INVESTIGATING KNOWLEDGE TASK DIFFICULTIES IN DESIGNING PROFESSIONAL ETHICS INSTRUCTIONAL FRAMEWORK FOR TECHNICAL EDUCATORS

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Ethics education and professional conduct are inextricably linked for people entering the labour market and professional practice in their professions. Despite the importance of teaching ethics, there is considerable uncertainty on how ethics and professionalism should be taught in institutions of higher learning, owing to a lack of directives and guidelines for instructors, delivery techniques, and instructor ability for teaching ethics. In this light, this article intends to investigate knowledge task difficulties in designing professional ethics instructional framework for technical educators particularly in the higher learning institutions. Applied Cognitive Task Analysis (ACTA) was employed to elicit the difficult cognitive elements identified by a group of experts. Interview sessions were conducted in two phases i.e., task diagram and knowledge audit technique, and the data are analysed based on the common cognitive tasks identified. From the task diagram, three cognitive tasks which considered difficult by the experts: (i) assess learners' profiles (ii) select and set learning objectives (iii) select instructional methods. These cognitive tasks are then investigated further in knowledge audit phase whereby the experts suggested strategies which novice technical educators could adopt: i) conduct preliminary assessment on students' profiles to determine the appropriate method of delivery, ii) technical educators are encouraged to attend courses on teaching and learning theories and practices, iii) provide trainings for technical educators on alternative pedagogical approaches, iv) students are to be treated as active learners whereby the teaching and learning process is interactive. For further study, it is suggested that workshops, seminars, and peer collaborations need to be implement to foster the exchange of best practices and alleviate educators' apprehensions about trying new methods.

Keywords: *Ethics Education, Professional Ethics, Higher Learning, ACTA*

INTRODUCTION

Professional ethics, as defined by Dehghani (2020), is a cognitive process aimed at identifying the values that warrant protection and promotion within an organisation. It also encompasses a set of ethical behaviours and responses that facilitate positive social interactions among individuals fulfilling professional responsibilities. In essence, it embodies a sense of moral responsibility and meticulousness towards any job, duty, or obligation. Distinguishing itself from general ethics, professional ethics delves into the realm of interactions between practitioners and their clients, all while adhering to ethical codes governed by professional bodies (Ibrahim et al., 2019). A crucial competence required by the industry is ethical competency, which entails working in accordance with the professional ethical codes of conduct (Sands & Pearce, 2014; Adnan et al., 2012).

However, these ethical principles are subject to evolving changes resulting from industry innovations, often challenging individuals' personal and professional stances (Balakrishnan et al., 2019). A survey conducted by PwC Malaysia (2020) highlights a significant increase in bribery incidents, primarily perpetrated by internal actors within organisations. While there's no explicit indication that these wrongdoers are professionals, their vulnerability is rooted in their positions of authority and decision-making (Monteiro et al., 2020; Sharma & Bagozzi, 2021). Addressing ethical misconduct involves incorporating ethics education, as advocated by Abdul Rahman et al. (2016). This perspective aligns with the views of Kohlberg (1976) and Rest (1986), emphasising the role of education in guiding individuals through different cognitive stages. Many higher education institutions, both local and international, have undertaken efforts to provide such education. For instance, Balakrishnan et al. (2019) conducted a comparative study on engineering ethics education in Malaysia and Japan, underscoring the importance of preparing future engineers to act responsibly. Furthermore, Coldwell et al. (2020), in their study on the efficacy of ethics courses in South African universities, proposed that formal tertiary education plays a pivotal role in cultivating ethical managers. This viewpoint is supported by a multitude of studies (Kidd et al., 2020; Dziubaniuk & Nyholm, 2020; Balakrishnan et al., 2019; Bairaktarova & Woodcock, 2017; Song et al., 2017; Marzuki et al., 2017; Miñano et al., 2016) focused on ethics education at the undergraduate level, where professionals receive their formal training within their respective fields.

This study is centred on the vital role of ethics education in the development of future professionals, with a specific focus on the technical fields at the undergraduate level. The study commences with an extensive literature review of ethics education within higher education institutions. Subsequently, an in-depth examination of current practices in professional ethics education is conducted, with a significant issue identified being the absence of clear teaching guidelines. To address this issue, the study proceeds on the development of an instructional framework explicitly designed to outline the delivery of professional ethics content by technical educators. This framework aims to bridge the existing gaps and propose a systematic approach in professional ethics instructions at the undergraduate level for future professionals in technical fields.

LITERATURE REVIEW

Ethics Education in Higher Learning Institutions

In higher learning institutions, ethics courses play a crucial role in shaping the ethical awareness and decision-making abilities of students as future professionals (Prasad, 2019).

These courses are designed to provide students with a deep understanding of ethical issues within their respective fields and equip them with the necessary skills to make ethical decisions. In medical programmes, ethics education, particularly bioethics, is considered essential and is delivered through various methods, including standalone courses or integration into the curriculum (Sim et al., 2019). The focus is not only on imparting ethical principles but also on developing practical skills to address real ethical challenges, especially critical for future medical professionals who may face life-threatening situations (Dehghani, 2020; Safari et al., 2020). However, designing and assessing ethics curricula remain challenging (McInerney & Lees, 2018), with educators adopting either outcome-oriented or process-centred approaches (Kenny et al., 2019). Ethics education in medical programmes aims to cultivate proactive ethical conduct, where graduates actively uphold ethical values in their workplaces (Kenny et al., 2019; Langlois and Lymer, 2016). To achieve this, engaging and meaningful ethics learning activities are essential.

Ethics education also holds significance in business and accounting education, with a focus on instilling ethical and responsible conduct in graduates (Magrizos, 2020). Strategies include integrating ethics education into business courses and utilizing experiential learning approaches to expose students to real-world ethical dilemmas (Sholihin et al., 2020; Baumtrog et al., 2019). Peer learning and case studies are effective tools for fostering ethical awareness and competence (Ohreen et al., 2022; Jonson et al., 2015). However, concerns persist about the effectiveness of current teaching practices in business and accounting ethics, particularly in preventing unethical behaviour (Edwards & Gallagher, 2018). Ethics education is seen as a catalyst for enhancing professional skepticism and ethical aptitude (Edwards & Gallagher, 2018). In accounting ethics education, there is no consensus on specific topics to be included, varying based on curriculum strategies (West & Buckby, 2020). Similarly, other fields such as management and public relations incorporate ethics education differently, either as standalone courses or integrated into broader courses (Neill, 2017; Berkovich and Eyal, 2020; Magrizos, 2020; Sexton & Garner, 2020).

The inclusion of ethics education in higher learning is driven by the recognition that professionals must possess technical expertise as well as a strong ethical foundation (De Villiers, 2021; Martin et al., 2021; Hess & Fore, 2017). Academic accreditation bodies, such as ABET and RICS, emphasize the importance of ethics in shaping the curriculum and educational standards (ABET, 2021a; RICS, 2023). These bodies acknowledge that ethical conduct is integral to professional competency and decision-making. In Malaysia, the Malaysia Qualification Agency (MQA) mandates ethics and professionalism as essential learning outcomes, but the challenge lies in translating these requirements into meaningful educational experiences (MQA, 2019). The Board of Quantity Surveying Malaysia (BQSM) also highlights ethics and professionalism, but consistent inculcation of ethical considerations throughout the curriculum is essential (BQSM, 2019).

Consequently, ethics education in higher learning institutions is critical for preparing future professionals to make ethical decisions in their respective fields. Academic accreditation bodies play a pivotal role in driving the inclusion of ethics education. The emphasis on ethics education reflects the understanding that professional competence extends beyond technical skills and requires a deep awareness of ethical dimensions and a commitment to societal well-being. The effectiveness of ethics education lies in the ability of graduates to internalise ethical principles and apply them meaningfully in their professional practices, contributing to the integrity and sustainability of their professions and society at large.

Teaching Professional Ethics in Technical Education

Studies on pedagogical approaches in ethics education have highlighted the diverse methods employed by technical educators (Balakrishnan et al., 2021; Balakrishnan et al., 2020; Balakrishnan et al., 2019). These approaches have been shown to have varying impacts on students' cognitive and affective development. Additionally, integrating ethical and social elements into existing curricula and selecting appropriate pedagogical methods to support this effort have been subjects of consideration (Lim et al., 2021; Lönngren, 2020; Nair & Bulleit, 2020; Zein, 2016). Several factors influence the teaching of ethics, including responsiveness to current societal and industrial demands (Zhang & Zhu, 2021; Lapuzina et al., 2018), students' lack of interest, especially in technical programs (Valentine et al., 2020; Zhu & Woodson, 2020), and the shortage of skilled teaching staff in ethics (Nguyen et al., 2021; Zhang & Zhu, 2021). The literature on ethics education pedagogy identifies various methods and practices, including lectures, interactive lectures, experiential learning, directed discussions, project-based learning, case-based learning, simulations, and service learning (Lim et al., 2021; Balakrishnan et al., 2020; Balakrishnan et al., 2019; Lapuzina et al., 2018; Nguyen et al., 2021; Lönngren, 2020; Bombaerts et al., 2021; Martin et al., 2021; Valentine et al., 2020).

Case-based learning, in particular, has gained prominence in teaching professional ethics, with studies emphasizing its benefits and limitations (Bombaerts et al., 2021; Martin et al., 2021; Zhang & Zhu, 2021; Valentine et al., 2020). It is considered engaging and stimulating for students, presenting scenarios relevant to their future professions. However, challenges such as the suitability of selected cases, students' technical knowledge and skills, and their motivation to engage actively in case study discussions need to be addressed. Collaborative learning approaches, including problem-based learning, cooperative learning, and collaborative learning itself, have been explored extensively and endorsed for their effectiveness in achieving educational objectives. These approaches nurture critical thinking and teamwork skills, essential for understanding and internalizing professional ethics content (Hsu, 2021; Panitz).

Experiential learning, including service learning, has gained traction in higher education, particularly for professional ethics education. While traditional lecture-based instruction and collaborative learning still dominate, the potential benefits of experiential learning are recognized. Overcoming barriers to its implementation, such as rigid schedules and institutional resistance, is crucial (Wurdinger & Allison, 2017). Experiential learning offers direct engagement with ethical dilemmas, fostering critical thinking, empathy, and practical decision-making skills. The integration of dynamic and practical learning is essential in higher education, particularly when addressing complex ethical issues.

Instructional design paradigms play a vital role in advancing student learning (Carter, 2015). Instructional design involves a systematic approach to solving educational issues and developing effective learning programs (Khalil & Elkhider, 2016). While instructional design models are commonly used, their application in teaching ethics, especially professional ethics, is underrepresented in the literature. Nonetheless, a systematic review on instructional design models by Stefaniak and Xu (2020), highlighted the prevalence of the ADDIE model across various educational domains, including early and school education, higher education, and corporate training programs. The ADDIE model's flexibility allows instructional designers to adapt its phases to suit specific needs (Bond & Dirkin, 2020; Stefaniak & Xu, 2020; Almomen et al., 2016).

In contrast, the ASSURE model, an evolution of ADDIE, primarily finds use in early and school education due to its classroom-oriented approach (Stefaniak & Xu, 2020). Developed by Heinich, Molenda, Russell, and Smaldino in 1989, ASSURE begins with learner analysis, ensuring instruction aligns with learner characteristics (Heinich et al., 1996). The model emphasises customised materials, educational media, and active student engagement (M. Rafiq et al., 2019; Goode, 2018; Bond & Dirkin, 2020; Olayinka, Jumoke, & Oyebamiji, 2018). It promotes dynamic evaluation and adaptation by educators (Rahman, 2017). Stefaniak and Xu's analysis underscores ADDIE's versatility, and the evolution into the ASSURE model enhances its relevance, particularly in professional ethics education, where it supports ethical awareness and decision-making.

METHODOLOGY

The study begins with the identification of research issues and review on literature related to ethics education particularly on professional ethics in terms of pedagogical strategies adopted by technical instructors. It then proceeds to the identification of current practices and issues in professional ethics instructions from the perspective of technical educators. The findings are analysed using thematic analysis become the basis for Applied Cognitive Task Analysis (ACTA) interviews with experts of professional ethics instructions, instructional design, and technology as well as curriculum development for technical education. The input gathered from ACTA (i.e. task diagram and knowledge audit) are analysed accordingly and used to identify the elements of professional ethics instructional framework. The elements identified are then included in the design and development of professional ethics instructional framework for technical educators or instructors (PEIF). The framework is then reviewed by the experts and the final instructional framework is endorsed.

Applied Cognitive Task Analysis (ACTA)

The Applied Cognitive Task Analysis (ACTA) approach is employed to examine the complexities of professional ethics instruction, drawing on the expertise of individuals involved. ACTA employs four techniques: task diagrams, knowledge audits, simulations, and cognitive demand tables. For the purpose of designing the Professional Ethics Instructional Framework (PEIF), the first two phases of ACTA, i.e., task diagrams and knowledge audits are employed:

i) **Task diagram technique**: Task diagram technique is used to elicit the broad overview of the PEIF design into components that require the most cognitive task skill. The experts were asked to identify the tasks involved in the delivery of professional ethics instruction based on their extensive knowledge and experience in ethics education.

ii) **Knowledge audit technique**: Knowledge audit table technique is used to explore the cognitive task difficulties identified in the task diagram. Experts were asked about cues and strategies they rely on when they face difficulties in the delivery of professional ethics instructions. The suggestions are drawn from the experts' knowledge and experience of good practices and potential barriers which might pose a challenge to novice or inexperience technical educators.

Experts in professional ethics education, instructional design, and curriculum design with substantial experience in higher education and their respective fields (**refer Table 1**) participated in the ACTA sessions (Militello & Hutton, 1998). Their insights contribute to refining the instructional framework for professional ethics education.

Table 1 *Expert Profiles*

Participants	Expertise	Education	Experience in higher learning education	Experience in respective field
Expert 1	Professional ethics education	PhD	More than 20 years	15 - 20 years
Expert 2	Instructional design	PhD	More than 10 years	5 – 10 years
Expert 3	Curriculum design	PhD	More than 10 years	5 – 10 years

FINDINGS

This section discussed the findings of the output constructed from three phases in the ACTA analysis, which are the task diagram technique, knowledge audit technique and simulation technique. Thematic analysis was done towards the transcripts of the interviews, from the three phases. Recommendations given by experts were also discussed.

Task Diagram Technique

The experts were asked to identify the tasks involved in the delivery of professional ethics instruction based on their extensive knowledge and experience in ethics education. After consolidation of input from the experts, five cognitive tasks were established: (i) assess learners' profiles (ii) select and set learning objectives (iii) determine course content, (iv) select instructional methods, and (v) evaluation and feedback. The experts were then asked to determine which of these tasks identified require the most cognitive task skills for further discussion. From the five previously listed, three tasks were considered to be explored which are: (i) assess learners' profile, (ii) set learning objectives and (iii) select instructional methods. The task diagram for PEIF design is shown in Figure 1.

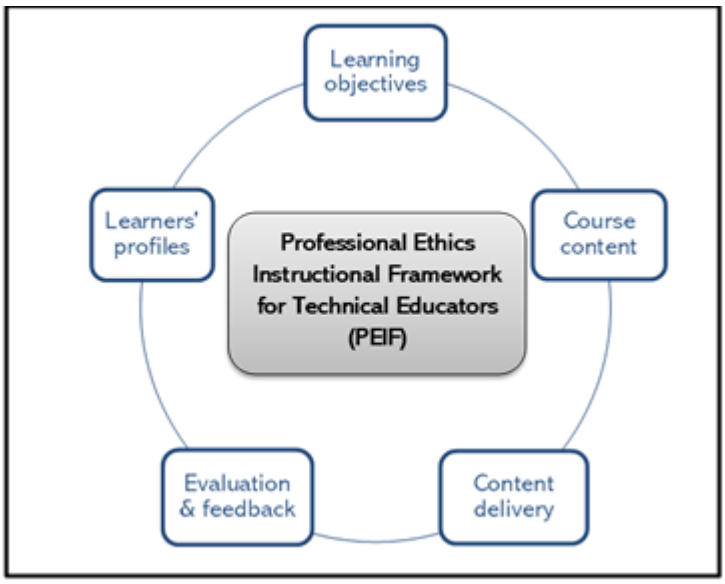

Figure 1 *Task Diagram for PEIF design*

Knowledge Audit Technique

Following the task diagram, the knowledge audit table technique is employed to delve deeper into the cognitive task complexities previously identified. Experts are consulted regarding the cues and strategies they employ when confronted with challenges in delivering professional ethics instruction. The cognitive skills identified by the experts, as explained in the task diagram, are further investigated. Table 2 presents the cues and strategies recognised by the experts as integral cognitive elements of professional ethics education. The first identified task entails assessing learners' profiles to determine their learning styles, prerequisite knowledge, and exposure to professional ethics. Challenges arise due to large class sizes and limited time for ethics modules. To address this, preliminary assessments of students' profiles are suggested to tailor the delivery method accordingly.

The second cognitive task revolves around setting appropriate learning objectives and taxonomies for professional ethics, ensuring alignment with professional ethics attributes. Knowledgeable individuals should be responsible for assigning these objectives. Additionally, technical educators should undergo teaching and learning courses, especially if they lack professional training in pedagogy. The third task involves selecting instructional methods that foster interaction and active learning among technical educators and students. Challenges include limited training in alternative teaching techniques, reluctance to embrace new methods, and difficulty bridging theoretical and practical aspects of professional ethics. To overcome this, technical educators should receive training in alternative pedagogical techniques, and those who adopt such methods should be recognised and rewarded to encourage peer buy-in.

Table 2 *Knowledge Audit Table*

PEIF tasks	**Cues & strategies**	**Why difficult**
Assessing learners' profile	*Cues:* Students faced difficulties in understanding professional ethics modules or topics. Students have different learning styles and prerequisite knowledge. Students are not exposed to the application of professional ethics in their respective field of	Large number of students per learning sessions. Time allocated for ethics modules or topics is often limited.

	study. *Strategies:* Conduct preliminary assessment on students' profiles to determine the appropriate method of delivery.	
Set learning objectives	*Cues:* Learning objectives and taxonomies assigned for professional ethics subject or module are not suitable for the attainment of professional ethics attributes.	Technical educators are not professionally trained in teaching and learning theories and practices.

	Teaching and learning activities planned for the lesson are not aligned with learning objectives set for the course/module. *Strategies:* Learning objectives and taxonomies will be assigned by those who are knowledgeable in teaching and learning theories and practices. Technical educators are encouraged to attend courses on teaching and learning.	Lack of experience in planning teaching and learning activities.
Select	*Cues:*	Technical educators received

instructional methods	Lack of interaction between the technical educators and students. Interaction between students is not encouraged. The topics do not necessarily state specifically the connection with professional ethics. *Strategies:* More trainings on alternative pedagogical techniques for the technical educators / technical educators. Technical educators who actively adopting alternative techniques in teaching should be rewarded and acknowledged to encourage 'buy-in' by their peers. Students are to be treated as active learners whereby the teaching and learning process is interactive and responsive to promote better understanding among the students.	minimal trainings in alternative teaching techniques. Technical educators are apprehensive to try new or alternative techniques of teaching. Technical educators faced difficulties to make the link between theories and practice of professional ethics.

DISCUSSION AND CONCLUSION

The ACTA approach, involving Task Diagram and Knowledge Audit techniques, was employed to identify the crucial cognitive elements within the Professional Ethics Instructional Framework (PEIF) and gather detailed insights into the cognitive skills necessary for designing the instructional framework. Initially, the Task Diagram technique

provided a comprehensive overview of PEIF's design by breaking it down into components requiring significant cognitive skills. Experts, drawing from their extensive experience in ethics education, identified tasks related to delivering professional ethics instruction. Following expert input consolidation, five cognitive tasks emerged: (i) assessing learners' profiles, (ii) selecting and defining learning objectives, (iii) determining course content, (iv) choosing instructional methods, and (v) conducting evaluation and feedback. Three tasks, based on their cognitive complexity, were selected for further exploration: (i) assessing learners' profiles, (ii) setting learning objectives, and (iii) selecting instructional methods.

Subsequently, the Knowledge Audit technique was employed to delve deeper into the cognitive challenges outlined in the Task Diagram. Experts were questioned about the cues and strategies they employ when encountering difficulties in delivering professional ethics instructions, drawing from their knowledge and experiences. The first cognitive task, assessing learners' profiles, was found to be challenging due to the large class sizes and time constraints for ethics modules or topics. Experts recommended preliminary assessments of students' profiles to determine appropriate delivery methods. This approach aligns with Tempelaar's (2020) findings, emphasising the importance of understanding students' profiles for effective teaching and learning, particularly when specific learning skills are required.

The second cognitive task is establishing appropriate learning objectives and taxonomies for professional ethics, addressing a misalignment issue between objectives and professional ethics attributes. The experts proposed that knowledgeable individuals should define these objectives. Moreover, technical educators should receive training in teaching and learning theories and practices, especially when lacking prior curriculum planning and instructional design experience. Lastly, the third task involves selecting instructional methods that promote meaningful interaction between educators and students while facilitating active learning. Overcoming challenges such as educators lacking training in alternative teaching techniques and struggling to bridge theory with practical ethical scenarios requires a multi-faceted approach. Comprehensive training in alternative pedagogical techniques equips educators with diverse tools for engaging students in ethical discussions and problem-solving. Workshops, seminars, and peer collaborations can foster the exchange of best practices and alleviate educators' apprehensions about trying new methods. Recognising and rewarding educators who adopt innovative techniques can further motivate their peers to embrace interactive and experiential learning methods, promoting a more engaging and effective educational environment.

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