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Designing an Accounting Analytics Course Using Experiential Learning Approach

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ABSTRACT

This paper describes an undergraduate accounting analytics course which was delivered based on an experiential learning approach. This accounting analytics course is timely as, with the proliferation of Big Data, several accounting professional bodies have highlighted the importance of developing analytical skills among accounting graduates. The experiential learning approach was adopted because there is a need to equip students with future work skills so as to tackle increasingly complex problems. The professors collaborate with external partners to design a course which combines theory with experiential learning through heavy use of projects involving real world problems. Students rated the course favourably. The students' feedback indicated that the experiential learning approach is beneficial for their overall learning outcomes such as enhancing their problem-solving, analytical, reasoning and communication skills. The course demonstrates a curriculum design that integrates industry experience with classroom learning. External partners were also supportive of the experiential learning approach.

Keywords: accounting analytics; experiential learning; project-based learning

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1. INTRODUCTION

The scale and complexity of challenges facing the world today are unprecedented. Often, solutions do not come from any single discipline, but from collaboration between innovators from various disciplines who can see beyond the way the world is to the way it could be. With these challenges in mind, it is paramount that universities identify and equip their students with relevant skills for the future by embracing innovation in their teaching pedagogies and making learning more pertinent.

In the 'Future Work Skills 2020' report (IFTF 2011) released by the Institute for the Future, 'multidisciplinarity', and 'novel & adaptive thinking' skills were identified as skills important to future workforce. Multidisciplinarity involves drawing from several disciplines to redefine problems outside normal boundaries and reach solutions based on a new understanding of complex situations. Novel and adaptive thinking refers to the ability to problem solve, think outside the box and come up with tailored solutions. Mastery of both skills may require collaboration between relevant entities in devising effective solutions to address complex problems.

Besides 'Future Work Skills 2020' report (IFTF 2011), Singapore's recently launched national movement, 'SkillsFuture'[5], which aims to promote a mindset of continuous lifelong learning, emphasized the importance of knowledge, application and experience. In particular, SkillsFuture highlights useful skills such as 'real world work exposure' and 'managing collaboration with industry partners'. It notes that defined learning outcomes and structured activities must be established to support the learning outcomes in collaboration with industry partners. It also implies a curriculum that integrates industry experience with learning in classroom.

Recognizing the need to prepare its students with future work skills so as to tackle increasingly complex real-world problems, University A in Singapore recently launched pilot undergraduate courses that adopt an experiential learning based pedagogical design called 'UNI-X'. UNI-X pedagogy comprises four principles: i) project-based learning tackling real world problems and issues; ii) inter-disciplinary learning; iii) active mentoring and; iv) a deeper relationship between faculty, student and industry partner. By applying the four principles in a UNI-X course, it is believed several future work skills may be inculcated in the learning process. These skills include critical and inventive thinking; communication, collaboration and information skills; and civic literacy, global awareness and cross-cultural skills. These skills are consistent with major skills highlighted in both Future Work Skills 2020 (IFTF 2011) and SkillsFuture.

[5] SkillsFuture is a Singapore national movement to provide Singaporeans with the opportunities to attain mastery of skills and develop their fullest potential throughout life. One of the key thrusts is to develop an integrated high-quality system of education and training that responds to constantly evolving needs. For more details, refer to http://www.skillsfuture.sg/.

The aim of the paper is to describe and explain how experiential learning may be applied in delivering an accounting analytics course. The paper focuses on one of the UNI-X courses that was launched during the pilot phase, an accounting analytics course called Intelligent Accounting Function (IAF). This IAF course was taught by both accounting and information systems professors. Students from various disciplines learn what comprises a highly optimised accounting process, design an end-to-end process management and explore the underlying accounting information systems and advanced data analytical applications. Together with the mentors from the external project sponsor, students work on a real world problem and are expected to offer recommendation and develop solution prototypes of intelligent accounting function. The aim of UNI-X is to engage students in real life application and encourage students to creatively apply theoretical concepts to practical problems in their pursuit of solving real world problems.

Given that several accounting professional bodies have recently commented on the importance of developing information technology (IT) skills among accounting graduates (AAA, 2012; AACSB, 2014), especially data analytics, the experiential learning approach may serve as a plausible way for learning analytics. This is because students may apply the theories they learn in class first-hand, in a real-world setting by delivering an analytical solution to address a real problem. This is also consistent with the Pathways Commission Report that was released by the American Accounting Association (2012) which indicates that one of the action items is to transform learning experiences to reflect current and emerging technologies in business. In addition, AICPA also developed a Core Competency Framework, which defines a set of skills-based competencies needed by all students entering the accounting profession. Under the Core Competency Framework, AICPA states that accounting professional needs to demonstrate technological adaptability by acquiring new IT skills and determining how new technologies should be best incorporated into their accounting practices. Recent AACSB report (2014) has also commented on the need to include business analytics in the Accounting Information Systems (AIS) curriculum in preparation for future accounting work.

The remainder of the current paper is organized as follows. First, we review the literature on experiential learning. Next, we present the UNI-X pedagogy. This is followed by a description of the IAF accounting analytics course. Next, we discuss the feedback of students and external partners.

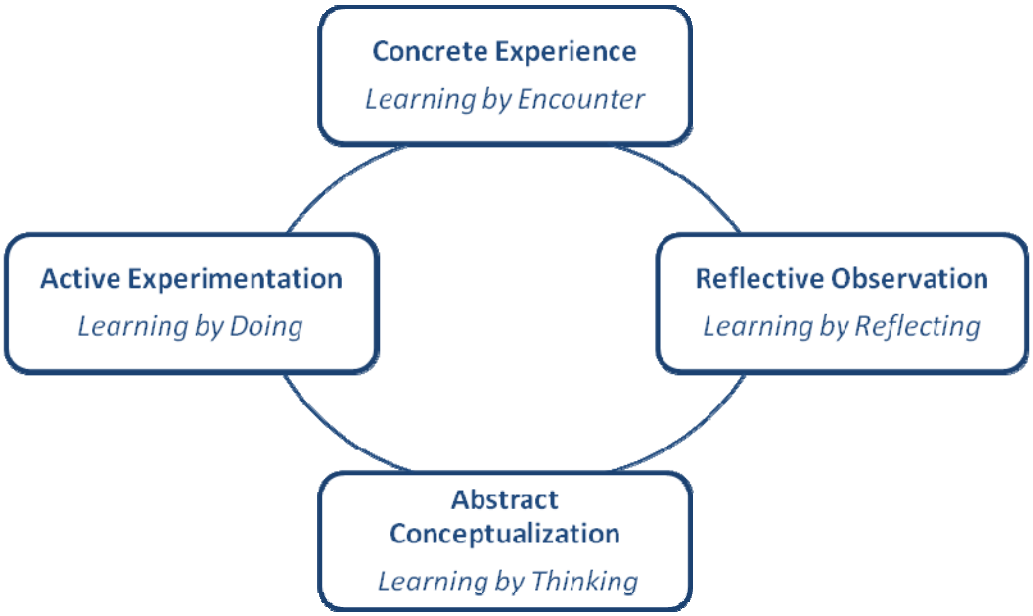
2. EXPERIENTIAL LEARNING

In light of the increasingly competitive and complex environment, universities are called on to better prepare students, such that the students are able to successfully deal with the rising uncertainty, ambiguity and volatility of the future business environment. Furthermore, the expectations of employers for graduates have also risen considerably, where graduates are not only expected to have deep technical knowledge but also have strong practical skills such as collaborative and integrative thinking skills (Li, Greenberg and Nicholls, 2007). Therefore, universities are progressively pushed to adopt innovative

teaching pedagogies, where the focus of higher education is shifting away from content-based teaching approaches (e.g. teaching-oriented approaches like lectures) to student-centered and learning-focused methodologies such as experiential learning (Canboy, Montalvo, Buganza and Emmerling, 2014). As a result, experiential learning has shifted from the periphery of education to the center, where such form of learning is considered fundamental to meaningful learning (Lewis and Williams, 1994).

Kolb's Experiential Learning Theory (ELT) is widely recognized and accepted as an important framework for learning-focused curriculum development and instructional design (Kolb, 2014). Over the past few decades, there have been many studies done using ELT to further advance the theory and application of experiential learning (Kolb, Boyatzis and Mainemelis, 2001). The prevalence of ELT is further exemplified by a review conducted by Arbaugh, Dearmond and Rau in 2013, which indicated that 27 percent of top cited articles in management education journals were centered on experiential learning and learning styles.

Figure 1: Kolb's Experiential Learning Theory



Kolb's ELT was developed based on the research of notable academics like Dewey, Piaget and Lewin, all whom advocated the importance of experience in learning (Kolb, 1984). According to ELT, experiential learning is defined as "the process whereby knowledge is created through transformation of experience, where knowledge results from the combination of grasping and transforming experience" (Kolb, 1984). There are 2 related methods of grasping experiences – Concrete Experience (CE) and Abstract

Conceptualization (AC) – and 2 related methods of transforming experiences – Reflective Observation (RO) and Active Experimentation (AE). Together, the 4 modes form an idealized learning process, whereby the learner can begin the process at any point (Kolb and Fry, 1975) and will likely learn the most when all 4 bases are covered. According to the ELT model, the learner first encounters various types of concrete experiences, and processes these experiences through reflective observation. After which, the learner subsequently assimilates and refines these reflective observations into abstract concepts, from which novel implications for action can be distilled. These implications then can be actively experimented and serve as a platform in creating new experiences.

Past research has identified numerous benefits associated with experiential learning. Experiential learning not only enhances student learning and performance, (Hakeem, 2001) but also provides students the opportunity to develop their communication, problem-solving and critical thinking skills, thus enabling students to better meet the rising expectations of prospective employers (Clark and White, 2010; Quinn and Shurville, 2009; Brickner and Etter, 2008). Proponents argue that experiential learning benefits students by fostering greater interest in topic content, enhancing their intrinsic learning satisfaction, increasing their long-term retention of knowledge and developing students' desire and ability to become lifelong learners (Brickner and Etter, 2008; Snyder, 2003). Therefore, experiential learning can provide an enriching educational experience, which students can rely on in later years when confronted with a similar situation (Loeb and Ostas, 1997). Ultimately, undertaking such experiential learning enables students to apply the concepts and theories that they learnt in the classroom to real-world situations that students may face in their future professional careers (Dellaportas and Hassall, 2012).

2.1 Importance of Experiential Learning

The growing expectations of employers as well as the numerous benefits associated with experiential learning have resulted in the shift away from traditional pedagogies to innovative teaching approaches. Aside from these factors, literature has highlighted various concerns regarding traditional pedagogies that could potentially be addressed with the adoption of experiential learning methods.

According to McCord, Houseworth and Michaelsen (2015), there are four key issues that need to be addressed with regard to traditional teaching pedagogies. Firstly, students often lack experience and are not sufficiently equipped with knowledge that is grounded in practice. Secondly, the analysis of cases is generally given greater priority over synthesis of knowledge in most business schools, such that students are not given the chance to work on real world problems (Starkey, Hatchuel and Tempest, 2004). Thirdly, the content focus of courses in business schools can be limited and thus does not

encourage the development of students' integrative thinking skills that are needed to form linkages across disciplines (McCord et al., 2015). Finally, the traditional teaching pedagogy does not promote the development of reflective and collaborative skills (Mintzberg and Gosling, 2002) or teamwork skills needed for students to collaborate and communicate effectively in cross-functional teams (Darian and Coopersmith, 2001).

These issues are also highlighted in a study done by Albrecht and Sack (2000), who identified pedagogy as a crucial problem in accounting education. They are highly critical of teaching approaches that overly focus on the delivery of content-based syllabi, as they do not prepare students for the ambiguous world of business. As such, Albrecht and Sack (2000) recommend educators to adopt out-of-classroom experiences to instruct students.

Taking into account the abovementioned issues, this paper strives to explain how the UNI-X programme is a practical and powerful experiential learning approach that can be adopted to overcome the gaps created by traditional pedagogies. Appealing to Kolb's ELT, UNI-X programme is intended to provide students with a holistic experiential learning process, where they will have a chance to deal with real-world problems and develop relevant skillsets (e.g. ability to deal with ambiguity, integrative thinking skills, communication skills) needed for their future careers.

Despite the intuitive appeal of ELT, Kolb's ELT model has been subjected to certain criticism. For example, according to Kayes (2002), critics of ELT argue that the model decontextualizes the learning process and fails to consider other equally important factors (psychodynamic, social and institutional factors) that influence learning. In addition, other critics find ELT to be an oversimplified depiction of reality (McGuigan and Weil, 2007), where the linear nature of the idealized learning process is too one-dimensional (Webb, 2004). Despite these criticisms, ELT remains to be relevant to this study as it can be applied to determine how learning process is enhanced with the implementation of UNI-X programme.

3. UNI-X PEDAGOGY

Typically, a UNI-X course combines theory with experiential learning through heavy use of real projects. It also challenges students to use their disciplinary knowledge and skills to tackle real world problems and issues through inter-disciplinary approaches and activities. As each course involves partners from corporate, non-profit or government-sector organisations in project design and content delivery, it is also built into the course that the partners and faculty actively mentor so that students benefit most out of the deep relationship. Essentially, a UNI-X course establishes a learning loop for the tripartite: students obtain a deeper understanding of what it means to apply theory learnt outside

the classroom, faculty learns how real world adapts theory and external partners deepen their own learning methodology.

UNI-X experiential learning pedagogy comprises four principles: project-based learning tackling real world problems and issues, inter-disciplinary learning, close faculty and external partner relationship and active mentoring. By weaving these four principles together in a closely knitted manner, it offers a fundamental platform for students to learn and share knowledge. We will next describe and explain the four UNI-X principles in detail.

3.1 Project-based Learning

The first principle of UNI-X pedagogy is project-based learning (PBL). PBL can be defined as “a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured among complex, authentic questions and carefully designed projects and task” (Markham, Larmer and Ravitz, 2003, p. 4).

Prior research shows that PBL provides a number of positive learning outcomes for students (Holm, 2011; Lee, Blackwell, Drake and Moran, 2014, Thomas, 2000). Parker, Mosborg, Bransford, Wilkerson and Abbott (2011) shows that PBL resulted in deeper conceptual learning and PBL students performed as well or better than traditionally taught students on high-stakes test. Mergendoller, Maxwell and Bellisimo (2006) found that PBL was a more effective instructional approach than traditional lecture-discussion. Gultekin (2005) suggests that students may become better researchers, problem solvers and high-order thinkers through PBL. Bell (2010) also mentions students enjoy PBL as it encourages greater understanding of a topic and it increases motivation to learn.

While the individuals can get the task work done alone, the ability to interact effectively with others is often acquired through exposure to different group work experiences. These abilities are highly valued because it is transferable across different professional domain (Marks, Mathiew and Zaccaro, 2001). Learning in a group also has its advantages compared to individual learning. Groups have greater amount of information compared to an individual. Assuming group members’ knowledge, skill and ability sets are not completely redundant; groups have a greater pool of information compared to individuals (Hinsz, Tindale and Vollrath, 1997). As there are diversity in members’ knowledge and skills, individuals working in groups can learn from each other, which maximizes each individual’s learning opportunities.

3.2 Inter-disciplinary Learning

Another principle of UNI-X pedagogy is inter-disciplinary learning. Inter-disciplinary learning draws on multiple disciplines to gain a deeper understanding of complex issues. It requires a systematic effort to synthesize multiple perspectives into a unified framework of analysis.

Prior research shows that inter-disciplinary learning provides a number of positive learning outcomes for students. Inter-disciplinary learning helps students to overcome a tendency to maintain preconceived ideas and results in a broader understanding of the issues (Repko, 2008). Repko (2008) also suggests that interdisciplinary learning helps students to advance their critical thinking and cognitive development. According to Ertas, Maxwell, Rainey and Tanik (2003), inter-disciplinary forces one to “think across, beyond, and through the academic disciplines to encompass all types of knowledge about an idea, issue, or subject (p. 289). This confluence of disciplinary power offers possibilities for richer and deeper student learning. From graduate capabilities and outcomes, to the creation of diverse knowledge bases, inter-disciplinary teaching enhances the development of creative and practical skills that enables application across industries and practices (Devlin, 2008). Gruenwald (2014) argues that universities should embrace an inter-disciplinary approach to student learning in order to overcome the departmental compartmentalisation of knowledge. However, universities seem to struggle to develop inter-disciplinary teaching and research due to the contradictory forces of specialised knowledge silos within the respective disciplines and departments (Ryan and Neumann, 2013).

3.3 Close Collaboration between Faculty and External Parties

The third principle of UNI-X pedagogy is close collaboration between faculty and external parties. External partners include corporate, non-profit or government-sector organisations. Donovan (2005) suggests that academia and practice will benefit from a closer working relationship. He highlights potential that can be developed in harnessing the partnership of faculty and practitioners and recommends that there should be continuing dialogue and co-operation between faculty and practitioners. Slack, Loughran and Abrahams (2014) suggest that a closer collaboration between faculty and practitioners helps in more fully integrating theory and practice in an academic environment.

Lee et al. (2014) suggests that recruiting external partners is challenging but the relationships between faculty and external partners can be rewarding. A key benefit of close engagement with external partners is to provide authentic feedback on student projects. Lee et al. (2014) also found that using client-based projects helped to motivate students and resulted in more effort and commitment from students. In addition, students

could better see the applicability of the course to their future careers with client-based projects.

3.4 Active Mentoring

The last principle of the UNI-X pedagogy is active mentoring both from the faculty and the external partner. Berk, Berg, Mortimer, Walton-Moss and Yeo (2005) define mentoring relationships in education as relationships "that may vary along a continuum from informal/short-term to formal/long-term in which faculty with useful experience, knowledge, skills and/or wisdom offers advice, information, guidance, support, or opportunity to student for that individual's professional development (p. 67). Mentoring is viewed a vehicle for promoting involvement in learning and improving students' levels of academic achievement (Jacobi, 1991). Tenenbaum, Crosby and Gliner (2001) identify three functions of academic mentoring: psychosocial, instrumental and networking support. In a similar vein, Yim and Waters (2013) concur that psychosocial and instrumental support are major mentoring support functions. Their study confirmed that interpersonal comfort, communication quality and attributional confidence are important elements to consider in mentoring relationships among academic advisors and students.

In the next section, we will illustrate how the UNI-X principles were applied in an accounting analytics course that adopted an experiential learning pedagogy.

4. THE ACCOUNTING ANALYTICS COURSE

4.1 Course Objectives

This course 'Intelligent Accounting Function' focuses on a few key topics that are vital to establishing a smart accounting function: finance strategy and transformation, lean finance and finance shared services, business intelligence analytics, and enterprise process management. Students learn what comprises a highly optimised accounting process, design an end-to-end process management and explore the underlying accounting information systems and advanced data analytical applications. Together with the mentors from the external project sponsor, students work on a real world problem and are expected to offer recommendation and develop solution prototypes of intelligent accounting function. The course outline is provided in Appendix 1.

4.2 Alignment with UNI-X Pedagogy

The aim of this course is to engage students in real life application and encourage students to creatively apply theoretical concepts to practical problems in their pursuit of solving real world problems. Some of the course activities are described in Table 1.

Table 1. Alignment of the course with UNI-X pedagogy

	UNI-X Principle	Remark
1	Project-based Learning with real world problems	Students are expected to complete an industry project identified by the external project sponsor. The project involves addressing some real-world challenges/issues faced by the project sponsor, within the domain of “intelligent accounting function”.
2	Inter-disciplinary Learning	‘Intelligent accounting function’ integrates accounting and information systems knowledge domains. Essentially it is an inter-disciplinary course. The course will be taught by both accounting and information systems faculty. Students that are taking the course comprise accounting, information systems and business disciplines.
3	Close Collaboration between Faculty and External Parties	Significant knowledge exchange is expected to take place among students, faculty and project sponsor. In this course, students are expected to conduct a presentation to the project sponsor’s executives. A town hall poster exhibition will also be organized.
4	Active Mentoring	The project is likely to be a complex one. There will be active mentoring from both the faculty and external project sponsor. Students are expected to meet their mentors on a regular weekly basis.

4.3 Intended Audience

This course is an elective under the Bachelor of Accountancy programme. It was offered for the first time from the period of August to December 2015. There were thirty-six students enrolled in the course. The students were full-time students aged between 20 and 23 and all of them took the course during their fourth year at the university. Students who were taking this course comprised accounting, information systems and business disciplines.

4.4 Project Details

The project focused on developing a performance measurement program that is comprehensive and metrics-driven. Central to the program is a balanced scorecard that includes key financial and non-financial performance metrics, targets and a driver map that links each metric to an overall strategic business objective. The overall purpose for developing the scorecard is to measure the performance of the finance function and find out whether the operation align to the strategic goals of the Company. In the project, students used tools and methodology they deemed suitable to provide balanced performance measurement. They also developed a practicable framework, as well as specific metrics, that the project sponsor organization should adopt. Project teams selected select one or more metric(s), and developed a prototype based on a visualization tool called Tableau, to capture and compute the necessary data to track and report these metrics regularly.

5. FINDINGS AND DISCUSSION

An online survey was conducted and twenty two anonymous students voluntarily participated in the survey.

5.1 Students' Feedback

Students were asked to rate the importance of working together with classmates on projects outside class on a four-point Likert scale ranging from not important (= 1) to very important (= 4). Nine students rated "very important", eleven students rated "important" and the remaining two students rated "somewhat important". The mean importance rating of 3.32 (SD = 0.65) indicates that a large majority of respondents viewed that it is important to learn through projects (see Table 2).

Students were also asked whether it is important that the project involves a real world problem on a four-point Likert scale ranging from not important (= 1) to very important (= 4). All the students rated it as important. Ten students rated "very important, eleven students rated "important" and the remaining student rated "somewhat important". The mean importance rating of 3.41 (SD = 0.59) suggests that students hope to work on a real work problem in their projects (see Table 2). Table 2 also shows that working with the external project sponsor on a real world problem contributed to the students' overall learning experience (M = 3.23, SD = 0.69).

Table 2. Student survey feedback on experiential learning

	Questions [a]	Mean (n=22)	Standard Deviation
1	One way we learn is through working together with classmates on projects outside class. In your view, how important is this learning method? [a]	3.32	0.65
2	Is it important the project examines and solves a real problem or issue faced by a company vs. learning using case studies? [a]	3.41	0.59
3	To what extent working with the external project sponsor contributed to your overall learning experience? [b]	3.23	0.69

a. Survey scale: 1 = not important; 2 = somewhat important; 3 = important; and 4 = very important.
b. Survey scale: 1 = no contribution; 2 = to a small extent; 3 = to a moderate extent; and 4 = to a large extent.

Students were also asked about their overall learning outcomes on a five-point Likert scale ranging from strongly disagree (= 1) to strongly agree (= 5). Results show that the IAF course contributed to positive learning outcomes (see Table 3). A large majority of respondents agreed that the IAF course enhanced their problem-solving skills (M = 3.91, SD = 0.68), analytical skills (M = 3.91, SD = 0.68), reasoning skills (M = 3.86, SD = 0.56) and communication skills (M = 4.05, SD = 0.58). Students also indicated that they were able to better apply subject concepts (M = 3.55, SD = 0.8) and were more prepared for the working world (M = 3.64, SD = 3.73) after taking the IAF course. Last, students commented that working with others from different disciplines helped them view problems holistically (M = 3.73, SD = 0.83).

Table 3. Student survey feedback on the overall learning outcomes

	Questions [a]	Mean (n=22)	Standard Deviation
1	This course enhanced my abilities in problem solving.	3.91	0.68
2	This course enhanced my analytical skills.	3.91	0.68
3	This course enhanced my reasoning skills.	3.86	0.56
4	This course enhanced my communication skills.	4.05	0.58
5	I am able to better apply subject concepts.	3.55	0.80
6	I am more prepared for the working world compared to before I took this course.	3.64	0.90
7	Working with students from different disciplines helped me view problems holistically.	3.73	0.83

a. Survey scale: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree.

Respondents also provided qualitative feedback. Students valued the opportunity of working on a real world problem with an external project sponsor. Students also learned the importance of analytics to accounting. Selected student comments included:

> *"My key learning takeaway is the experience of being able to work on a real life problem, gaining insights and advice from a very experience mentor from the external project sponsor and being able to present our ideas to an external client."*

> *"Working with a real-life company has a lot of challenges, as it is difficult to understand a company's process and be familiarised with it over a semester. Also, to learn to discuss and think and analyse situations properly, and find ways to implement metrics that can be useful for a company."*

> *"Learn to solve a real world problem! Interaction with industry people"*

> *"Prepared to learn on your feet regarding new concept. Be professional when working with client."*

> *"Learning how to work with external companies and managing expectations, and understanding how complex business processes can get."*

"How analytics and accounting can be complementary each other in real-world contexts."

"It is interesting to learn how analytics is actually in practice in a certain company."

"Accounting has transformed its role to add value to the business by using analytics."

"Approaching the accounting and finance function from a different perspective. Applying analytics, automation and adding value to a finance cost centre."

The findings corroborate results of prior studies that an experiential learning approach is beneficial for student learning.

5.2 External Partners' Feedback

The external project sponsor is very supportive of the IAF course. The sponsor is pleased to collaborate by providing a platform and business environment for students to work with finance leaders to work on a real life business case study. The sponsor stated that "as the students are working on a real business issue, one of their biggest challenges is to develop a solution which is practical, workable and something which could relate to the business issue." Students are challenged as they do not have a precedent which they can refer to and the questions that they faced while doing the project are largely things which they cannot find in textbooks or from classroom-based learning which they have undergone previously. Thus, students need to be self-initiative and do a lot of research on their own.

The sponsor indicated that this collaboration benefits the company as the company will actually obtain a solution to a real life business problem that they are facing today. The finance leaders of the sponsor also shared that the close interaction with students provides them the opportunity to learn new ideas and knowledge. They commented that "through the working relationship, it has evolved from a mentor-mentee relationship to a friendship. Students get to learn from finance leaders and finance leaders learn from students." The sponsor believes that this UNI-X experiential learning approach will "set the students of University A apart from other students who would just be largely driven by classroom training and experiences." The sponsor also provided positive feedback about the students. They "find them very engaging", "communicate continuously with their mentor", "very committed in coming out with a solution", "very resourceful and able to work under stress, think on their feet and a group of students with very bright prospects."

Besides the project sponsor, a professional accounting body also participates in the IAF course. It invited its members to a lunch forum where students presented their findings to practitioners. The General Manager of the accounting body is supportive of the UNI-X pedagogy and commented that “the fact that the students of University A are able to interact with members that work in this areas would give them a lot of industry experience and knowledge in terms of what is like in working life”.

6. CONCLUSION

This paper describes an undergraduate accounting analytics course which was delivered based on an experiential learning approach. This accounting analytics course is timely as several accounting professional bodies have commented on the importance of developing analytics skills among accounting graduates.

This course is one of the UNI-X courses launched during the pilot phase. UNI-X is an experiential learning based pedagogical design adapted by University A as it recognizes the need to prepare its students with future work skills so as to tackle increasingly complex problems. The course combines academic with experiential learning through heavy use of real projects. It also challenges students to use their disciplinary knowledge and skills to tackle real world problems and issues through inter-disciplinary approaches and activities.

Students rated the course favourably. The students’ feedback indicated that the UNI-X experiential learning approach is beneficial for their overall learning outcomes such as enhancing their problem-solving, analytical, reasoning and communication skills. The course demonstrates a curriculum design that integrates industry experience with learning in classroom. External partners were also supportive of the experiential learning approach.

Future studies can examine the effectiveness of the UNI-X pedagogy by conducting matched-subjects quasi-experiments. Future studies can compare the future work skills between students who are enrolled in a UNI-X course and students who are not enrolled in a UNI-X course in order to assess the effectiveness of the UNI-X pedagogy. Future studies could also compare the effectiveness of the experiential learning approach against other learning interventions.

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Appendix 1: Course Outline for the Intelligent Accounting Function Course

COURSE PREREQUISITES

Students are allowed to take this course only after completing Accounting Information Systems or Process Modelling and Solution Blueprinting.

COURSE DESCRIPTION

(1.0 course unit)

Traditionally, the accounting function's role is always viewed as that of a steward, the control centre for the organisation, rather than the catalyst for enterprise growth. The term 'back office' is often used to describe the operating nature of accounting function. So in today's volatile global business environment, the key challenge for accounting function is how to lead the enterprise in its growth strategies while ensuring effective risk management and stewardship of the enterprise.

With complexity and data proliferation, increasingly the CEO and the board turn to accountants to help make sense of all the data, to help cut through this complexity, and to provide more informed analysis on the business and its operation. The opportunity for accounting function is if it can generate the insights that help make better corporate decision making, while continuing to ensure effective control of the enterprise, its reputation as a catalyst for growth will be guaranteed. To do so, traditional accounting departments may have to transform themselves into 'intelligent accounting functions'.

Intelligent accounting functions run their operations as cost effectively as possible, leveraging technology to reduce finance operating costs; strengthen stewardship and control so as to establish a solid foundation to support growth. The biggest challenges, however, lie in creating the efficiencies needed to gather and process basic financial data and continue to deliver traditional finance outputs while at the same time redeploying their limited resources to enable higher-value business decision support activities.

This UNI-X course focuses on a few key topics that are vital to establishing an intelligent accounting function (refer to the diagram below): finance strategy and transformation, lean finance and finance shared services, business intelligence analytics, and enterprise process management. In this experiential learning course, students from various disciplines learn what comprises a highly optimised accounting process, design an end-to-end process management and explore the underlying accounting IT systems and advanced data analytical applications. By working closely with instructors from accounting and information systems disciplines, together with an industry partner, students are expected to carry out design and development of an intelligent accounting function solution. The whole idea is to engage students in real-life application and to encourage students to creatively apply concepts to practical problems in their pursuit of solving real-world problems. Students will apply the concepts in real projects.

TEXTBOOK AND RECOMMENDED READINGS

No prescribed Textbook. Assigned readings will be updated later.

LESSON PLAN

Class sessions are of 3-hour duration and will include a review of study materials, relevant research materials, class discussions, hands-on work in lab, project discussion and other learning activities where appropriate.

UNI-X PRINCIPLES

	UNI-X Principle	Remark
1	PROJECT BASED LEARNING and REAL-WORLD PROBLEMS AND ISSUES	Students are expected to complete an industry project identified by our industry partner. The project involves addressing some real-world challenges/issues faced by the industry partner, within the domain of "intelligent accounting function"
2	INTERDISCIPLINARY LEARNING ACTIVITIES	'Intelligent accounting function' integrates accounting and information systems knowledge domains. Essentially it is an interdisciplinary course. The course will be taught by accounting and information systems faculty. Students that are taking the course comprise accounting, information systems and business disciplines
3	ACTIVE MENTORING	The project is likely to be a complex one. There will be active mentoring from both the faculty and industry partner. Students are expected to meet their mentors on a regular basis (i.e., weekly)
4	FACULTY-EXTERNAL PARTNER RELATIONSHIP	Significant knowledge exchange is expected to take place among students, faculty and industry partner. In this course, students are expected to conduct a presentation to the executives of the industry partner. A town hall poster exhibition will also be organized.

COURSE TOPICS AND SCHEDULE

Seminar	Topic	Sub-topic
1	Finance strategy and transformation	• Changing role of finance function • Overview of Intelligent finance function
	Lean finance and finance shared services	• Simplifying, streamlining and harmonizing essential finance processes to create a leaner, more efficient finance function • Shared finance services/outsourcing • Guest Speaker from Industry Partner
2	Enterprise performance management	• Framework for defining, measuring and improving finance performance (e.g., cost, productivity, service level) • Guest Speaker
3	Business intelligence analytics	• Intelligent systems • Embedding analytics in finance processes • Predictive analytics • Analytics tools and applications
4	Industry Presentation	• Conduct presentation to accounting professionals at a lunch forum facilitated by a professional accounting body
5	Industry Presentation	• Conduct presentation to accounting professionals at a lunch forum facilitated by a professional accounting body

6	Project	• Project Briefing and Site Visit
7	Project	• Project Meeting with Faculty and/or industry partner
8	Project	• Project Meeting with Faculty and/or industry partner
9	Project	• Project Meeting with Faculty and/or industry partner
10	Project	• Project Meeting with Faculty and/or industry partner
11	Project	• Project Meeting with Faculty and/or industry partner
12	Project	• Project Presentation to Industry Partner's executives

ASSESSMENT

To pass the course, a student is required to obtain a **TOTAL** mark of 50% or better. The assessment components are listed below: Group Project (35%), Lab Exercises, Quiz and Class Exercises (10%), Write-up and Presentation (20%), and Final Examination (35%).

Group Project (35%)
There will be one group project assignment in this course. The detailed project assignment will be announced in class.

Lab exercises + Quiz + Class exercises (10%)
There will be lab exercises, quiz and class exercises during the course. Details will be announced in class.

Write-up and Presentation (20%)
Students are expected to conduct research on the topics assigned by the instructors. They have to submit a write-up and present their research findings to accounting professionals at a lunch forum facilitated by a professional accounting body.

Final Examination (35%)
The final examination is closed-book, of 2 (two) hours duration and covers the entire course.