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IT Ethics and Law Courses: An Analysis of Curricula in Medium-Sized US Doctoral Classification Universities

Troy J. Strader
Drake University, troy.strader@drake.edu

J. Royce Fichtner
Drake University, royce.fichtner@drake.edu

Abstract

Information technology ethical and legal (ITEL) issues must be incorporated into university curricula to properly train new information technology (IT) specialists to deal with the full range of issues they will face in their careers. This report looks at the extent to which ITEL classes are being developed and taught in a sample of US universities. The study identifies which academic departments offer the courses, which university resource, governance, and enrollment profiles are most often associated with the offering of ITEL courses, and what topics are most commonly included in these courses. The sample of schools reviewed are the 163 US universities that are in the Carnegie classification for four-year medium-sized doctoral universities. Findings show that about five out of every eight universities that were reviewed offer at least one ITEL class and the largest number of unique ITEL courses at any university is five. The courses are most commonly taught at the undergraduate level in computer science. Further analysis shows that the universities that offer at least one ITEL class have larger total student enrollments, are publicly governed, and have a majority, or larger proportion, of undergraduate students. Course descriptions typically discuss the topics in general terms referring to the broad subjects of IT-related ethics and law, but it should be expected that AI's ethical and legal issues will receive more attention in the future. The report concludes with a set of recommendations for universities that are developing new ITEL courses and directions for future research.

Keywords: information technology ethics, information technology law, information systems curricula

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1. Introduction

In the decades after the invention of the computer, opportunities for new applications were most often determined by the extent to which processor speed and storage capacity had increased. In today's environment, it is not so much a matter of what can be done with information technology, but rather what should be done. Ethical and legal issues are much more significant. This is reflected in industry practice, but they are also an important consideration when developing new curricula. Information technology ethical and legal (ITEL) issues must be incorporated into university curricula to properly train new information technology specialists so they are prepared to deal with the issues they will face in their careers. Review task forces have recommended that this topic be incorporated into both undergraduate and graduate information systems (IS) curricula. One of the nine information systems competency areas included in the MSIS 2016 master's degree global competency model is ethics, impacts, and sustainability (Topi *et al.*, 2017). The task force's rationale for adding this competency is that MSIS 2016 focuses on capabilities that enable graduates to contribute to positive transformation of various societal activities through digitalization. They define ethics, impacts, and sustainability as the conceptualization and implementation of environmentally and socially sustainable IT solutions that are aligned with the responsibilities of organizations and in compliance with legislative and regulatory requirements and industry standards. The ACM/AIS IS2020 undergraduate IS curriculum review task force also recommended the addition of an organizational domain competency for ethics, use and implications for society (Leidig and Salmela, 2022). Their rationale for adding this competency is that it is related to the ubiquitous nature of information systems, and increasing influence of these systems in society.

These recommendations were made several years ago so there has been sufficient time for programs to incorporate these topics into their undergraduate majors and graduate degree programs. Given how important it is for industry to ethically and legally develop, implement, and operate global information systems, the purpose for this report is to evaluate the current educational environment and assess the extent to which ITEL classes are being developed and taught in US universities and, more specifically, which courses have been developed. The following five questions will be addressed in this study:

1. What portion of the reviewed universities offer one, or more, ITEL classes?
2. At what level (undergraduate vs. graduate) are the courses offered?
3. Given that these courses are interdisciplinary, which departments most often offer these ITEL classes?
4. What are the resources, governance structures, and enrollment profiles for universities that are more likely to offer ITEL courses?
5. What topics are most often included in ITEL courses?

The answers to these questions will be based on a review of a sample of universities that represent medium-sized US universities located in all regions of the country. This provides a sample of universities that includes both public and private universities that would be large enough to have the intellectual and financial capacity to offer ITEL courses.

The following sections are included in this report. First, a review of related literature is provided to describe similar IT-related curriculum studies and the questions they have addressed. This is followed by a description of the methodology used in this study, the research questions, and the answers that were found based on the analysis of the course and university data that was collected and reviewed. The report concludes with a set of recommendations for universities that are developing new ITEL courses, study limitations, and directions for future research.

2. Curriculum Review Studies

A number of past studies have reviewed, or recommended designs for, IT-related curricula. Some of the studies make recommendations for overall curriculum design while others make recommendations for changes that could be made within existing courses. An additional study looked at the university characteristics that support more up-to-date and innovative IT curricula.

2.1 Studies Recommending Overall Curriculum Change

Gupta et al. (2015) presented a model curriculum that introduces business intelligence (BI) and analytics topics into existing curriculum. It focused on adding appropriate elective courses to existing curriculum in order to foster the development of BI skills, knowledge, and experience for undergraduate majors, master of science in business information systems degree students, and MBAs.

Burns et al. (2018) investigated the knowledge and skills required by potential employers of students graduating from undergraduate information systems programs. Entry level job listings were collected and analyzed from several Internet sites specializing in technology related employment. This information was used as the basis to compare the knowledge and skills required by potential employers to the suggested curriculum of the 2010 ACM/AIS Information Systems Curriculum Guidelines.

Saltz et al. (2018) explored the different data science codes of conduct and ethics frameworks. They compared this analysis with the results of a systematic literature review focusing on ethics in data science. Their analysis identified twelve key ethics areas that should be included within a data science ethics curriculum. The results from their study can be used by educators and program coordinators to identify key ethical concepts that can be introduced within a data science program.

Lyytinen et al. (2021) describe the first phase of the work done by the Management Curriculum for the Digital Era (MaCuDE) disciplinary task force on information systems. The MaCuDE project recommends changes to business curricula based on the influence of digital technologies on business transformation and the widespread use of big data analytics (BDA) and AI technologies in organizations. Based on the MaCuDE project survey conducted in early 2020, they identified the core digital topics and tools that the programs covered based on a sample of global IS departments from 17 undergraduate programs and 23 graduate programs.

Another study used text mining techniques to analyze university information systems curricula (Föll and Thiesse, 2021). It presented a quantitative content analysis procedure for collecting, analyzing, evaluating, and comparing curricula that provides an alternative to qualitative content analysis. The procedure was tested using data from more than 90 German IS programs and the results provided insights for curriculum redesign and assessing whether programs fulfill the skill expectations that employers have for their new IT employees.

2.2 Studies Recommending Changes for IT Courses

One of the earliest studies in this area recommended adding a course on information technology law for legal education in the US (Hirsh and Miller, 2003). They noted that legal education in the United States has been fundamentally unchanged in the past century while the practice of law has been revolutionized by information technology. The authors reviewed the availability of courses covering use of technology in law practice at American law schools and set out their own proposal for such a course at the Duke University School of Law. They focused on two areas – technology use in the courtroom, and technology use in legal offices. At the time, they were concerned with the technology skills required to participate in the legal profession. Course content related to laws governing data management and privacy would be a consideration in the future.

Another study outlined a series of ten themes for teaching ‘cyberlaw’ in an attempt to overcome problems associated with teaching a course on IT law that is new and rapidly changing (Quirk, 2008). The themes identified include jurisdiction, agency, payments, risk transfer, security, taxation, crime, history, privacy and intellectual property. The article discusses each theme in relation to the legal environment at the time of the study along with advanced sub-topics that may be relevant in the future.

Subramanian and White (2008) discuss the evolution of information technology and how this has led to a plethora of US and international laws that govern the use of IT. Given the importance of these laws to IT managers, they review model IT curricula and found that legal issues were not receiving the attention that they deserved. Their study provides the justification and design for a course in IT and the Law.

Grosz et al. (2019) noted how important it is that computer science curricula expand to include ethical reasoning about the societal value and impact of information technologies. In their study, they describe Embedded EthiCS, a novel

approach to integrating ethics into computer science education that embeds philosophers teaching ethical reasoning directly into computer science courses.

Fiesler et al. (2020) described current trends in computing ethics coursework by conducting a qualitative analysis of 115 syllabi from university technology ethics courses. They identified the content and goals for these courses and made recommendations for how these courses might be integrated across a computing curriculum.

2.3 A Study Identifying the University Characteristics that Support New IT-Related Curriculum Development

Strader and Bryant (2018) conducted a study to identify the characteristics of schools that have developed data analytics programs. The study identified factors that increase the likelihood that a university will develop a data analytics program based on a review of 391 US regional master's universities. The study found that schools with data analytics programs are more likely to be in larger cities and have larger student enrollments, better educational quality rankings, and existing statistics and/or actuarial science programs.

While past studies have addressed a variety of IT curriculum and course issues indicating where changes were needed, no study has assessed the current environment for ITEL course offerings and the topics that are included. This present study looks at this important and timely IT curriculum issue.

3. Methodology

The sample of universities reviewed in this study are in the Carnegie classification that includes medium sized doctoral universities (Carnegie Classification of Institutions of Higher Education, 2023). This is a representative sample of US universities that could provide some insight into current ITEL course development. Medium sized universities were chosen for the sample because very small universities are unlikely to offer these courses because they don't have the financial or faculty resources, and curriculum at very large universities would not be representative of the much larger number of mid-sized universities.

There are 163 universities in this group. Data for each of the universities was collected from a variety of sources. A spreadsheet was downloaded from the Carnegie website that included data for all of the institutions that were Doctoral Universities for their Basic Classification. Within this spreadsheet, the universities were selected when their Size & Setting included the word "medium" indicating that they were a medium sized university relative to the size of all of the other doctoral universities. This spreadsheet also included more specific data about each university's governance (public versus private) and enrollment profile (ranging from very high undergraduate through very high graduate). Each of the university websites were then searched to find their course catalog. The course catalogs were manually examined to identify courses that were primarily related to the topic of interest in this study – information technology ethics and law. Typically, the courses that matched this topic were found in business information systems, computer science, business/data analytics, philosophy, business law, or related areas. For each course, data was collected for the name of the department offering the course, the course number, title and description, and the level at which the course was offered (undergraduate and/or graduate). Some universities did not offer any relevant courses, while others offered more than one. Additional university data was then added for the overall enrollment, and whether they had undergraduate majors or master's programs in business information systems, computer science, business/data analytics, or philosophy. Total enrollment data was found in the National Center for Educational Statistics, COLLEGE Navigator, website (National Center for Educational Statistics, COLLEGE Navigator, 2023). This site was used for enrollment data instead of searching each university website because the data was more consistent and it included both full-time and part-time student numbers.

The combined set of collected data was used in this study to assess the current state of ITEL course offerings from several perspectives. The data look at what courses are offered, their departments and levels, the resource, governance, and enrollment profile strategic characteristics of universities who are more likely to offer these courses, and the course topics. The specific questions and findings are discussed in the next section.

4. Questions and Findings

4.1 Portion of Universities Offering ITEL Courses

The first question addressed in this study was to identify what portion of the 163 reviewed universities offered at least one ITEL course? It was found that 102 (62.6%) of the universities offered at least one ITEL course. In addition, 44 (27.0%) of the universities offered more than one ITEL course. These findings point to the current diffusion stage for the development of these courses. Fichman (1992) found that the diffusion process usually starts out slowly among pioneering adopters, reaches "take-off" as a growing community of adopters is established, and levels-off as the population of potential adopters becomes exhausted. This can be viewed as an S-shaped three-phase cumulative adoption curve. Given this pattern, the findings from this study indicate that ITEL courses are several years into a diffusion process where it is past the early adopter phase and well into the second phase where a larger number of universities have offered these courses for several years. The number of new ITEL courses offered in the next decade can be expected to be relatively small. Another way to view the course data is to look at the distribution of the number of ITEL courses offered at each of the reviewed universities. For each of the universities reviewed, how many different ITEL courses do they offer? The results are summarized in Figure 1.

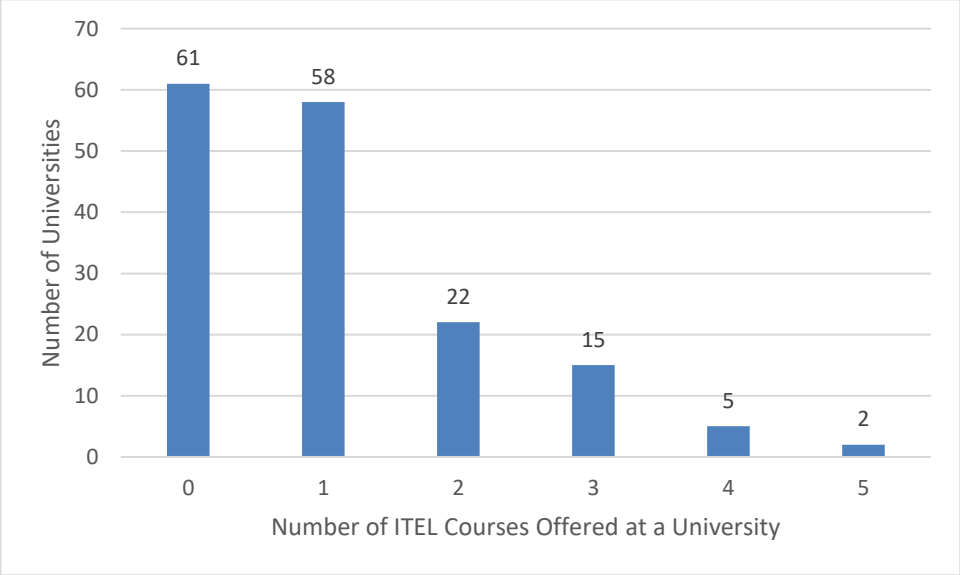

Figure 1. Distribution of How Many Different ITEL Courses are Offered at How Many Universities

As discussed earlier, 61 of the 163 universities do not offer an ITEL course. For the universities that do offer an ITEL course, most of them (58 out of 102, 56.9%) only offer one course. The largest number of unique ITEL courses offered is five. These findings would be expected for a new course offering that can cover a wide range of IT ethical and legal issues at either the undergraduate or graduate levels. Two or more courses would typically indicate that the courses are offered at different levels (undergraduate vs. graduate), or offered by different departments that each offer a unique focus on the issues.

4.2 ITEL Course Level Distribution (Undergraduate vs. Graduate)

The second question addressed in this study looked at the level in which these ITEL courses are offered. What portion of the ITEL courses offered were at the undergraduate level, graduate level, or a cross-listed course for both undergraduate and graduate students? The results are summarized in Figure 2. The majority of the ITEL courses are at the undergraduate level (119 out of 177, 67.2%). The remaining courses are either graduate level (48, 27.1%), or unique courses that are cross-listed courses for both undergraduate and graduate students (10, 5.6%). It is likely that the larger number of undergraduate courses is because the universities offer more undergraduate programs and have a relatively larger undergraduate student population when compared with their graduate student enrollment. It does not indicate that the topic is less relevant for graduate students. For some universities, offering a cross-listed course at both levels provides an efficient method to deliver the content to a broader audience.

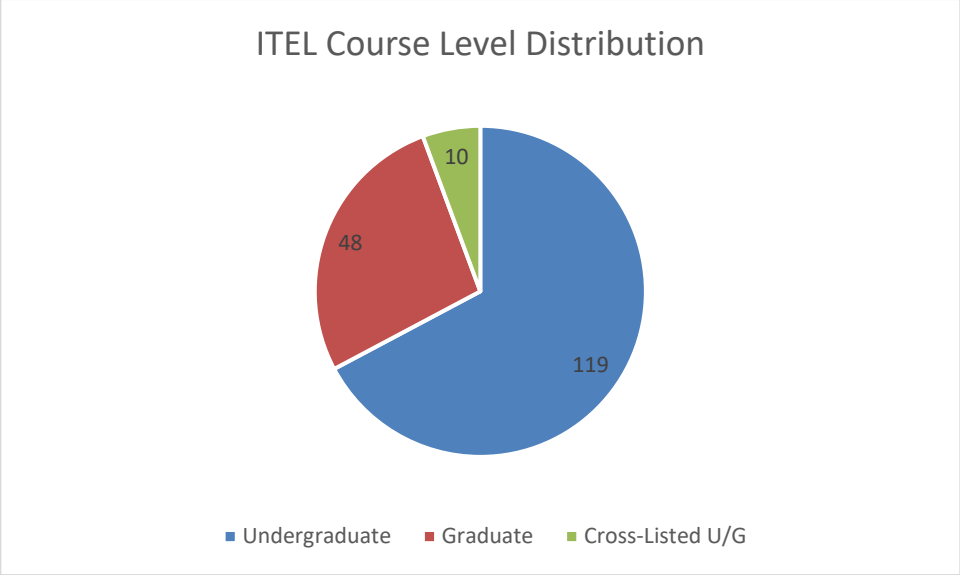

Figure 2. Distribution of ITEL Courses Offered at Undergraduate and/or Graduate Levels

4.3 Departments Offering ITEL Courses

The third study question looks at which departments are most likely to offer at least one ITEL course. The results are summarized in Table 1. As expected, the most common department offering an ITEL class is computer science. Ethical and legal issues related to information technology development and impact are important components of a computer science education in today's world. Philosophy is the second most common department offering ITEL classes. Ethics is a major topic in any philosophy curriculum. The explosive growth and impact of information technology make it an obvious area for discussion and curriculum inclusion. The third and fourth most common departments offering ITEL classes are business information systems and business/data analytics. They are the areas that collect, store, distribute and analyze massive amounts of data so ethics and relevant data-related laws are an important topic to include in their curricula to properly train students to work in their field.

Department	Number Offering ITEL Course	Percentage Offering ITEL Course
Computer Science	79	44.6%
Philosophy	30	17.0%
Business IS/MIS	28	15.8%
Data/Business Analytics	19	10.7%
Business Law	8	4.5%
Other	5	2.8%
Business	4	2.3%
Multi-department	4	2.3%

Table 1. Distribution of Departments Offering ITEL Courses

4.4 University Characteristics for Schools Offering ITEL Courses

To answer the fourth question addressed in this study, an additional consideration when assessing ITEL course offerings is to identify the underlying characteristics of universities that are most likely to offer at least one ITEL course. In this section the focus is on three university characteristics: (1) total university enrollment, (2) how the programs are governed, and (3) the university's enrollment profile strategy. These characteristics may provide the underlying resources and motivations to create ITEL courses as part of an innovative and up-to-date curricula.

4.4.1 University Total Enrollment

Universities with larger total student enrollments would be more likely to have more overall university financial resources. It would be expected that these resources would provide a greater opportunity to offer at least one ITEL course. A regression model was used to test this idea. The dependent variable is a binary variable indicating whether, or not, one or more ITEL courses are offered (0=no ITEL course, 1=one or more ITEL courses). The independent variable is the university's total student enrollment. The smallest university has 1014 students, the largest has 18053, and the average total enrollment is 7667. The analysis supports this expected relationship. The results shown in Table 2 indicate that universities with larger total enrollments are significantly more likely to offer at least one ITEL course when compared with universities with smaller enrollments.

Parameter	Estimate (S.E.)	p-value
Intercept	0.4520 (0.1021)	<0.00001***
Total Univ. Enrollment	0.00002 (0.00001)	0.00007***

NOTE: ***p < .01; **p < .05; *p < .10

Table 2. Relationship Between Total University Enrollment and Offering an ITEL Course

4.4.2 Governance

Universities may be governed as public universities or private universities. One major difference is that public universities would have some level of governmental support that would provide additional financial resources relative to their private university counterparts. The number of publicly and privately governed universities that offer, or do not offer, at least one ITEL course is shown in Table 3. The data supports the idea that publicly governed universities are more likely to offer at least one ITEL course. 80.4% of public universities in the sample offer at least one ITEL course, while only 53.3% of private universities offer an ITEL course.

University Governance	Offer ITEL Course	Do Not Offer ITEL Course	Percentage Offering ITEL Course
Public	45	11	80.4%
Private	57	50	53.3%

NOTE: There are 56 publicly governed universities and 107 privately governed universities in the sample.

Table 3. Percentage of Publicly and Privately Governed Universities Offering an ITEL Course

4.4.3 Enrollment Profile Strategy

Universities may choose to focus their efforts primarily on undergraduate education, or they may decide to have a greater portion of graduate students. The data from the Carnegie website separates universities into one of four categories: (1) very high undergraduate, (2) high undergraduate, (3) majority undergraduate, or (4) very high graduate. Table 4 shows the number of universities in each category that offer, or do not offer, at least one ITEL course. It appears that undergraduate focused universities are far more likely to offer an ITEL course. This matches the results shown earlier in Figure 2. 81.8% of universities with a very high undergraduate enrollment profile strategy offer an ITEL course, while only 37.5% of universities with a very high graduate enrollment profile strategy offer a course.

Enrollment Profile Strategy	Offer ITEL Course	Do Not Offer ITEL Course	Percentage Offering ITEL Course
Very High Undergraduate	9	2	81.8%
High Undergraduate	49	25	66.2%
Majority Undergraduate	38	24	61.3%
Very High Graduate	6	10	37.5%

Table 4. Enrollment Profile Strategies for Universities Offering an ITEL Course

The results from the analysis described above shows that the universities that offer at least one ITEL class have larger total student enrollments, are governed as a public university, and have a much larger proportion of undergraduate students. The findings show that resources are an important enabler for new course development. More students and public governance provide more financial resources which provides greater opportunities for new course development.

4.5 Course Topics

For the fifth study question, the final perspective that can provide insights into the current state of ITEL classes is to identify which topics are included in the courses. One of the most popular textbooks in this area is organized into ten chapters that builds from broad background discussions of ethics and law and then identifies several of the most impacted topic areas such as privacy, security, and intellectual property (Reynolds, 2019). Each course description was reviewed and the number of times each of these major topics appeared is summarized in Table 5. This provides a list of topics that are most emphasized in ITEL courses, which ones appear less often, and which topics do not appear in any of the course descriptions. Results are displayed in three columns – all courses, only undergraduate courses, and only graduate courses.

There are five broad topic areas that appear 100 or more times. As expected, ethics/ethical and law/legal appear most often in the course descriptions because they are very broad terms that are directly related to the course topic. Other terms commonly included are data, privacy, and some mention of security. These are some of the most important areas where laws exist to protect individuals and organizations along with opportunities for unethical behavior. Seven additional topics appear more than ten times. This is where the descriptions point to areas of emphasis for a particular course. These more specific topic areas include ethical and legal issues for intellectual property, the Internet, artificial intelligence, the economy, professional codes of ethics (conduct), software development, and social media/networks. Finally, topics such as social responsibility, labor and productivity, social audit, freedom of expression, and outsourcing rarely appear in the course descriptions, if at all. Overall, it appears that most course descriptions are written in broad terms so they can evolve as specific ethical contexts and laws change over time. A smaller number are more narrowly defined to fit a more specific purpose within a curriculum. It is very rare that specific ethical frameworks or laws are noted in a course description.

There are a few differences that are apparent when comparing undergraduate and graduate course descriptions. Undergraduate course descriptions mention ethics/ethical more often while graduate courses mention law/legal and data relatively more often. Surprisingly, artificial intelligence is not included many times in graduate course descriptions, but that could be the case where the course description was written several years ago before AI began to receive increased attention. This is the topic that would most likely see greater interest going forward.

Rank	Word/Phrase	Number of Appearances for Word/Phrase in a Course Description		
		All Courses (Undergrad and Grad + U/G cross-listed)	Only Undergrad	Only Grad
1	Ethics/ethical	274	210	46
2	Law/legal	196	97	78
3	Data	142	65	70
4	Privacy	120	80	40
5	Security/cybersecurity	100	57	37
6	Intellectual property, copyright, patent, trademark	62	42	18
7	Internet	32	25	7
8	Artificial intelligence/AI, intelligent system	30	23	5
9	Economy/economics	18	11	5
10	Professional code of ethics	16	13	2
11	Software development/engineering	14	12	0
12	Social media/network	12	9	1
13	Social responsibility	7	5	1
14	Labor, productivity	2	2	0
NR	Social audit Freedom of expression, first amendment Outsourcing	0	0	0

Table 5. Number of Times a Word/Phrase Appears in a Course Description

5. Recommendations for New ITEL Courses

The findings from this study, and the undergraduate and graduate information systems curriculum task force reports, provide some recommendations that universities can consider when developing new ITEL courses. The goal is to develop a course, or courses, that effectively teaches students about the current legal environment, ethical decision making, and industry practice, but does it in a way that efficiently utilizes available financial and faculty resources. These recommendations pertain to: (1) who should offer the course, (2) what topics should be included in general or program-specific ITEL undergraduate or graduate courses., and (3) a set of complementary assessment methods.

An important consideration when developing new ITEL courses is to try to utilize existing faculty capacity so that the new course does not require excessive resources. The most efficient way to develop a first ITEL course is to create one course that is cross-listed, or offered as an elective, between two or more departments. Based on an analysis of existing courses, the most common combination of departments is computer science paired with philosophy, business information systems, or business/data analytics. One general ITEL course can serve students in all of these programs. This is the most efficient way to teach students about these topics without requiring large amounts of new resources. The course can be required for all four of these majors because the content is so important in today's technological world. If it is required, then more students will take this course leading to larger class sizes that demonstrate that the course is needed and should be continued to be offered in the future. The same recommendation can be made for a graduate level ITEL class. It can be cross-listed for master's programs in information systems, computer science, business administration, accounting, public administration, and philosophy. Unique versions could also be developed to focus on specific issues that are unique to law schools or healthcare programs. Many of the courses assessed in this study did not require any prerequisite courses, but it may be helpful to require an introduction to information systems and/or an introduction to business law course to reduce the time required to cover these background issues.

The second major consideration is course content in new ITEL classes. Table 6 provides one example describing how to organize topics for a general undergraduate or graduate ITEL class. It lists topics and the rationale for their inclusion. The courses can be broken into three sections: (1) introduction to ethical analysis and the law, (2) analysis of ethical and legal issues for specific IT-related topics and contexts, and (3) comprehensive analysis of ethical and legal issues for an organization's entire information system or e-commerce site looking at the interrelationship between issues and potential conflicts. The ACM/AIS IS2020 competency model and the MSIS 2016 report both recommend the addition of an ITEL

course, but they do not provide a list of specific course topics. They do promote the idea that the course is important because it introduces the idea of socially and environmentally sustainable IT use.

Topic(s)	Rationale
SECTION 1	
Introduction to ethics and frameworks for ethical analysis and decision-making	Students need basic information about ethical theory and analysis frameworks so they can apply it to IT-specific contexts. They also need to understand how ethics and law are different, but also see how they are related.
Introduction to the legal environment and judicial processes in the US and other jurisdictions (for example, the European Union)	Option for courses where students have not had an introductory business law course. Students should understand the difference between civil and criminal laws and penalties.
SECTION 2	
Privacy	An important topic for individuals and organizations. What data should be collected and how should it be shared and analyzed appropriately.
Freedom of expression and social media	Understand what protections are available for free speech and how this impacts people and organizations involved in social media sites where individuals post information and share opinions.
Intellectual property and cybersecurity	Intellectual property is some of the most valuable organizational assets. They are protected by copyrights, patents, and trademarks, but digitized intellectual property can be more easily stolen online if systems are not secured.
Software engineering	Optional topic for programs where students are being trained to be software developers.
Impact of IT and AI on the global economy and social and environmental sustainability	Broader issues that affect entire industries, labor, the overall global economy, and societal transformation. This topic is directly tied to recommendations from the ACM/AIS IS2020 competency model and the MSIS 2016 report that emphasized socially and environmentally sustainable IT use.
SECTION 3	
Comprehensive review of all of the course topics and how they are interrelated	Previous sections have independently addressed important issues. This concluding section should look at how the topics are interrelated and potential conflicts.

Table 6. Example General ITEL Course Design

Finally, effective ITEL courses should utilize several complementary assessment methods to test students' knowledge and their ability to apply this knowledge to real-world scenarios. Quizzes can be used in each module to assess their factual knowledge about important issues, terminology and laws. In each module, discussion questions and case studies

provide students with scenarios where they can apply their knowledge and look at issues from multiple perspectives focusing on specific real-world issues. They can be asked about what decision they would make, but also asked to describe the rationale behind their decision. Courses can conclude with a comprehensive case where students apply all of their course knowledge and demonstrate that they can recognize ethical problems, legal issues, and potential conflicts between these issues, and then provide solutions to minimize the identified problems. For example, an ITEL course could ask a student to act as a consultant to evaluate a real-world organizational information system or e-commerce site to identify potential ethical or legal problems. Are there any potential unethical uses for the system when it is collecting, storing, and sharing information among its stakeholders? And what general or industry-specific laws (for example, the Health Insurance Portability and Accountability Act (HIPAA) or FERPA) need to be considered.

6. Summary of Findings and Directions for Future Research

This study's findings provide a snapshot for the current state of ITEL class offerings at a sample of US medium sized doctoral universities. It was found that about five out of every eight sampled universities offer at least one ITEL class with some university offering as many as five unique ITEL classes. The courses are most commonly offered at the undergraduate level by computer science departments. Based on an analysis of various university resource, governance, and enrollment profile characteristics, the universities that offer at least one ITEL class tend to have larger total student enrollments, are public universities, and have a majority, or larger proportion, of undergraduate students. The opportunity and ability to offer ITEL courses requires financial and faculty resources. It would be extremely rare for a university to create a new department just so it could offer ITEL courses. Most course descriptions are written in broad terms so they can evolve as specific ethical contexts and laws change over time. A smaller number are more narrowly defined to fit a more specific purpose within a curriculum. It is very rare that specific ethical frameworks or laws are noted in a course description.

This study has some limitations. The sample of universities reviewed is relatively small compared with the large number of US universities and all of the data was collected from university websites and other online sources. These limitations point to some directions for future research. Additional ITEL curriculum review studies could look at samples of larger or smaller US universities to see if the findings from this study are generalizable to these other groups. Studies could also review ITEL course offerings at universities outside of the US. Universities in the European Union (EU) may offer these courses because those countries are very concerned with ethical data management practices and have enacted a number of technology-related laws to protect their citizens and organizations. Another direction for future research could involve digging deeper into the reasons why an individual faculty member or department created an ITEL course. Faculty members that have developed or taught ITEL classes could be interviewed to gain a deeper understanding about what topics they cover, what assessment methods are used, and look at who initiated the course development and the reasons why they felt that the course was needed. These interviews could also focus on the influence that accrediting bodies may, or may not, have on ethics-related curriculum. For example, the Accreditation Board for Engineering and Technology (ABET) (https://www.abet.org/accreditation/) accredits programs in computing technology. And business colleges and schools may be accredited by the Accreditation Council for Business Schools and Programs (ACBSP) (https://acbsp.org/page/accreditation-overview) or the Association to Advance Collegiate Schools of Business (AACSB) (https://www.aacsb.edu/). Each of these accrediting organizations has begun to emphasize social impact and ethics in the past few years and this focus should be expected to continue to grow in the future. The question would be whether this emphasis has impacted curricular decisions in technology-related programs.

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Author Biographies

Troy J. Strader is the Aliber Distinguished Professor of Information Systems and Research Fellow in the Zimpleman College of Business at Drake University. He received his Ph.D. in Business Administration (Information Systems) from the University of Illinois at Urbana Champaign in 1997. Dr. Strader has edited three books and his research has been published in *Decision Support Systems, Electronic Markets, Journal of Information Technology, Journal of the Association for Information Systems, International Journal of Electronic Commerce, Communications of the ACM, Electronic Commerce Research, European Journal of Information Systems* and other academic and practice publications. He is the founding Editor-in-Chief for the Drake Management Review.

J. Royce Fichtner is the Ellis and Nelle Levitt Distinguished Professor of Business Law at the Zimpleman College of Business at Drake University. He received his Bachelor's Degree in Business Administration at the University of Northern Iowa and his Juris Doctorate from Drake University. His major research interests are information technology law, company law, and corporate governance.

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