, and what are universities' strategic positioning for teaching this innovation?

To answer the question, we studied the curricula of all the universities in the Shanghai Ranking's top 50 universities in the world, resulting in a sample of 229 courses. Using abductive coding, we identified five main course categories: 1) professional practice courses (single competency) that focus on introductory or basic learning; 2) courses built around two or three competencies aimed at those seeking in-depth knowledge of the technology in a well-defined area of expertise; 3) courses geared to entrepreneurship that address the full potential of blockchain in business development; 4) sector-based courses that seek to move away from the siloed approach in professional practice and are geared to the issues raised by blockchain rather than to specific disciplines; 5) critical thinking blockchain courses that critique the technology and its effects and discuss possible radical changes in the business world.

Contribution

Our results lead to several contributions. We provide an overview of blockchain education at the world's top universities, showing the schools' visions for teaching this disruptive technology and for promoting these classes. This inventory reveals a degree of homogeneity in blockchain course offerings, which seems to be the result of the institutional isomorphism process (DiMaggio & Powell, 1983). Our empirical study also finds that certain universities (the highest-ranked in the Shanghai rankings) seek to distinguish themselves in blockchain education by offering courses with sector-based, critical thinking or holistic approaches, which reveal sub-groups of institutional isomorphism. Our analysis also brings to light the temporality in the schools' development of course offerings.

The article is organized as follows. First, we position blockchain technology as an innovation and discuss trends in how it is taught in university curricula. We then position social and contractual theories as potentially useful to understanding the content of the curricula. We describe the qualitative methodology we used to classify the data and to aggregate and reconcile the conceptual categories for an analytical reading of the university courses and strategies surrounding teaching an innovation like blockchain. We present our results and discuss them. We then provide our conclusion and a research agenda to explore the modalities of blockchain education in accounting.

Literature review

Blockchain: from accounting innovation to teaching concept

In this section, after positioning blockchain as an accounting innovation, we address determinants of innovation topics in higher education curricula.

Blockchain as an accounting innovation

Schumpeter (1939) defines an innovation as '*a new combination of the means of production, i.e. a change in the factors of production that makes it possible to modify what is produced and/or the way it is produced*' (Schumpeter, 1939, p. 87). Although there is no real consensus on how to define innovation (Damanpour & Schneider, 2009; Godowski, 2003), this concept could be characterized as relative or absolute (Kimberly & Evanisko, 1981); as a product and/or process (OECD, 2005); and as technological or managerial (Gopalakrishnan & Damanpour, 1997).

Coyne and McMickle (2017) and Degos (2017) point out that accounting media have already evolved many times over to adapt to available technologies and economic life (clay tablets, parchment, paper, magnetic recordings, the Cloud, etc.). In the digital age, these registries take the form of databases. However, blockchain can be defined as '*a very large notebook, which everyone can read freely and without charge, on which everyone can write, but which is impossible to erase and is indestructible* [translation]' (Delahaye, 2015). In addition, Jiang and Zheng (2021) state that blockchain technology is the result of multiple technology integrations and re-innovation. The technologies include P2P networking, consensus mechanisms, digital signatures, encryption mechanisms, and privacy protection mechanisms. Blockchain is thus a technological solution that can enable the replacement of the trusted party required to verify transactions because it provides a shared ledger system that ensures transparent authentication (O'Leary, 2018; Yermack, 2017).

Blockchain is therefore a database with its own specificities, including quality of the registry, that can be considered to have the potential to bring innovations to the fields of accounting and auditing (Desplebin et al., 2019, 2021). In accounting, blockchain technology is defined as an innovation that progressively aids in changing the contours of accounting, auditing, and reporting (Bellucci et al., 2022). Felsky and Empey (2020) show that a large majority of professionals and instructors view blockchain as technology with unlimited potential for the future of accounting, which should prompt universities to incorporate blockchain as a curriculum topic, and which invites us to explore how it is taught from that perspective.

Determinants of innovation topics in higher education curricula

Integrating innovation topics in education is a major issue in the development of institutions of higher learning (Bédard & Raucent, 2015). Curriculum content (showing what is taught, i.e. coverage and sequence of subjects – Spillane & Burch, 2006) makes it possible to see how innovation topics are incorporated in education, and, more generally, the evolution of and changes to societal models (McEneaney & Meyer, 2000). Several studies have reviewed the inclusion of innovations in accounting curricula, particularly digital innovations (Kotb et al., 2019; Qasim et al., 2022).

As is the case with many other innovations, the teaching of blockchain brings up issues (Desplebin et al., 2021; Qasim & Kharbat, 2020; Stratopoulos, 2020). Indeed, the teaching of innovations leads to questions about the often-routinized practices of universities, in an effort to '*think about transforming pedagogical practices* (…) *in a paradigmatic change* [translation]' (Paquelin, 2020, p. 10). Such a change could be met with inertia (of people as well as of structures), especially when it involves an innovation that challenges well-established practices (Bédard & Raucent, 2015).

While international rankings that promote competition lead universities—via 'edicts' (Lemaître, 2015)—to want to incorporate the latest innovations into their programs (Lison et al., 2015), universities, meanwhile, operate in a highly institutionalized environment (within the meaning of neo-institutional theory), where '*the pressure to conform, or even imitate practices, serves as the authority [translation]*' (Pelletier, 2009, p. 27). As a result, schools are increasingly standardizing their curricula (including in societies that differ considerably in terms of economic development – McEneaney & Meyer, 2000), a market response that suggests the end of academic and institutional freedoms (Pelletier, 2009).

However, understanding the future of teaching about innovations requires taking into account the academic and administrative environments, and even the political settings, in which these projects take place (Bédard & Raucent, 2015). Based on this observation, some authors (Bess & Dee, 2008; Morrill, 2010) ponder management strategies and how they influence the inclusion of innovations in curricula. They identify four main challenges to strategic leadership in the design and integration of innovative subjects into curricula: 1) alignment of the organization and its environment; 2) alignment of organizational strategy and structure; 3) ability to place activities at the center of resources and competencies; 4) deployment of a competitive advantage (Noël, 2009).

The first aspect, alignment of the organization and its environment, refers to the 'Harvard School[1]' and the conditions for organizational survival. This activity seeks to align the organization's strengths and weakness with the opportunities and threats of its environment. According to Noël (2009), the strengths and weaknesses in the university environment mainly revolve around the '*qualities and skills of the faculty and the teaching and research staff in general* [translation],' while opportunities and threats refer to the '*political and social conditions that legitimize institutions, the vagaries of public funding (or) the growing need for scientific and technical expertise* [translation]' (Ibid., p. 113).

The second aspect, alignment of organizational strategy and culture, refers to the fact that the design of courses and curricula for teaching about innovations should rest not with senior management and the hierarchy, but rather mainly (in keeping with universities' professional bureaucracy structures) with teacher-researchers, who are the sole '*repositories of the skills and knowledge making it possible to engage in fulfilling the mission of higher education institutions [translation]*' (Ibid, p. 115). However, this does not deny the fact that structures can facilitate innovation, notably through incentive mechanisms (rewards or prizes) (Cros, 2002).

The third aspect of placing a university's activities at the center of resources and skills is directly linked to the second. The goal here is to avoid developing activities in areas that are *a priori* congruent but that, in the end, hinder program updates and development, particularly since they require specific resources and skills. The issue is therefore to '*narrowly target areas of the discipline, academic levels, levels of study, etc.* [translation]' (Ibid., p. 118).

The fourth aspect, deployment of a competitive advantage, is based on interactions between the actors (particularly the experts—teacher-researchers and the administration). This is in order to offer innovative instruction and a high content of value-added material for students that help differentiate the university.

While understanding the future of teaching about innovations requires taking into account the political, social, and institutional context (Bédard & Raucent, 2015), social and contractual theories, such as institutional, legitimacy, and stakeholder theories, appear to be complementary frameworks (Deegan, 2014) for explaining the behavior of organizations. Applied to the university sector, which is characterized by global competition (Mouline, 2018), these theories may provide hints about how to read universities' practices and strategies.

Social and contractual theories explaining curriculum content

Institutional theory (DiMaggio and Powell, 1983; Scott, 1995) posits that an organization cannot be studied independently of the political, social, and institutional context in which it operates, since the organization concurrently influences and is influenced by these contexts. Along these lines, Meyer and Rowan (2006) defend the originality of the institutional approach in their exploration of changes in the education sector. According to Spillane and Burch (2006), to discern and analyze teaching practices (what people do and how they do it), it is important to take into account the institutional structures that can allow or limit these practices. These authors emphasize that many studies have looked at practices in an institutional void (Ibid, p. 106), ignoring the context and limiting understanding of the evolution of practices. Beyond teaching practices, this approach is used to explain the development of management tools in universities (Bollecker, 2016; Dreveton et al., 2011), management logics (Boitier & Rivière, 2016), and sustainable development and social responsibility strategies and practices (Chatelain-Ponroy & Morin-Delerm, 2012; Petitjean et al., 2021).

Stakeholder theory (Freeman, 2010) and legitimacy theory (from the institutional perspective of DiMaggio & Powell, 1983; Meyer & Rowan, 1977; and Powell & DiMaggio, 1991) also share the assumption that organizational practices (in our case, the development of a course offering) are influenced by the values of the environment in which the organization operates. Organizations seeking legitimacy try to ensure they are operating within the norms of their society, adopting strategies and practices consistent with its values, expectations, and standards (Meyer & Rowan, 1977). As underlined by Meyer and Rowan (2006), the educational system, operating in an increasingly knowledge-dependent economy, occupies a central role in society, leading a multitude of stakeholders to want to participate in its governance (families, businesses, states, etc.), which increases pressure on these organizations (Rowan, 2006). Stakeholders have been identified as key components in the governance of universities (Flórez-Parra et al., 2019; Leroux & Pupion, 2012; Meyer & Rowan, 2006). The university's stakeholders include its staff and the state, but also the public, and future students. Leroux and Pupion (2012) distinguish between primary stakeholders, which '*include individuals whose issues are directly linked to the university's organization and production* [translation]' (op. cit., p. 255), and secondary stakeholders, which include rating agencies, businesses, national research bodies, local communities, etc. The distribution of stakeholders may, however, vary depending on the academic discipline studied. For example, Leroux and Pupion (2012) indicate that businesses have relatively low power. However, in the fields of accounting and business at the university level, the power of businesses, professional associations, and professional orders appears to be greater. Thus, as Anteby (2015) points out, the links are such that business executives

and managers evaluate the interest of what is being taught and, more generally, they assess instructors' activities. Such stakeholders could therefore influence the development of how blockchain is taught in a specific area (accounting) that has high expectations around this subject (Desplebin et al., 2021).

The quest for legitimacy and the nature of the pressures in an institutional environment lead organizations in the same organizational field to resemble each other (homogeneity). This homogeneity results from a process of institutional isomorphism (DiMaggio & Powell, 1983). Rowan (2006) underlines that market conditions in the education sector and the response of educational organizations leads to the isomorphism of these organizational populations. DiMaggio and Powell (1983) identify three forms of institutional isomorphism: coercive isomorphism, normative isomorphism, and mimetic isomorphism. These three forms have been identified in relation to the strategies employed by universities (Meyer & Rowan, 2006; Mouline, 2018; Rizza, 2008). Coercive isomorphism is associated with the pressures exerted by the supervisory authorities (government departments) that validate the courses universities offer or that establish performance indicators by which they can be compared. Mimetic isomorphism is associated with competition between universities as well as with other education actors, such as private schools. For example, Verseman (1998) shows how private Lutheran schools made a strategic choice to intentionally imitate public schools by adopting almost identical commercial strategies. Normative isomorphism is based in particular on the value systems that are shared in teaching and research institutions and that often lead to '*situations that may seem contradictory: public service versus profitability; the quality of their missions versus limited means; the professionalization of teaching versus pedagogical and scientific recognition* [translation]' (Mouline, 2018). DiMaggio and Powell (1983) clearly link universities to isomorphism. Thus, the authors explicitly identify universities as important actors in the development of organizational norms among professional administrators and their staff, in particular by standardizing the profiles of graduates, thereby creating a '*pool of almost interchangeable individuals*' (Ibid, p. 152). It is worth examining the inclusion of blockchain-related courses in accounting education as a new factor in this standardization, which will incorporate a new skillset into the pool of individuals. Accordingly, we apply a methodology that lets us analyze how the world's top universities educate accounting students on this subject.

Methodology and methods of the study

To perform the study, we visited the websites of the 50 highest-rated universities in the world (according to the 2021[2] Shanghai Ranking) to collect descriptions and syllabuses of courses that included or addressed blockchain technology and that could be selected by students enrolled in an accounting program. The data were collected manually for each university in the sample. The keyword 'blockchain' was used to perform searches on the schools' websites or on the websites dedicated to the courses they offered. As Béchard (2016, p. 30) points out, '*researchers are increasingly analyzing institutional websites because the information is accessible and the method is affordable* [translation].' Furthermore, in higher education, websites serve as information showcases aimed primarily at attracting new students (Béchard, 2016). The search allowed us to identify 229 courses offered in the fall of 2021 that were available to students enrolled in an accounting

program. The number of courses per university varied significantly. Many universities offered only one course (11 universities), while some offered more than 10 (and as many as 14 at the University of California, Berkeley). Some of these courses came under accounting departments, while others were outside these departments and were located in business schools (faculties) or outside them (in the latter two cases, the courses were often optional or outside the core curriculum of accounting students). In all cases, these courses could be selected by accounting students as part of their progression through accounting courses, certificates, or programs.

An exploratory approach was taken to code the course content (the curricula), comparable to the approach proposed by Gioia et al. (2013). The analysis was based on the three major steps identified in the literature (Pratt et al., 2006): (1) classifying verbatim transcripts into descriptive empirical themes; (2) initial abstraction of these themes into conceptual categories that make sense of the issue; and (3) a second conceptualization, based in particular on an analysis of the first-order conceptual categories and establishing relationships between these categories for analysis purposes. The objective of the second round of analysis was to identify practices and behaviors. The descriptions and syllabuses of the 229 courses were analyzed manually using a conceptualizing reading approach (Figure 1). Each of the three researchers individually coded the data manually, as suggested by Bhattacherjee (2012). The three sets of codes were compared and discussed collectively, and constant comparison techniques were used to assist in discerning the classifications. Differences were discussed in order to reach a consensus on the coding. Cohen's κ was run to determine if there was agreement between researchers. The

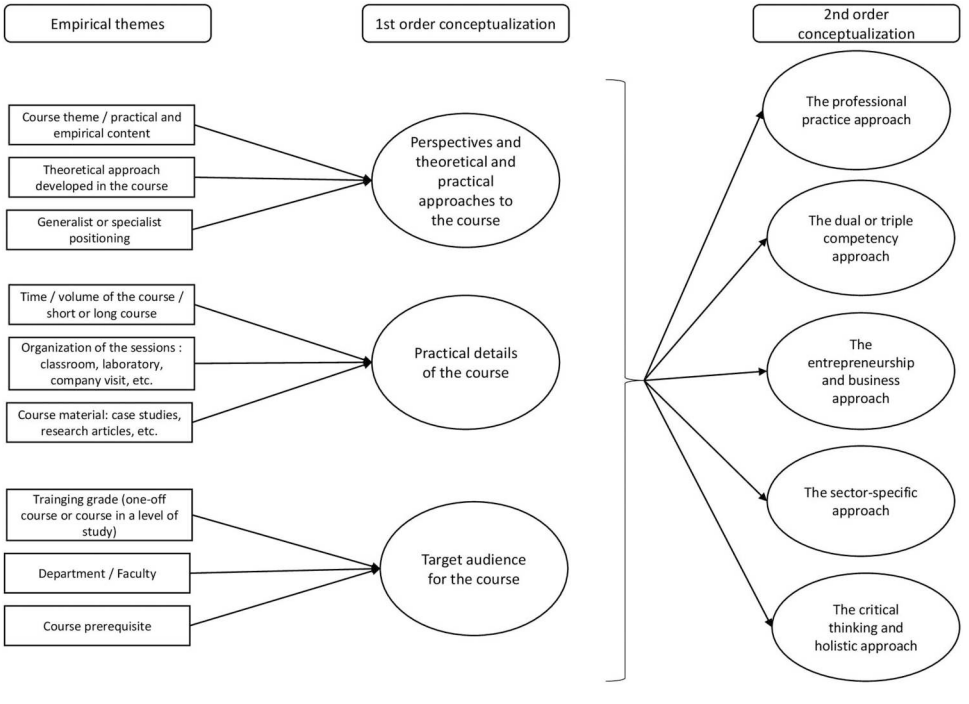

Figure 1. Analysis of blockchain course data (source: the authors).

coefficient of agreement $\kappa = 0.804$ ($p < .001$) shows moderate to strong agreement between the researchers (McHugh, 2012).

We first identified empirical concepts, constituting our first-order analysis. We then developed our first-order codes (Gioia et al., 2013; Miles & Huberman, 2003) to produce simple descriptions of the course contents and modalities. These codes are the following:

In the second step, we followed the recommendations of Miles and Huberman (2003) and Gioia et al. (2013) by performing axial coding to transform empirical concepts into conceptual categories through a process of abstraction. As we had no theoretical reference on the subject, this work was performed using a purely inductive approach. This allowed us to identify three categories forming the basis of the last level of analysis: (1) the course's target audience, (2) its practical and instructional aspects, and (3) its theoretical and practical perspectives.

The final stage of the analysis involved searches to aggregate and reconcile conceptual categories in order to support an analytical reading of the 229 courses analyzed and the university strategies around teaching an innovation like blockchain. The model presented below (Figure 1) is the result of these three stages. It reveals five main types of courses dealing with blockchain in the world's top 50 universities: 1) professional practice; 2) dual or triple competencies; 3) entrepreneurship and business; 4) sector-based; 5) critical thinking and holistic.

Results

Group 1: the professional practice approach

This group consists of 85 courses (Figure 2), and is the most widely used approach in our classification system. These courses are designed to introduce blockchain as a component of a student's specialized training. They are all intended for managers (but are explicitly open to accounting students), and are mostly designed as an introduction to the topic rather than to provide in-depth training. They are mainly given by business schools or faculties of management, accounting, or finance (32 courses). However, some courses

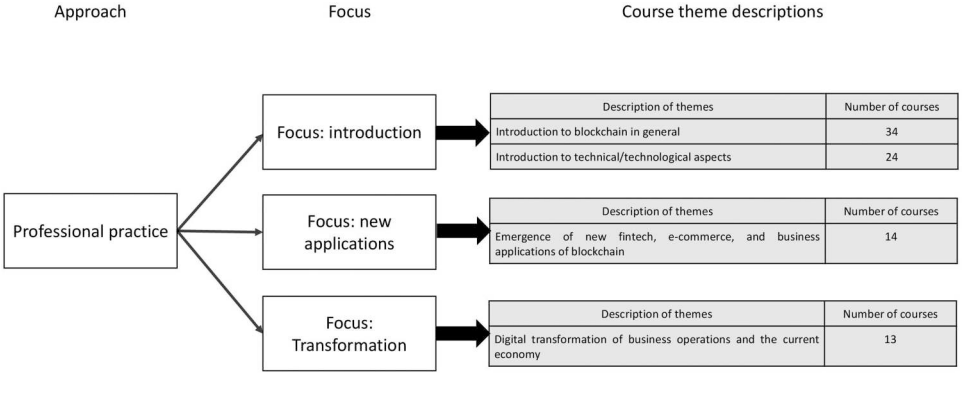

Figure 2. Themes of blockchain courses with a professional practice approach that are available to accounting students (source: authors)

come under engineering or computer science faculties (24 courses), particularly when introducing technical aspects of blockchain and its applications in organizations. In this case, the course is often optional in the accounting student's curriculum. Lastly, a large number of courses are offered as part of executive education or continuing education programs (22 courses), illustrating the perceived interest in training working professionals on this technology.

The courses are homogeneous in the subjects they cover and can be grouped under four separate themes.

The introductory courses on blockchain are generic courses addressing the subject of blockchain in all its diversity and touching on various ways to approach the topic. The aim is to introduce students to the subject and expose them to issues (economic, technical, legal, etc.), without emphasizing any one particular angle. This generalist approach was the one most frequently found, and many universities offer it, sometimes as the only option for blockchain.

Other courses, offered by engineering and computer science faculties, approach the subject from a more technical point of view. However, in this case, the aim is not to provide students with dual competencies in terms of coding ability, but rather to give them an understanding of the technology's operating mechanisms and how they translate into application capabilities, in order to become familiar with the field and how it operates.

The last group of courses consists of two similar but nevertheless distinct themes.

The first covers courses focused on potential applications of blockchain and the new opportunities presented by this technology in terms of new fintech or e-commerce product creation. In this case, the aim is to train students on the potential emergence of new products or new markets that they may need to follow or develop in the workplace, without necessarily taking an entrepreneurship approach.

The second theme consists of 13 courses also pertaining to potential applications of blockchain, excluding new products and creations linked to the technology. They focus on the transformation of corporate operations and the economy through leveraging the possibilities offered by blockchain. Students are encouraged to think about the transformation of current business models in response to the arrival of potentially disruptive technologies.

Group 2: the dual or triple competency approach

The sample features 66 courses involving two or three competencies (Figure 3), 56 for the former (2 fields of study) and 10 for the latter (3 fields of study). This type of course is offered at 24 universities in the top 50. The schools offering at least one of these types of courses are somewhat homogeneous, with one or two of the courses offered by 17 out of the 24 universities (71%); three courses by six universities (25%); and four courses by just one university (Stanford – 4%).

Although the schools appear to be somewhat homogeneous by offering this type of course, the overall offerings are nonetheless rich and varied. The courses associate 13 different fields with blockchain (Table 1), two of which were dominant in terms of number of courses: (1) blockchain and law (23 courses) and (2) blockchain and computer

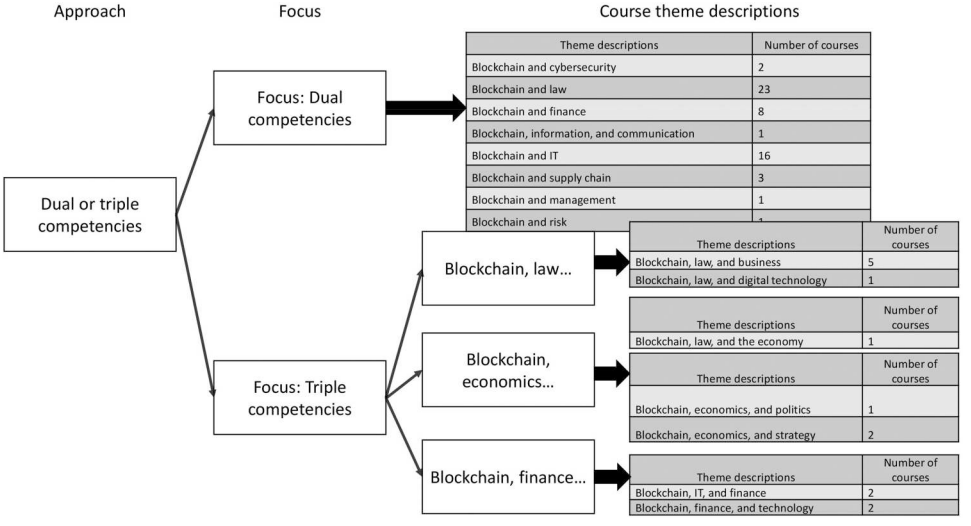

Figure 3. Themes of blockchain courses available to accounting students that target two or three competencies (source: the authors).

science (16 courses). Midway through the list is blockchain and finance (eight courses, most of which are course co-constructions with departments other than accounting).

These dual or triple competency courses are aimed at two separate audiences, as confirmed by their course outlines, instructional conditions, and number of hours. The first course offering (53 courses; 80%) is aimed in a fairly traditional way at students pursuing a bachelor's or master's degree. In this case, the courses involve a commitment of about 40 h that are usually spread out over more than two months. A second course offering (13 courses; 20%) is aimed at an audience outside the academic path (a complete academic program). The courses are offered on a one-off basis or as part of a certificate, thus with course lengths ranging from a half-day (three hours) and a maximum of three or four days (approximately 20 h).

An analysis of this academic offering and the associated conditions reveals three different approaches.

The first is to provide an overview or generalist approach, based on basic knowledge at the intersection of two or three disciplines. These courses are either very short (one day) or long (a traditional course lasting approximately 40 h). The sample courses with a unique

Table 1. Description of empirical codes.

Department / faculty	Department where the course(s) is/are given
Course approach: generalist vs. specialist	Breakdown between courses that provide an overview and those that examine a specialized aspect
Practical and empirical course content	What is the course about? Does it cover practical aspects of blockchain? If so, how?
Theoretical approach	Do the courses use theoretical perspectives and approaches? If so, which ones?
Course duration	In hours, and long-range schedule of sessions
Instructional environment	In the classroom, the laboratory, company visits, etc.
Level of study	Certificate, Bachelor's, Master's, etc.
Course materials	Theory, business case studies, research articles, and white papers as teaching aids, project-based teaching, etc.
Instructors	Classroom lectures given by an academic or professionals invited as guest lecturers?
Focus	The three main themes addressed in the programs reviewed

theme fall under this approach. Examples include a course dealing with cyber risks in companies (blockchain and cyber risks) or the 'issues' at the intersection of several fields, such as a course entitled 'Legal Challenges Posed by New Technologies and Emerging Issues.'

In addition, there is a hyperspecialized approach that addresses only a small area within the overlap between two or three fields. These courses are exclusively part of the academic programs and require a significant time commitment (around 40 h). They discuss very specific aspects of one or more fields, such as one course at the intersection of blockchain and law titled 'Legal Issues Associated with Digital Currency Transactions,' which focuses on digital currency transactions carried out de facto in blockchain rather than on blockchain in general.

Lastly, some courses have a technical and applications approach and are mainly tied to IT or ICT. They are generally quite involved, lasting 30 to 60 h, because they usually feature technical learning, such as accounting-related coding. Course themes include 'Learning SmartContract Programming' and 'Coding smart contracts.'

Group 3: the entrepreneurship and business approach

A significant component of the course offerings (37 courses) deals with entrepreneurship and the business models associated with business development (Figure 4). This course offering can be found in 15 of the top 50 universities, each consisting of one to five such courses.

The courses on blockchain entrepreneurship and business models are mainly offered by business schools (17 courses), but also, to a considerable extent, by engineering/computer science faculties (six courses). Some courses are created jointly by business schools and engineering faculties (three courses). Lastly, more infrequently, some are offered in partnership with faculties of law (3), liberal arts faculties (1), and on a foreign campus not tied to a specific faculty (2). In the latter case, the courses are strongly influenced by the associated faculty (e.g. legal approaches to the issue) or the context (e.g. regional considerations). One example is a course on blockchain entrepreneurship in a specific geographical area (China and Hong Kong).

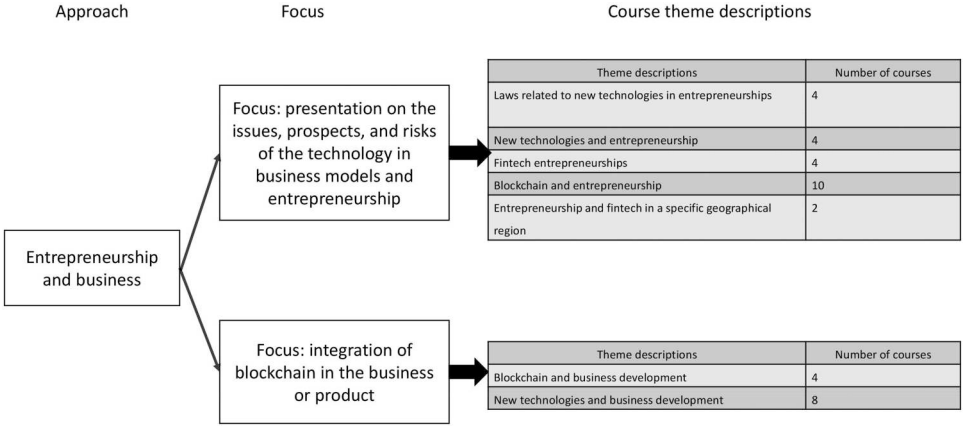

Figure 4. Themes of blockchain courses with an entrepreneurship and business approach available to accounting students (source: the authors).

Our analysis also found that some are part of continuing education or executive education programs (five courses). As a result, the courses dealing with entrepreneurship or business models have a very wide range of instruction times, from six hours to 60 h. Several courses are given in less than 20 h or three days (five courses), while the rest take from 35 to 49 h to complete (exceptionally, one course runs for 60 h and has a heavy component of real-world case studies).

The courses focus mainly on entrepreneurship related to blockchain and business models related to fintech and digital technologies (with a view to creating new activities). A large majority of these courses are also offered to engineering and business students at the same time, in particular with a view to getting the students to work together in start-up mode.

An analysis of the course content and teaching modalities under the theme of blockchain entrepreneurship and business models revealed, *a priori*, two main types of course content. The first provides relatively theoretical content that develops reflections on issues, outlooks, and risks related to the technology in business models and entrepreneurship. The second type of content adopts a more operational point of view to address issues such as how to effectively integrate blockchain into a business and how to develop and position a blockchain product in a business. This second type of content is, in most cases, specialized by sector of activity (industry, finance, or services), geographical area (United States, China, etc.), or degree of integration of blockchain into the business (product or service, commercial process, production process, etc.).

Group 4: the sector-specific approach

The fourth component of the course offerings (31) is a group of sector-specific courses (Figure 5) designed to move away from the siloed professional practice approach. The content is not geared to a discipline but to the issues raised by blockchain. Adopting

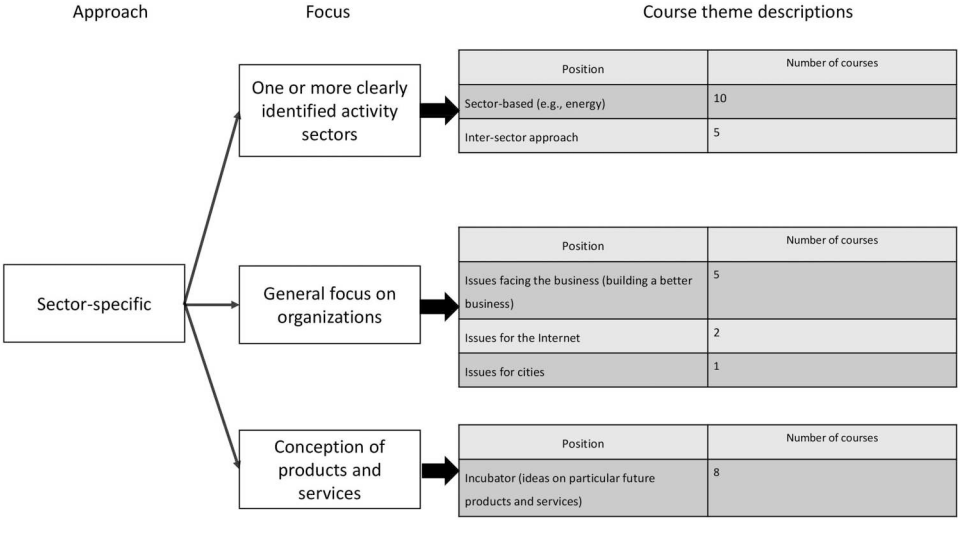

Figure 5. Themes of sector-specific blockchain courses available to accounting students (source: the authors).

this point of view, the courses focus on students' versatility and their ability to develop a personal blockchain project.

We refer to courses positioning blockchain within a particular economic sector as sector-specific. Ten courses were identified as dealing with specific sectors, such as services, fintech, culture, e-commerce, marketplace commerce, energy, utilities, politics, and developing economies.

The less specific offerings consist of five courses with a cross-industry approach, addressing, for example, the place of blockchain simultaneously in medicine, law, economics, and other sectors or in supply chains, fintech, healthcare and energy.

In addition, five courses have the theme of business challenges but do not distinguish between fields or sectors. Two courses adopt a similar perspective, addressing challenges faced by cities and challenges for the internet. Lastly, similar to the previous courses, eight courses are positioned as incubators for thinking about and building a better company and company ecosystem using blockchain. These courses are all aimed at a diverse audience, as underscored by this excerpt from the course outline: 'Students from all disciplines and all years, both undergraduate and graduate, are welcome. The selection of teams will be controlled to ensure that they are multidisciplinary in nature.' The course is based on the incubator principle: 'The program begins in Singapore with several days of intensive learning through discussions, lectures, case studies, simulations, role playing and exercises. The course is structured as an incubator where multidisciplinary teams of students will work together on real-world deliverables.' Note that all the above courses (see figure below) are offered by nine different universities, seven of which are in the top 10 (and all of which are in the top 20).

Group 5: the critical thinking and holistic approach

The fifth group consists of courses (10) that are mainly holistic and based on critical thinking (Figure 6). The holistic approach is found in a series of courses in which students are given blockchain projects (not related to entrepreneurship). In addition, some courses do not have blockchain as the main theme but include it as one component of business and company transformation, adopting a holistic approach to the evolution of the business world. However, featuring blockchain as one component among many others in business transformation could also be viewed as using a critical thinking approach, in view of the effects of the growing enthusiasm for the technology.

Some courses use deep critical thinking to look at the technology and its implications, such as offerings that use prospective and post-humanist approaches. For example, Stanford University has a course presenting utopic and dystopic scenarios on a wide array of cutting-edge technology such as robotics, AI, genomics, autonomous vehicles, blockchain, and 3D printing. The National University of Singapore offers a course that takes a critical look at emerging technologies, such as transplanted and artificial body parts, cyborgs, mind uploading, blockchain, and the Internet of Things. It examines the mechanisms by which the expansion of intellectual property laws is enabling a growing commodification of humanity. Another Stanford University course allows students to imagine what roles stakeholders (markets, governments, etc.) should have in shaping blockchain. Also within the critical thinking category, New York University offers a class that offers an explicitly critical analysis of the technology's political

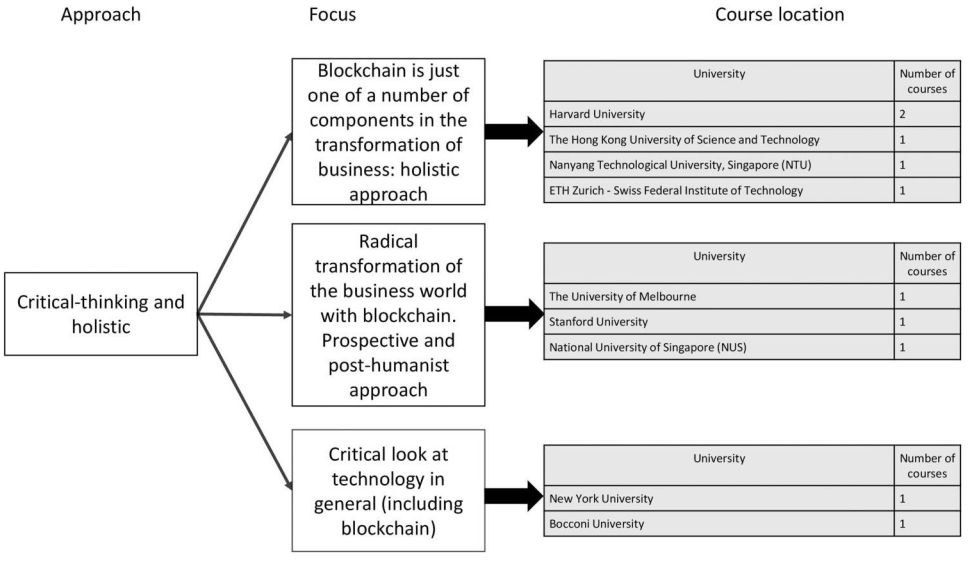

Figure 6. Themes of blockchain courses using a critical thinking and/or holistic approach, and their locations (source: authors).

neutrality. Bocconi University offers a module aimed at enabling students to critically analyze the impact of modern technology in the field of economics.

Discussion

These results lead to discussion points in relation to our research question (how is blockchain being taught to accounting students in universities?)

Highly homogeneous practices

An initial reading of our results confirms the work of Pelletier (2009) and Rowan (2006), who point out, among other things, a trend toward increased standardization of course progressions. In fact, the first three approaches we have identified reveal homogeneity in the blockchain courses offered by these universities. This seems to be the result of an institutional isomorphism process (DiMaggio & Powell, 1983), and this is particularly true for these first three categories—professional practice courses (group 1), courses targeting two or three areas of competency (group 2), and courses geared to entrepreneurship (group 3). These courses are homogeneous in the topics they address, which fall under a scant few distinct themes or themes that are often repeated across the top 50 universities. Such homogeneous practices reveal the presence of a mimetic isomorphism associated with competition between universities (Mouline, 2018; Rizza, 2008) and schools, as well as a desire for legitimacy in the professional world (Dumitru et al., 2014) and with stakeholders (Flórez-Parra et al., 2019; Leroux & Pupion, 2012; Meyer & Rowan, 2006). In fact, companies (and their representatives) exert considerable power over the fields of accounting and business in universities (Anteby, 2015), as do professional accounting associations (especially in Anglo-Saxon countries – US,

Canada, Australia, and the UK) and accounting firms. Blockchain and the innovations and changes around the field of accounting are generating considerable expectations among professionals in the field (Desplebin et al., 2021; Felsky & Empey, 2020). In response, universities have been homogeneous, as reflected in their introductory courses on blockchain, specialized courses in two or three areas of competency, and courses geared toward entrepreneurship. These courses appear to supply accounting students' foundational learning of blockchain.

It therefore appears that offering courses on blockchain is a prerequisite for legitimacy for any university in the top 50. However, the schools display some differences in their quest for legitimacy on the worldwide market.

Attempts at differentiation

Our results show that some universities, in addition to their 'traditional' courses (evincing their homogeneous practices), offer original courses that fall under the sector-specific approach (group 4) or the critical thinking and holistic approach (group 5). All these courses are found in the top 25 schools (90% in the top 20). In addition, given the global competition among universities (Mouline, 2018), some schools (the highest ranked, according to the Shanghai Ranking) seek to stand out in teaching blockchain in their academic programs. They therefore appear to be developing a specific management strategy (Bess & Dee, 2008; De La Harpe & Thomas, 2009; Morrill, 2010). However, an analysis of course content, coordination, and instruction appears to indicate that the development of such courses may depend more on the particular interests of the instructors rather than an institutional directive issued in response to a strategy. The ability of universities to offer curricula addressing the latest innovations may therefore be based primarily on the capacity and willingness of individual professors to teach rather than on any genuine institutional strategy. This point appears to give credence to the idea that an organization's culture prevails over its strategy. This domination is illustrated by the fact that the design of courses and programs (curricula) dealing with innovations depends mainly (in line with universities organized as 'professional bureaucracies') on teacher-researchers, who are the sole '*repositories of the skills and knowledge making it possible to engage in fulfilling the mission of higher education institutions* [translation]' (Noël, 2009, p. 115), and not on the university's senior administration and hierarchy. However, the fact that the highest ranked universities (the top 25 in the Shanghai Ranking) are exclusively represented in the group discussed here suggests that university institutions have a hand in developing this type of course offering. They may possibly recruit teacher-researchers with specific profiles (the Shanghai Ranking is based on aspects such as number of Nobel prizes, Fields medalists, publications in certain journals, rates of citations of teacher-researchers, and indexing of articles in databases) (Barats & Leblanc, 2013). The schools could also be giving higher-profile teacher-researchers more latitude and autonomy in decision making (academic freedom). Therefore, if institutions implemented a recruitment strategy for professors or other actors in connection with these aspects, it could lead to a greater likelihood of institutions teaching innovations, and teacher-researchers doing the same. At any rate, the fact that five educational approaches have been identified here indicates that a selection process does occur. The impetus behind these choices cannot be fully understood at this stage of study, however. Obstacles to introducing a course in higher

education are a fact. They include the traditional financial, human, material, time, and other constraints, in addition to consideration of the expectations of primary or secondary stakeholders, as mentioned previously (Leroux & Pupion, 2012).

Attempts at differentiation raise the issues of the innovation's temporality and mimetism in curricula

These results could be viewed as counter-intuitive. Universities are essentially places of innovation, and they want to deliver innovative course content. We could have hypothesized that the teaching of an innovation whose future prospects are still unstable across all their dimensions would lead to a vast array of course contents in the offerings. This is not actually the case, and similarities in blockchain instruction by these various universities might be a paradox, in that the innovative nature of the subject is not necessarily followed by innovation in teaching methods. The presence of strong mimetism in the blockchain courses in groups 1 to 3 at the top 50 universities and the fact that groups 4 and 5 are different from the others, which also indicates some mimetism in a smaller group of universities in the top 20/25, suggests, within the isomorphism process, a possible temporality of mimetism within the groups.

Mouline (2018) explains that universities caught up in the growing global competition are simultaneously developing exploitation and exploration activities to become ambidextrous in education and research. Exploration combines the search for new ideas, new markets, new relationships, discovery, innovation, and risk-taking. Exploitation involves the search for efficiency in the traditional fields of research and education. We could therefore surmise that the teaching of blockchain as a new technology was, for a time, an exploratory activity fully in line with the objectives of these universities. Gradually, but quickly, universities adopted similar behaviors in terms of teaching the technology according to their resources, including according to the characteristics of their teacher-researchers (who may have similar training and skillsets, and who may develop courses that fit with these skillsets and with their prior experiences), giving rise to mimetic isomorphism on a number of levels, contributing to distinctions between the universities. This could be explained by the fact that these schools, engaged in a global competition involving knowledge dependence (Meyer & Rowan, 2006), cannot ignore the effects of the trend of putting technology topics in teaching content, particularly to attract students, who bring financial resources with them. In offering these courses, the most cutting-edge universities with the greatest resources seem to have pulled ahead.

Conclusion and research agenda

This study analyzes blockchain education for accounting students and professionals at the world's top 50 universities (according to the 2021 Shanghai Ranking). It provides an insight into how these institutions are laying hold of new knowledge and passing it on to their students. The course offerings are essentially shaped by the subject (a technological innovation) and the target audience—current or future managers and accounting professionals. The many blockchain courses offered at these institutions can be classified under five approaches: a professional practice approach, consisting of introducing blockchain as a component of the student's specialist training; a dual/triple competency

approach, combining blockchain with a non-core discipline, such as law, IT, economics, etc.; an entrepreneurship approach, covering business models used in the development of activities in connection with blockchain; a sector-specific approach, breaking out of silos in various fields to look at blockchain in a specific context or sector; and a critical thinking and holistic approach, imparting ideas on the transformation propelled by blockchain technology. These five groups collectively raise the issue of homogeneity of practices and differences between universities.

Universities can use these results to position their course offerings. Among the courses documented here, we do not view one approach to be better than the other. Selecting a specific type of blockchain program will hinge on a range of constraints, particularly financial, human, regulatory, market, and time considerations. Decision aid tools at the university can provide assistance with this process. As senior administrators in our universities (academic director of a faculty in a Chinese university, vice-president of a French university, and director of a PhD program at a Canadian university), we suggest that universities seeking to introduce blockchain in their professional accounting programs should first ask a series of questions that we consider to be of prime importance. This list of questions is not exhaustive, however.

First, a series of generic questions should be asked in relation to introducing any new course in the university:

What teaching competencies do we have?
The creation of blockchain courses creates pressure on the pedagogical team and can require hiring new specialized teachers or reassigning personnel from other programs. This could lead to tensions within the teaching body, and even conflict.

What will be the financial impact of the decision?
Creating a new course often involves considerable costs, especially to pay for course hours and new teacher recruitment, purchasing new equipment and technology (particularly IT infrastructure for blockchain), and implementing a quality teaching program (conception, communication, and implementation of the program).

Creating a new program involves expectations in terms of inflows, which depend directly on market demand and social and economic expectations from the outside. Universities are frequently caught between a number of imperatives. First, they must take into consideration market demand in terms of competencies and knowledge so as to ensure their programs will lead to professional opportunities for students. Second, regarding the topics discussed here, schools must also teach innovation, such as emerging technologies and rapidly developing fields. Concurrently, they must foster research and collaboration with companies and government organizations, with a view to developing and teaching innovative solutions to complex problems. Third, schools must focus on academic quality by offering high-quality academic programs, hiring high-reputation teachers, conducting cutting-edge research, and obtaining certifications. This strategic positioning could attract students and talented faculty and enhance the university's reputation. Lastly, schools must increase their community engagement by offering academic programs that meet local needs and by establishing partnerships with companies and community organizations. They can demonstrate good corporate citizenship by organizing events that are open to the community

and by encouraging students to become involved in volunteerism. This could help schools meet the sometimes disparate expectations of stakeholders such as students, teachers, companies, the community, and the social and economic environment. Regarding these expectations, and working under the constraint of their resources, schools must judiciously select a strategic position for themselves in order to remain attractive and ensure their own longevity.

We now suggest a more specific question surrounding the introduction of blockchain in professional accounting programs:

What are the regulatory restrictions concerning accounting, control, and auditing courses?

Universities must comply with the standards and regulations established by a variety of organizations, particularly concerning the content and duration of academic programs. This is particularly the case in accounting. For example, in France, graduate accounting, control, and auditing course outlines relate to the teaching modules for the national accounting diplomas (DCG – accounting and management diploma, and DSCG – graduate accounting and management diploma). These outlines also must meet the expectations of the association of chartered accountants and the association of auditors. Similarly, the contents of undergraduate accounting programs in Canada are designed to meet requirements for the examination of the Chartered Professional Accountants of Canada (CPA). Any changes in the examination have a profound effect on the content of undergraduate programs.

This study has some limitations, notably the fact that the sample used for our analysis is based on a ranking (Shanghai) that has been the subject of criticism (Fernández-Cano et al., 2018), particularly with regard to judging teaching (Desbois, 2007). According to Harfi and Mathieu (2006), the authors of the Shanghai Ranking justify their selection criteria based on the following two points:

> 1) It is very difficult to precisely measure the quality of teaching at the universities; at any rate, there are no criteria for making international comparisons possible in that regard; 2) the indicators used to establish the Shanghai Ranking provide a fairly good idea of the international reputation of the institutions in terms of teaching [translation].

The ranking is therefore an imperfect tool, but it does have the merit of providing information on the most watched universities around the world. A second limitation of this study is that it relies solely on online descriptions to compare the university courses.

This study could be supplemented with interviews with teacher-researchers and the heads of university accounting departments and schools, with a view to answering questions such as: How do you teach blockchain to accounting students? How should blockchain be taught to accounting students? What resources are needed to teach blockchain? These studies would make it possible to overcome the limitation of having only one source of data—the curricula listed online—and to draw on a panel of experts regarding the issues surrounding blockchain pedagogy.

We have also discussed our contribution to the study of isomorphism of universities. Although we were able to observe that the practices among the universities were fairly homogeneous, a characterization of the isomorphic process would require a longitudinal

approach, which could be addressed in a future study. Such a study could, for example, replicate our approach but collect the curricula in different phases (over three, four, or five years). It could thus observe changes in course content, and above all, identify the isomorphic process by addressing these sub-questions: Which universities have original approaches to their courses? How are these courses positioned (type of audience, type of specialization, etc.)? Which universities are innovative and which of them follow innovations?

Notes

1. Refers to the theory of the firm, developed mainly by Harvard professors Mason and Bain.
2. Despite some weaknesses, the Shanghai Ranking has the advantage of being thoroughly researched in the literature and characterized as fairly stable (Docompo et al., 2022). Although it has been criticized, it has for years been an archetypal reference to the award list concept in academics (Barats & Leblanc, 2013). Other rankings could have been used, such as QS Universities Rankings or The Times Higher Education World University Rankings. The universities competing for the highest slots, i.e., those selected for our study, are almost all listed in these other rankings as well (Pavel, 2015).

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References

Anteby, M. (2015). *L'École des patrons. Silence et morales d'entreprise à la Business School de Harvard*. Éditions de la rue d'Ulm.

Barats, C., & Leblanc, J. (2013). Généalogie de la co-construction médiatique du « classement de Shanghai » en France. Corpus de presse et usages sociodiscursifs. *Mots. Les langages du politique*, *102*, 67–83.

Béchard, J. (2016). *Penser la formation en gestion: Repères pour l'enseignement supérieur*. Presses de l'Université de Montréal.

Bédard, D., & Raucent, B. (2015). Les innovations pédagogiques en enseignement supérieur: pédagogies actives en présentiel et à distance. *Revue internationale de pédagogie de l'enseignement supérieur*, *31*(1), 1–3.

Bellucci, M., Cesa Bianchi, D., & Manetti, G. (2022). Blockchain in accounting practice and research: Systematic literature review. *Meditari Accountancy Research*, *30*(7), 121–146. https://doi.org/10.1108/MEDAR-10-2021-1477

Bess, J. L., & Dee, J. R. (2008). *Understanding college and university organization: Dynamics of the system (Vol. 2)*. Stylus Publishing, LLC.

Bhattacherjee, A. (2012). *Social science research: principles, methods, and practices* (2nd ed.). CreateSpace Independent Publishing Platform.

Boitier, M., & Rivière, A. (2016). Les systèmes de contrôle de gestion, vecteurs d'une logique gestionnaire: Changement institutionnel et conflits de logiques à l'université. *Comptabilité-Contrôle-Audit*, *22*(3), 47–79.

Bollecker, M. (2016). L'adoption de la comptabilité de gestion à l'université: la présence de clivages internes dans un contexte de demandes institutionnelles contradictoires. *Comptabilité-Contrôle-Audit*, *22*(2), 109–138. https://doi.org/10.3917/cca.222.0109

Calderon, J., & Stratopoulos, T. C. (2020). What accountants need to know about blockchain. *Accounting Perspective*, *19*(4), 303–323. https://doi.org/10.1111/1911-3838.12240

Chatelain-Ponroy, S., & Morin-Delerm, S. (2012). Adopter les pratiques de reporting de développement durable : le cas des universités françaises. *Politiques et Management Public*, *29* (2), 253–280. https://doi.org/10.3166/pmp.29.253-280

Coyne, J. G., & McMickle, P. L. (2017). Can blockchains serve an accounting purpose? *Journal of Emerging Technologies in Accounting*, *14*(2), 101–111. https://doi.org/10.2308/jeta-51910

Cros, F. (2002). L'innovation en éducation et en formation: topiques et enjeux. *Les logiques de l'innovation*, 211–240. https://doi.org/10.3917/dec.alter.2002.01.0211

Damanpour, F., & Schneider, M. (2009). Characteristics of innovation and innovation adoption in public organizations: Assessing the role of managers. *Journal of Public Administration Research and Theory*, *19*(3), 495–522. https://doi.org/10.1093/jopart/mun021

Deegan, C. (2014). An overview of legitimacy theory as applied within the social and environmental accounting literature. In J. Unerman, J. Bebbington, & B. O'Dywer (Eds.), *Sustainability accounting and accountability* (pp. 248–272). Routledge.

Degos, J. G. (2017). Les blocs chaînés et la future fiabilité des missions d'expertise comptable. *La Revue du financier*, *39*(224–225), 13–24.

De La Harpe, B., & Thomas, I. (2009). Curriculum change in universities: conditions that facilitate education for sustainable development. *Journal of Education for Sustainable Development*, *3*(1), 75–85. https://doi.org/10.1177/097340820900300115

Delahaye, J.-P. (2015). Les Blockchains, clé d'un nouveau monde. *Pour la Sciences*, *39*(449), 40.

Desbois, D. (2007). Classement de Shanghai: peut-on mesurer l'excellence académique au plan mondial? *Recherche, Technologie et Société*, *67*, 20–26.

Desplebin, O., Lux, G., & Petit, N. (2018). L'évolution de la comptabilité, du contrôle, de l'audit et de leurs métiers au prisme de la Blockchain: une réflexion prospective. *Management & Avenir*, *103*, 137–157. https://doi.org/10.3917/mav.103.0137

Desplebin, O., Lux, G., & Petit, N. (2019). Comprendre la blockchain: Quels impacts pour la comptabilité et ses métiers? *ACCRA*, (2), 5–23. https://doi.org/10.3917/accra.005.0005

Desplebin, O., Lux, G., & Petit, N. (2021). To be or not to be: Blockchain and the future of accounting and auditing. *Accounting Perspectives*, *20*(4), 743–769. https://doi.org/10.1111/1911-3838.12265

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 147–160. https://doi.org/10.2307/2095101

Docampo, D., Egret, D., & Cram, L. (2022). An anatomy of the academic ranking of world universities (Shanghai ranking). *SN Social Sciences*, *2*(8), 146.

Dreveton, B., Lande, E., & Portal, M. (2011). *L'instrumentation des activités publiques. Le cas d'une université, 32ème congrès de l'Association Francophone de Comptabilité*. (AFC), Montpellier.

Dumitru, V. F., Stanciu, A., Dumitru, M., & Feleaga, L. (2014). Pressure and Isomorphism in Business Education. *Amfiteatru Economic Journal*, *16*, 784–799.

Felsky, E. A., & Empey, T. B. (2020). *Should blockchain be added to the accounting curriculum? Evidence from a survey of students, professionals and academics. The accounting educators' journal*, *30*, 201–218.

Fernández-Cano, A., Curiel-Marin, E., Torralbo-Rodríguez, M., & Vallejo-Ruiz, M. (2018). Questioning the Shanghai Ranking methodology as a tool for the evaluation of universities: An integrative review. *Scientometrics*, *116*(3), 2069–2083. https://doi.org/10.1007/s11192-018-2814-7

Flórez-Parra, J., López-Pérez, M., & López Hernández, A. (2019). La gouvernance d'entreprise dans les universités colombiennes. *Revue Internationale des Sciences Administratives*, *85*, 565–582. https://doi.org/10.3917/risa.853.0565

Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge university press.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, *16*(1), 15–31. https://doi.org/10.1177/1094428112452151

Godowski, C. (2003). Essai sur la dynamique d'assimilation des innovations managériales: Le cas des approches par activités. *Comptabilité Contrôle Audit*, *9*, 71–86. https://doi.org/10.3917/cca.093.0071

Gopalakrishnan, S., & Damanpour, F. (1997). A review of innovation research in economics, sociology and technology management. *Omega*, *25*(1), 15–28. https://doi.org/10.1016/S0305-0483(96)00043-6

Harfi, M., & Mathieu, C. (2006). Classement de Shanghai et image internationale des universités: quels enjeux pour la France? *Horizons stratégiques*, *2*, 100–115.

Jiang, Y., & Zheng, W. (2021). Coupling mechanism of green building industry innovation ecosystem based on blockchain smart city. *Journal of Cleaner Production*, *307*, 126766. https://doi.org/10.1016/j.jclepro.2021.126766

Kimberly, J. R., & Evanisko, M. J. (1981). Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal*, *24*(4), 689–713. https://doi.org/10.2307/256170

Kotb, A., Abdel-Kader, M., Allam, A., Halabi, H., & Franklin, E. (2019). *Information technology in the British and Irish undergraduate accounting degrees*. Accounting Education.

Lemaître, D. (2015, June). Pourquoi innover? L'injonction pédagogique et ses enjeux éducatifs. *In VIIIe colloque Questions de pédagogie dans l'enseignement supérieur*, 71–80.

Leroux, E., & Pupion, P. (2012). Bilan social et personnel à l'épreuve de la nouvelle gouvernance des universités. *Management & Avenir*, *55*, 252–271. https://doi.org/10.3917/mav.055.0252

Lison, C., Bédard, D., & Côté, J. A. (2015). Être tuteur en apprentissage par problèmes: quels styles d'animation? *Revue internationale de pédagogie de l'enseignement supérieur*, *31*(1), 1–13.

McEneaney, L. H., & Meyer, J. W. (2000). The content of the curriculum: In institutionalist perspective. *Handbook of the Sociology of Education*, 189–211.

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia medica*, *22*(3), 276–282. https://doi.org/10.11613/BM.2012.031

Meyer, H. D., & Rowan, B. (2006). Institutional analysis and the study of education. *The New Institutionalism in Education*, 1–13.

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, *83*(2), 340–363. https://doi.org/10.1086/226550

Miles, M. B., & Huberman, A. M. (2003). *Analyse des données qualitatives*. De Boeck Supérieur.

Morrill, R. L. (2010). *Strategic leadership: Integrating strategy and leadership in colleges and universities*. Rowman & Littlefield Publishers.

Mouline, A. (2018). Les universités françaises à l'heure de la compétition mondiale et du Nouveau Management Public. *Management international/International Management/Gestiòn Internacional*, *22*, 143–148.

Noël, M. (2009). Chapitre 6. Où sont les clés du leadership stratégique en enseignement supérieur? Dans D. Bédard (Éd.), *Innover dans l'enseignement supérieur* (pp. 109–122). Presses Universitaires de France.

OECD. (2005). *The measurement of scientific and technological activities: Guidelines for collecting and interpreting innovation data*: Oslo Manual, Third Edition prepared by the Working Party of National Experts on Scientific and Technology Indicators, OECD, Paris.

O'Leary, D. E. (2018). Open information enterprise transactions: Business intelligence and wash and spoof transactions in blockchain and social commerce. *Intelligent Systems in Accounting, Finance and Management*, *25*(3), 148–158. https://doi.org/10.1002/isaf.1438

Paquelin, D. (2020). Innovation dans l'enseignement supérieur: des modèles aux pratiques, quels principes retenir? *Enjeux et société*, *7*(2), 10–41. https://doi.org/10.7202/1073359ar

Pavel, A. P. (2015). Global university rankings-a comparative analysis. *Procedia economics and finance*, *26*, 54–63. https://doi.org/10.1016/S2212-5671(15)00838-2

Pelletier, P. (2009). Chapitre 4. L'enseignement supérieur: un milieu sous influences? Dans D. Bédard (Éd.), *Innover dans l'enseignement supérieur* (pp. 77–92). Presses Universitaires de France.

Petitjean, J., Ory, J., & Côme, T. (2021). Quelle structuration de la démarche de Développement Durable-Responsabilité Sociale (DD-RS) à l'université? L'exemple des universités françaises. *Recherches en Sciences de Gestion*, *144*, 287–313. https://doi.org/10.3917/resg.144.0287

Pimentel, E., & Boulianne, E. (2020). Blockchain in accounting research and practice: Current trends and future opportunities. *Accounting Perspectives*, *19*(4), 325–361. https://doi.org/10.1111/1911-3838.12239

Powell, W. W., & DiMaggio, P. (1991). *The New Institutionalism in Organizational Analysis*. University of Chicago Press.

Pratt, M. G., Rockmann, K. W., & Kaufmann, J. B. (2006). Constructing professional identity: The role of work and identity learning cycles in the customization of identity among medical residents. *Academy of Management Journal*, *49*(2), 235–262. https://doi.org/10.5465/amj.2006.20786060

Qasim, A., El Refae, G. A., & Eletter, S. (2022). Embracing Emerging Technologies and Artificial Intelligence into the Undergraduate Accounting Curriculum: Reflections from the UAE. *Journal of Emerging Technologies in Accounting 1 September*, *19*(2), 155–169. https://doi.org/10.2308/JETA-2020-090

Qasim, A., & Kharbat, F. F. (2020). Blockchain technology, business data analytics, and artificial intelligence: Use in the accounting profession and ideas for inclusion into the accounting curriculum. *Journal of Emerging Technologies in Accounting*, *17*(1), 107–117. https://doi.org/10.2308/jeta-52649

Rizza, R. (2008). Néo-institutionnalisme sociologique et nouvelle sociologie économique: quelles relations? *Revue Interventions économiques. Papers in Political Economy*, *38*.

Rowan, B. (2006). The school improvement industry in the United States: Why educational change is both pervasive and ineffectual. *The New Institutionalism in Education*, 67–86.

Schumpeter, A. (1939). *Business cycles. A theoretical, historical and statistical analysis of the capitalist process*. McGraw-Hill Book Company.

Scott, W. R. (1995). *Institutions and organizations: Ideas, interests, and identities*. Sage publications.

Spillane, J. P., & Burch, P. (2006). The institutional environment and instructional practice: Changing patterns of guidance and control in public education. *The New Institutionalism in Education*, *6*, 87–102.

Stratopoulos, T. C. (2020). Teaching blockchain to accounting students. *Journal of Emerging Technologies in Accounting*, *17*(2), 63–74. https://doi.org/10.2308/JETA-2020-052

Verseman, D. (1998). *The distinctive mission of a private religious school system: The role of the teaching force in the schools the Lutheran Church-Missouri Synod. Ph.D. dissertation*. University of Michigan.

Yermack, D. (2017). Corporate governance and blockchains. *Review of Finance*, *21*, 7–31.