Can the introduction of a Research Informed Teaching intervention enhance student performance and influence perceptions?

Abstract

We are motivated to discover whether modifying the traditional accounting lecture (TA) can have a significant effect on the academic performance and perceptions of students through critical curiosity engagement. Thus, in this study, we compare the academic performance and perceptions of two student groups. The control group includes students that receive TA instruction during the totality of a lecture (TA sample). The experimental group receives a research informed teaching (RIT) intervention for the final 10 minutes of TA delivery (PER sample). Using questionnaire data, we find that the perceptions of both groups of students are equivalent at the start of the semester, suggesting two homogenous groups. However, at the end of the semester, we find the PER sample that receives the RIT intervention develop more critical perceptions. We find that the TA sample consolidates the views expressed in textbooks. Moreover, using mid-term and final exam values as a measure for academic performance, we find that the academic performance of both groups is equivalent at the mid-term point. However, the RIT intervention group demonstrates higher performance compared to the TA sample at the end of the semester. Overall our results suggest that undergraduate accounting students have the ability and sophistication to appreciate accounting research knowledge as a social phenomenon which can enhance their intrinsic motivation to develop accounting knowledge. Based on our findings, we believe that accounting lecturers may develop strategies to acknowledge the perceptions held in the accounting literature to enhance students' learning experience.

Keywords: Teaching intervention, student performance, research informed teaching, traditional approach

I.   Introduction

There is historical evidence to suggest that undergraduate accounting students have conflicting and complex perceptions about accounting (Fisher and Murphy, 1995). Marriott and Marriott (2003) find undergraduate students' perceptions about accounting are becoming increasingly negative from their initial contact with accounting to when they graduate. In this study, we question the argument whether delivering accounting knowledge using a traditional lecture approach (TA), the classic method of delivering accounting knowledge in tertiary institutions influences student perceptions. The TA approach has been designed to develop technical skills, based on the classic view that accounting is an advanced form of bookkeeping, which is required for professional life as an accountant (Alexander and Nobles, 1994; Dyson, 1997). However, critics of TA suggest that students that receive accounting knowledge through TA are likely to perceive accounting to be a process of memorising techniques without inquiry (Lucas, 2000; Lucas and Mladenovic, 2007; Mladenovic, 2000). Bui and Porter (2010) argue that the traditional lecture approach is not complete. However, in the literature, the extent to which a paradigm shift is required in accounting education varies. Watty (2005) argues that developing soft skills such as reasoning and other non-technical skills may improve academic

development. Bui and Porter (2010) surmise that additional skills are required to develop more complete learners with a suggestion that skills such as creativity should be emphasized. Other accounting academics posit that accounting should be framed from various perspectives so that students can develop a more comprehensive understanding of the role of accounting as a social practice (Plam and Bisman, 2010; Wood and Sangster, 2012). Critical accounting scholars go so far as to argue that the accounting subject itself and the narrative of accounting textbooks reflect Anglo-American values, thus should be re-framed (Apple, 2004; Ferguson et al., 2005; 2008; 2010). Based on our experience, we conjecture that students have the motivation and capability to do more than develop technical information; however, the TA approach is designed with this process in mind. Therefore, we have planned and developed a researched informed teaching (RIT) intervention to engage students' critical curiosity and to enhance students' learning experience. This study provides the details of our process, and findings.

The main research question of this study is whether (or not) 'the introduction of a RIT intervention enhances student performance and influences perceptions?' To answer this research question, we perform empirical tests on two student cohorts (samples) from a student population. The first sample receives the 'unchanged' TA lecture for 150 minutes (an identical delivery to previous years). The second group, the PER sample receive TA for 140 minutes, but are then expected to participate in a 10-minute research informed teaching (RIT) intervention. We interpret that students that participate in a 10 minute RIT intervention can enjoy a more complete learning experience compared to TA students based on the following: First, whilst TA delivery is efficient, it is a one-way form of communication where the lecturer imparts textbook knowledge and the ideologies included in textbooks, without question. However, because PER students are required to engage in an RIT intervention, they are more likely to develop critical curiosity and an appreciation of different accounting research topics. Thus, TA students may perceive accounting to be monolithic based on textbook knowledge. But, through the process of acknowledging and appreciating the various perceptions that exist in the accounting literature, students in the PER group may be more intrinsically motivated to challenge their own perceptions through engagement with research; a process shown to enhance academic performance in previous studies (Baldwin, 2005; Healey & Jenkins, 2000; Healey et al., 2005; Griffiths, 2004). Second, our RIT intervention is designed; i) to be a form of multisensory learning, which is considered superior to learning using a single sense/modality (Clark and Paivio, 1991; Shams and Seitz, 2008; Shams et al., 2011) and; ii) grounded in group learning theory, which implies that democratic group debates can consolidate knowledge and can accommodate various learning styles (Ashwin, 2015; Wegner et al., 2002).

We consider this study important, and are motivated to conduct this study for several reasons. First, we are motivated to report the perceptions of undergraduate students before they have participated in any teaching interventions; when they receive accounting knowledge in traditional accounting lectures, their own research, media etc. Thus, we collect questionnaire data in week 1 to discover how Korean accounting students perceive accounting as a result of a 'normal' university accounting education experience. Second, we question the argument whether our teaching intervention can influence student perceptions about accounting over a 15-week semester relative to TA. Thus, we collect data from an identical questionnaire in week 15. We are motivated to discover whether 2nd year undergraduate students have the motivation or ability to appreciate accounting as a social phenomenon or lack the sophistication and accounting knowledge to engage in such debates. Third, whether one group of students can be considered disadvantaged is an important ethical consideration. Therefore, we are motivated to demonstrate whether students that receive a RIT intervention demonstrate

consistent/higher/lower academic performance compared to students that receive instruction using TA exclusively.

This study can be of interest to accounting educators anywhere in the world, as well as the Accounting Education literature, because the results will offer contributions regarding the following: First, accounting educators should be efficient in delivering textbook accounting content knowledge for testing purposes, while on the other hand keeping students engaged in accounting as an academic subject to balance student's extrinsic and intrinsic motivations. However, developing technical skills may come at the expense of developing soft skills. Thus, providing insights about how traditional approaches socially condition accounting students to consolidate and reflect textbook ideologies can offer guidance to accounting educators about best practice. Second, to what extent accounting students are motivated to discuss accounting research topics and to challenge textbook knowledge using RIT is to a large extent a question left unanswered. If by providing students with the opportunity to engage in a well-designed 10 a minute intervention, students can develop voice and critical thinking skills, the study can have pedagogical planning implications. Third, whilst it is not the primary objective of this study to demonstrate that RIT interventions can enhance academic performance, there is the potential that RIT can enhance student performance. Demonstrating that the inclusion of a short RIT intervention can influence both the perceptions and academic performance of students can extend the literature by demonstrating the importance of including research perspectives in undergraduate classrooms.

The remainder of the study proceeds as follows. In section II, we review literature and develop hypotheses. In section III we explain our research design. In section IV we provide results from our empirical tests. Section V discusses our findings and concludes.

II.   Literature review and hypothesis development

2.1.   Literature review

Accounting Education scholars suggest that teaching is increasingly becoming less important for the career development of accounting lecturers because teaching is stated as being of a lower status to mainstream accounting research output by universities (Marriott et al., 2014; McGuigan, 2015; Sangster, 2015). Fogarty (2009) suggests the currency in the modern academic accounting environment is journal publication, not teaching. Wilson (2011) suggests that accounting education as a scholarly activity may be considered a burden to academics and that accounting education practitioners that focus on pedagogy can be disadvantaged in terms of funding and career advancement. Duff and Marriot (2017) surmise that lack of resources to integrate teaching and research leads to resistance in promoting teaching in accounting faculties. In the Accounting Education literature, there is growing concern that educators may focus on journal publications over their teaching responsibilities. In such a climate, valuable breakthroughs in Accounting Education may be replaced with cookie cutter teaching approaches. As Herring (2003) observes, traditional approaches may be used as a crutch by less experienced educators in lieu of developing informative and engaging teaching approaches. Whilst pessimism exists in Accounting Education, we believe that case study approaches are valuable to extend the literature by integrating teaching and research. We also believe that identifying the perceptions of students in relation to accounting topics can be the source of future research opportunities, enhance the accounting profession and inform practitioners about best practice.

TA delivery is a transmission communication model, a one-way communication process with the lecturer being the source of information and students considered information receivers (Stead, 1978). Based on Higher Education theory, TA can be defined as behaviourist learning. Behaviourist learning is the process of listening, and then through the completion of tasks/questions, receivers (students) are conditioned to memorize techniques. As a result of this process that includes feedback and reinforcement, students are able to memorize (accounting) techniques effectively (Reimann, 2018). The utilization of TA is consistent with a classical mainstream accounting perspective that implies undergraduate accounting students are required to develop technical skills in preparation for professional life (Dyson, 1997). However, recent Accounting Education studies suggest that the TA approach may be limited because accounting should be considered more than an advanced form of bookkeeping (Lucas, 2000; Lucas and Mladenovic, 2007; Mladenovic, 2000). Moreover, opponents of TA suggest that developing technical skills at the expense of soft skills such as creativity impair student development (Bui and Porter, 2010; Saemann and Crooker, 1999; Watty, 2005). Therefore, in the literature, there are conflicting views about the best methodological approach to deliver accounting knowledge to students. Whilst TA provides students with technical accounting knowledge, TA is not an effective strategy to develop soft skills that are required for academic and personal development. Thus, we posit that focusing on technical skill without developing other skills through active engagement is a limitation of TA delivery.

Social constructivist theory can be considered a well suited approach to engage students' critical curiosity. Social constructivist theory is developed based on the premise that students can negotiate meaning by overcoming the natural limitations of their perceptual field by imposing a culturally defined sense and meaning on the world (Vygotsky, 1978). Thus, whilst behaviourist theory (TA) can be considered efficient to develop technical skills and for classroom management purposes, TA is a one-way communication model which limits student development. On the other hand, social constructivist theory has the potential to develop student voice because students aren't told what to think; rather they are expected to explore accounting as a social concept to appreciate its role in society. Social constructivist theory suggests students can apply their own social knowledge and relate their beliefs about a subject (accounting) in a classroom (Brooks, 1999). Social constructivism also suggests that collaborative learning is important based on discussions addressing specific concepts, problems, or scenarios. Therefore, social constructivist theory can provide students with an opportunity to appreciate various social and research perspectives. To enact social constructivist theory, we believe research informed teaching can be considered an effective strategy.

RIT refers to the practice of linking research with teaching (accounting). Heaney (2005) considers 4 different RIT methods, research-tutored, (emphasis on writing and discussing research), research based (developing methodology), research orientated (knowledge about the research subject) and research-led (traditional research). Whilst each method is not mutually exclusive, the research tutored approach is considered the most appropriate for our RIT intervention. Heaney (2005) explains the research tutored approach is designed to provide students with an opportunity to critique and discuss research perspectives that exist in the literature. Moreover, the research tutored approach encourages students to develop knowledge about a research topic, acknowledging the existence of a research perspective and potentially develop their own view or perspective by comparison. Various studies demonstrate that RIT can enhance learning experiences through active engagement in the research process (Healey & Jenkins, 2000; Healey et al., 2005; Griffiths, 2004; Baldwin, 2005). However, whilst RIT is

considered as enhancing students' learning experiences, whether undergraduate students at the early stages of their academic life have developed the skills required to discuss accounting research topics is unknown. RIT is shown to enhance academic performance in Arts and Humanities. However, accounting students may be comfortable receiving accounting information through TA. Therefore, we believe the Accounting Education community may be interested to discover whether undergraduate accounting students have the capability or motivation to investigate research topics through active participation in research debates.

2.2. Hypothesis development

Herring (2003) suggests that through the application of TA, accounting textbooks can be used as a crutch by lecturers. Thus, naturalized ideologies (views and discourses) that exist in textbooks may be adopted by students. Ferguson et al. (2005; 2008; 2010) surmise that within accounting textbooks, Anglo-American values are promoted; furthermore, lecturers do not attempt to contextualize different accounting beliefs or perspectives to students. The argument put forward by mainstream accounting proponents is that TA is an efficient teaching methodology to develop technical knowledge to prepare students for professional life. However, increasingly, accounting education practitioners suggest that developing soft (Bui and Porter, 2010; Watty, 2005) and critical thinking skills (Plam and Bisman, 2010; Wood and Sangster, 2012) are likely to facilitate more complete learning experiences. The literature suggests that TA is not a complete teaching methodology. Therefore, we have experimented with teaching styles that require students to challenge the *status quo*. Based on classroom observations in 2017-2018, we find our specifically designed RIT intervention can enhance the TA approach because it provides students with an opportunity to acknowledge and interpret different perceptions that exist in the accounting literature (see Figure 1).

<Insert Figure 1 roughly here>

In previous TA deliveries, we found that students considered accounting knowledge and textbook knowledge to be equivalent, and that repeating textbook knowledge demonstrated academic knowledge. TA is a one-way process in which students are required to accept the message imparted by the lecturer without question, for academic purposes. Thus, students are conditioned to consider mainstream textbook knowledge and perspectives to be fact. On the other hand, RIT has the potential to engage students' critical curiosity. TA delivery without the RIT intervention may encourage students to consider accounting as monolithic based on the ideologies held in textbooks. However, RIT is designed to encourage students to develop research/inquiry skills and to consider how knowledge is developed; a practice shown to enhance learning engagement by increasing intrinsic motivation (Healey & Jenkins, 2000; Healey et al., 2005). Thus, in our RIT intervention, students are encouraged to acknowledge mainstream (Anglo-American) and critical perspectives, as well as the social theory that underpins both schools of thought to develop their own voice (perspective) by comparison. Thus, our RIT intervention has the potential to modify student perceptions through critical curiosity engagement compared TA, which may consolidate the views held in accounting textbooks. Based on the above, we develop the following hypothesis:

H1. Students that participate in the RIT intervention are likely to modify their perspective about accounting.

Whilst it is not the primary objective of this study to show that academic performance is improved using our RIT intervention, demonstrating that our intervention would not reduce student performance was an essential ethical consideration. The RIT intervention has the potential to influence student performance in three ways. i) The academic performance of the PER and TA sample will not be different. Allocating 10 minutes for the respective task may not affect a student's performance because accounting students may not have developed the competencies required to develop knowledge about accounting research topics so early in their academic careers. ii) The academic performance of students may decline as a result of the RIT intervention because they have extrinsic motivation to achieve the highest grade possible. Students may therefore feel that having a conversation to discuss their perceptions about accounting research topics is unnecessary. Moreover, introducing a new teaching style and ethos may not be effective. Put simply, if students receive TA in every class in each semester in an accounting program, they may find that participating in the RIT intervention may be outside their comfort zone. Thus, there is the potential that replacing TA (class time) with the RIT intervention may disadvantage the PER sample because the TA sample utilize more class time on material relevant to assessments.

iii) There is the potential that the RIT intervention enhances student performance through critical curiosity engagement (see H1). To develop our RIT intervention, we have experimented with numerous teaching approaches on an ad-hoc trial and error basis. We consider that the introduction of research topics through the RIT intervention is a well-designed approach to engage students' critical curiosity (see Section 3.1). From our observations in unstructured tests in a classroom environment, we found that introducing research topics intrinsically motivated students to engage with accounting material, as suggested by (Baldwin, 2005). Therefore, we hypothesise through the introduction of the RIT intervention, the PER sample may demonstrate superior academic performance compared to the TA sample in controlled empirical tests. Based on the above, we develop hypothesis:

H2. Students that participate in the RIT intervention demonstrate higher academic performance than those who do not.

III. Research Design

3.1 RIT Intervention

Next, we present the structure of the i) TA lecture, and ii) the lecture that includes the RIT intervention. The TA sample receives TA instruction (technical information) for the entirety of the 150 minute class, each week, over a 15-week semester (excluding periods where exams take place). The PER sample receive TA instruction for 140 minutes. However, the final 10 minutes is replaced with a RIT intervention. Thus, the PER and the TA lecture material is the same apart from a 10-minute period at the end of each class where PER students have a collaborative discussion about accounting from two different perspectives. As a result, technical accounting knowledge required for testing is delivered more quickly to the PER sample because of the inclusion of the RIT intervention. However, overall, the technical accounting material covered by both students excluding the RIT intervention can be considered equivalent.

To provide insights to educators about implementing our RIT intervention, we explain how the RIT intervention is introduced into TA lectures. During the RIT intervention, the PER sample is required to discuss the naturalized views listed in Table 1 for 10 minutes. The views

presented in Table 1 are familiar to students from the week's lectures. To facilitate the RIT intervention, the lecturer simply writes down two different research perspectives on the board and allows students to debate each view without the lecturer's input. Each student is randomly assigned a perspective based on odd (even) placement on the register. Based on the assigned (4) groups (of roughly 15), student argue left/right leaning perspectives in different weeks. For 5 minutes, a randomly selected group argues a left leaning perspective; then, for 5 minutes, a different group argues the right leaning perspective. We believe that the process of debating both perspectives allows students to develop and express their voice and to identify their individual perceptions about accounting. The lecturer guides the discussion, but is not involved with knowledge creation. Thus, knowledge creation is independent of the lecturer and dependent on the student peer group. The purpose of this approach is to understand how students develop meaning from their experiences and to then allow a student's individual frame of reference to emerge (Ashworth and Lucas 2000). In the final 10 minutes of the TA lecture, there is no intervention. Students are free to ask questions relating to class material or the lecture finishes at the allocated time.

< Insert Table 1 roughly here>

Higher Education literature suggests that students are able to become more effective learners through group participation (Ashwin, 2015; Wegner et al., 2002). The, RIT intervention is a group discussion in which students express their opinion about accounting in a collaborative setting. Thus, in a collaborative setting and without the influence of the lecturer, we perceive the student group can develop views more effectively. Furthermore, Higher Education literature consistently demonstrates that students are more effective learners if they are able to acquire knowledge using more than one sense or (modality) (Clark and Paivio, 1991; Shams and Seitz, 2008; Shams et al., 2011). Our RIT intervention is an active form of learning and designed to engage numerous senses through classroom debate.

3.2. Student perceptions about critical / mainstream perspectives

Next, we explain the research topics introduced in our RIT intervention debates. We develop our RIT intervention task based on a parsimonious framework to facilitate discussion. Each topic in Table 1 has been chosen based on i) accessibility (student's prior knowledge) and ii) relevance to the day's class material. For example, in week 2 and 3, the lecture was focused on financial statement preparation. Thus, the user and preparer perspectives were considered the most appropriate RIT intervention. It is beyond the scope of this study to provide a comprehensive analysis of each perception in Table 1. However, we design the RIT intervention so that the perceptions included in the right column (of Table 1 and Appendix A) to be left leaning (critical and liberal) and the views in the left column to be rightward leaning (mainstream and conservative). In the remainder of this section, we explain our basis for the selection of the naturalized concepts included in Table 1 and explain how research topics may be perceived by our students.

Ferguson et al. (2010) collect survey evidence to explore the extent to which accounting educators explicitly challenge the world view that underpins accounting textbooks. They find that at the early stages of academic development, developing awareness about social context and critical skills was not a priority for educators. Apple (2004) suggests that the education

process should not be considered an 'input/output' process, whereby students develop a dominant ideology. However, Ferguson et al. (2007) suggest that educators are aware of the ideology that exists within a textbook, and the values that promote the mainstream Anglo-American model of capitalism. Taken together, the literature suggests that Anglo-American values are considered impounded into accounting textbooks. Thus, whether such values have been adopted by South Korean academic institutes and students is an important question for accounting education. Potentially, capitalist values may be embedded into society and indistinguishable from Anglo-American values. Sangster (2010) suggests there is a need to address societal issues to acknowledge critical perspectives and to develop critical thinking skills to conceptualize the information in mainstream accounting textbooks. Ferguson et al. (2007) reports students would benefit if additional perspectives would be introduced to identify ideologies such as critical accounting perspectives. In week 13, elements of critical vs mainstream accounting principles were included in the class material; therefore week 13 was considered the best week to introduce critical vs mainstream principles in our RIT intervention to allow students to discuss both research topics.

A contentious issue in accounting education is whether the preparation of financial information should be framed from the 'user' or 'preparer' perspective; whether accounting should be considered as a 'technical information' or the process of 'understanding business'; and whether accounting information should be designed with 'shareholders' or 'various stakeholders' in mind (see Table 1, week 1-6). The purpose of annual reports according to policymakers is to provide (potential) shareholders and equity stakeholder with information for investment decision making purposes (IFRS, C., 2018). Ferguson et al. (2008) posit that accounting textbooks as well as the accounting profession should move away from the ideology that, above all accounting information is required for shareholders. After numerous high-profile financial scandals, Zeff (2012) criticizes the accepted naturalized view that information quality for investors is more important to the information needs of the general public. Stakeholder theory posits that various stakeholders are required to interpret financial statement data including customers, suppliers and employees. Thus, whether accounting is a process of preparing financial statements for shareholders or for various stakeholders may be a divisive issue for students. Thus, how students perceive the accounting needs of stakeholders vs shareholder wealth maximization can be of interest to accounting education and the accounting profession. Potentially, TA students may perceive that financial statement information is important for shareholders for decision making purposes based on the naturalized views in the accounting profession. Students that receive the RIT intervention would be required to consider both research perspectives; thus, have the potential to develop a more complete appreciation of the conflicting requirements of accounting in society.

Based on recent negative accounting/auditing events, we are curious whether the perceptions of students about accounting are complimentary or not complimentary. Following the infamous demise of Enron, numerous studies have called to reform accounting education to be more critical of the decision making of management (Amernic, and Craig, 2004; Boyce, 2004; Humphrey, 2005). Apple (2004) encourages educators to become aware the contestation that exists in society, and potential resistance that may take place. In our study, we question whether recent social phenomena have had a negative impact on students' perceptions about the accounting profession. Since the 1997 Asian financial crisis, there have been numerous financial defaults as a result of window dressing. In 2003, the FSC reported that one in three Korean Chaebols were committing accounting fraud and one in seven was engaged in aggressive earnings management, which has led to criticisms of the Korean audit system (Choi et al., 2017;

Lim and Mali, 2020, Mali and Lim 2018, 20219, 2020, 2021). Based on recent events, there is evidence that students may not consider accounting to be a fair system. Thus, we are curious about students' perceptions in relation to' tax evasion/fair taxation' (week 12). Extending from this argument, we consider that students may hold differing views of accounting; as focused on 'profit maximization' or the 'environment' (week 10); as well as 'monitory issues' or 'social issues' (week 11). Based on evidence that the propensity of Korean firms to report accounting information is higher than in some developed countries such as the UK (Lim and Mali, 2021), we are motivated to discover whether students perceive accounting as 'national' or 'international' (week 14). We are also interested in how students perceive accounting policy following South Korea's adoption of IFRS in 2010. Therefore, we provide students with an opportunity to interpret accounting as 'principle/rule-based' (week 9), and 'rigid' or 'flexible' (week 7).

3.3. Variable definition

Our variables of interest are the i) academic performance of students, and their ii) perceptions about accounting. First, we measure a student's academic performance using values from mid-term and final exams. Each student is required to complete a mid-term exam and final exam, with a maximum value of 100% available. The mid-term test's duration is 1 hours. The final exam lasts for 2 hours. The mid-term exam is made of 10 multiple choice questions (5% each) and 5 short questions (10% each). The final exam consists of 8 short answer questions (5% each) and a large question worth 60%. The final test is relatively more difficult compared to the mid-term exam because more material has been covered by the stage students are expected to sit final exams. However, both mid-term and final exam questions are qualitatively indifferent for both groups. Because the tests are qualitatively indifferent, there is no measurement bias between groups when estimating academic performance changes.

Second, we capture the perceptions of both groups of students about the accounting profession during the orientation period in week 1 and again in week 15 after the completion of the semester. We use a questionnaire to capture the perceptions of students in both periods (Appendix A). Based on Likert scaling; the 'strongest' left leaning perspectives (critical and liberal) are issued a score of 100; the 'strongest' rightward leaning (mainstream and 'conservative) perspectives are issued a score of 10.

3.4. Sample Selection

We use a South Korean student sample because the hierarchical structures in South Korea have been shown to have an adverse effect on critical thinking skills (Mckinley 2013). Thus, if our RIT intervention task has the potential to improve the critical inquiry of South Korean students, we conjecture our approach will be effective in an international context. Our sample selection process is shown in Table 2. Our initial student population consists of all 129 second year students that are required to complete a mandatory (non-elective) class named *Principles of Accounting*. The 129 students are randomly assigned into two cohort/groups (see section 3.5). 66 students were placed in the RIT intervention class by administration (PER sample). 63 students were randomly assigned into the traditional lecture (TA sample). 5 students are excluded from the study because they did not complete the program (3 PER, 2 TA). We also exclude students that missed more than 2 classes because a lack of engagement is likely to yield bias results. The final samples include 58 students from the PER group and 54 students from the TA group.

3.5. Ethical considerations and quasi-experiment control

The most important consideration for this study is to ensure that apart from the RIT intervention, the learning experiences of both PER and TA groups are equivalent. Ensuring that both groups and learning experiences are similar has two objectives. First, to satisfy the ethical requirements of this study, neither group of students could be considered disadvantaged. Second, as suggested by Cook and Campbell (1979), if groups are equivalent, it is a powerful control to demonstrate that the introduction of the RIT intervention (treatment) is the cause of the 'academic performance' and 'perception' effect. To develop an environment where both groups are considered equivalent for empirical testing, and neither student group is disadvantaged, we include i) controls at the start of the semester when selecting our samples; ii) we design our classes to be virtually identical apart from 10 minutes as a further research design control; iii) we also measure student perceptions and performance at two different time periods in the semester.

i) The first research design we include at the start of the semester is to divide the population of 2nd year undergraduate students in two samples to control for internal validity threats. It is accepted in the literature that empirical tests using populations are more robust compared to tests using samples because a population includes all student ability levels, diligence, social factors etc. (Gujarati and Porter, 1999). We are able to use a student population because all students must enrol in a mandatory (non-elective) class named *Principles of Accounting,* and pass to graduate the academic year. Second, Guney (2009) uses a dummy variable to demonstrate that endogenous characteristics (male/female, working/not working, and learning disability/no learning disability amongst other) influence student performance. To control for endogenous effects, we adopt a randomization methodology. The student population is divided randomly into two groups based on a) a student's timetable and b) surname grouping (by the university's administration), which is almost certainly not likely to influence a student's perception or academic performance in week 1. The purpose of randomly assigning samples is to match both cohorts at the initial stage of the study, a process that is shown to provide stronger descriptive causal inference when conducting quasi-experiments (Cook et al., 1991). Because our two random samples are the student population, endogenous effects (gender, household income, motivation, intelligence, work status and learning disability) are not likely to be the intervening variables that affect performance/perceptions. The randomization methodological approach is considered robust to conduct quasi experiments (Campbell and Stanley, 1963; Lim and Mali, 2021) and accepted in the extant econometrics literature as a method of significantly minimizing sample selection bias (see Field, 2013; Glasser, 2008; Gujarati and Porter, 1999; Hill et al., 2018).

ii) To satisfy the concerns of the ethics committee, the TA and PER samples could not receive significantly different teaching deliveries. Thus, we ensure that the learning environment and material for both the PER and TA samples are largely equivalent for the majority of the semester. Ensuring that the material/environment for both groups is qualitatively similar, excluding a 'treatment' can reduce external validity threats (Lewis-Beck 1993). iii) As explained in section 3.3, we collect questionnaire data and academic performance values at two different periods based on the assertion that causal inferences are improved when outcomes are predicted to change over a predicted time period (Cook, 1991, 2015; Shadish et al.

2002). We collect questionnaire data for both samples at week 1 and week 15 to compare relative perception changes for both groups over a semester. We also collect mid-term and final exam averages to capture whether the academic performance of both groups are different in both periods.

To the best of our ability we specifically control for the RIT intervention to be the intervening 'test' effect. However, the Hawthorne effect is a phenomenon that implies that group members modify behaviour in response to an awareness of being observed (Benke and Street, 1992). If one group was made aware that a method was considered more effective compared to the other, the Hawthorne effect could lead to one group losing motivation based on their perception of receiving a lesser teaching strategy. To control for the Hawthorne effect, a) we did not explain to either sample that they were being compared against each other. b) We designed both classes to be as similar as possible. c) Both classes knew they were taking part in an experiment to capture the effect of teaching styles on perceptions and academic performance, but participated in a lecture on a different day and a completely separate delivery. Thus, we interpret that both groups can be influenced by the Hawthorne effect equally. However, it is not possible to conclusively rule out the Hawthorne effect because students can meet in social settings to discuss class material. We discuss this limitation amongst others in section V.

3.6. Empirical test design

We perform mean difference (t) tests, as well as median difference (z) tests to compare the perceptions/performance of TA and PER samples (in different periods). To calculate mean (median) differences we minus the mean (median) of the PER sample from the mean (median) of the TA sample. We then divide our mean (median) difference with the population standard deviation. To demonstrate our two random samples (population) are homogeneous, we compare the (academic) mid-term exam performance of both PER and TA samples (t/z-test). Equivalent (statistically insignificant) mid-term averages for both samples would suggest homogenous groups. We also use the same approach to compare the final exam averages of both groups to capture whether students' involvement in both RIT and TA has an incrementally positive effect on academic performance. We employ an identical t/z-test methodology for the perceptions of both groups at week 1 using questionnaire data to capture whether our population is homogenous. The equivalent test in week 15 is used to show whether a teaching intervention can have an incremental influence on student perceptions.

IV. Empirical results

4.1. Co-variate analysis

In Table 3, we provide the results of Person correlations. *Group* is a dummy variable for our two samples. The PER sample takes the value of 1, the TA sample takes the value of 0. Thus, in column 1, we list the incremental effect of our RIT intervention on academic performance and changes in student perceptions. In line 2, we show that the academic performance of both groups based on mid-term exam values is not statistically significantly different (0.14). The results suggest a homogenous sample, allowing us to consider both groups equivalent. However,

when we compare the final exam values of both samples in line 3, the PER sample demonstrates higher academic performance, statistically significant at the 1% level (0.27***). When we compare the changes in performance for both samples between the final exams and the mid-term in line 4, the PER sample demonstrate the largest improvement, statistically significant at the 10% level (0.17*). The results suggest, that overall, 90 out of 100 PER sample students demonstrate larger academic improvements compared to the TA sample.

The Week1 *per* variable in line 5 captures the difference between the perceptions of the PER sample and TA sample based on questionnaire data collected in the orientation period in week 1. The insignificant relation suggests that both samples held similar perceptions during the orientation period (-0.02). Again, the results suggest a homogenous sample. The *Week15-per* variable in line 6 captures the different perceptions for the TA and PER sample at week 15. The *W15-W1* variable in line 7 captures the incremental changes in both groups before week 1 and 15. The 1% statistically significant relationship in line 6 (0.29***) and 7 (0.25***) suggests that the perceptions of both groups are different in week 15. Overall, the results show that our samples are indifferent at the start of our study, but academic performance and student perceptions are different for both groups as a result of including (excluding) the RIT intervention.

<Insert Table 3 roughly here>

4.2. Mean difference tests

In Table 4, we provide the results of mean (median) difference t/z tests and descriptive statistics to identify whether the average perceptions of students change from class orientation in week 1 to the end of the semester (week 15). When we collect data about student perceptions about accounting in week 1, we find both groups of students hold leftward leaning beliefs about accounting with average scores of 68.57 for the TA group, and 68.09 for the PER group. The results show that the perceptions for both groups are virtually identical at the start of the semester (t value, -0.29).

Next, we analyse the perception changes of both groups after a week 15-week period in which the TA sample receives traditional accounting lectures and the PER sample receives a 10-minute RIT intervention on a consistent basis. We find that the perceptions of the PER group become more leftward leaning 73.5 (+5.5). However, the views of the TA sample become more right leaning 67.53 (-1.04). When we perform mean (median) difference t (z) tests, they are statistically significant at the 1% level, showing that our teaching approach influences student perceptions (t value, 3.22***). However, whilst the PER sample adopt more critical perspectives, interestingly, we find that the TA group become more likely to accept the naturalized ideologies that exist in accounting textbooks (right-leaning). The result allows us to accept hypothesis *H1*.

<Insert Table 4 roughly here>

In Table 5, the TA and PER samples' maximum mid-term test scores are 100%. The lowest result for the TA sample is 20%, and 15% for the PER sample. Moreover, the academic performance of both groups is statistically insignificantly different (TA 75% and PER 81%, t value, 1.51). The results show that at the mid-term point, the academic performance of both groups is homogenous. This finding allows us to conduct further empirical tests to establish whether the performance of both groups is different in final exams, after the RIT intervention is delivered for 15 weeks in total.

The maximum and minimum final exam scores of both groups are 92% and 0% suggesting that the best and worst student achieved similar results. However, the final exam average of the TA sample is 59% and the final exam average of the PER sample is 72%, after the RIT intervention have been delivered for 15 weeks. The difference in academic performance for the groups is statistically significant at the 1% level (t value, 2.98***). The results allow us to accept that the RIT sample is not disadvantaged, but the PER sample demonstrates enhanced academic performance compared to the TA group, as a result of the RIT intervention. The results allow us to accept hypothesis *H2*.

<Insert Table 5 roughly here>

In Table 6, we add robustness to our analysis by providing details of the perception changes of both the TA and PER samples based on individual questionnaire data/questions collected in weeks 2 to 15. In relation to 'how the TA sample and the PER sample perceive accounting' (week 2-3); the PER sample consider that accounting information should be considered from the user perspective (+1.39***), consistent with critical accounting perceptions. The TA sample increasingly consider that accounting should be considered from a preparer perspective (-0.48***), consistent with the arguments put forward in mainstream accounting textbooks. The results are statistically significant at the 1% level. We find consistent results based on numerous other student perspectives. The TA sample consider accounting to be increasingly required for shareholders (-1.29***, week 6), rigid (-0.83***, week 7), rules based (-0.63**, week 9) and focused on monitory issues (-0.87**, week 11). The PER sample increasingly consider accounting to be required by various stakeholders (0.32***), flexible (0.50***) principles based (0.62**) and increasingly concerned with societal issues (0.22**). The results are consistent with our main analysis in hypothesis *H1,* suggesting that; the TA sample is more likely to adopt and consolidate the ideologies of mainstream accounting; and that the PER sample are more likely to consider critical perspectives. For completeness, we mention that both groups of students consider accounting to be increasingly an international issue. However, the TA sample perceive that accounting is an international phenomenon to a greater extent compared to the PER sample (TA Sample, 2.29***, PER Sample 0.72***).

<Insert Table 6 roughly here>

V. Conclusion and discussion

The traditional accounting lecture can be considered an efficient knowledge delivery method based on the classic view that the development of technical accounting information is the most important aspect of professional life as an accountant (Alexander and Nobles, 1994; Dyson, 1997). However, increasingly, accounting scholars conjecture that defining accounting as a technique limits the scope of accounting as an academic subject (Bui and Porter 2010; Watty, 2005), with suggestions that soft skills should be incorporated into traditional lectures (Plam and Bisman, 2010; Wood and Sangster, 2012). In this paper our main research question is whether modifying the TA approach to include research perspectives can enhance the learning experiences of students. To discover whether the inclusion of research perspectives can enhance student experience, we include a carefully designed RIT teaching intervention to compare the academic performance and perceptions (changes) of two groups. The TA sample that receives TA for the totality of a lecture and the PER sample that receives a supplemental

RIT intervention which replaces 10 minutes of TA delivery. We perceive TA to be a learning environment in which students are involved in 'recipe following' (Boud and Walker 1998: 192); a situation where 'elements of models of reflection are turned into checklists which students work through in a mechanical fashion without regard to their own uncertainties, questions or meanings'. RIT students are specifically required to 'question meanings' to develop a more comprehensive understanding of both accounting academia and the accounting profession. Using mid-term averages and final-exam averages to capture academic performance, and questionnaire data to measure students' perceptions, we find that students that receive TA are more likely to adopt and consolidate the ideology of accounting textbooks. The PER student sample adopts a more critical perspective. We also find that students that engage in the RIT intervention demonstrate higher academic performance compared to the TA sample.

Based on the following contributions, this study is important for several reasons. Our results demonstrate that a small intervention in a traditional accounting lecture can have significant influences on student perceptions. We also show that the perceptions of students change over the period of a semester when our RIT intervention is combined with TA. Lucan and Tan (2011) suggest that little is known about what influences students in an accounting classroom. We find that the perceptions of the TA sample are more likely to become right leaning consistent with mainstream ideologies that exist in accounting textbooks. Our results are consistent with suggestions that accounting textbooks reflect the Anglo-American values (Ferguson et al., 2005; 2008; 2010), which are adopted by students. Thus, potentially, an element of conditioning exists in a traditional accounting lecture. On the other hand, students that participate in the RIT intervention adopt more left leaning and critical perspectives. Based on our results, we suggest that triggering a discussion among students about accounting views held in the literature whilst respecting opposite opinions is potentially an effective strategy to develop students' critical thinking and soft skills. We encourage future studies to capture how different pedagogical approaches influence student perceptions to open a debate about how class materials have the potential to condition students' views on the role of accounting in society.

It is not the primary objective of this study to show that RIT can have a statistically significant effect on student performance. However, we find that our RIT intervention improves academic performance. We perceive that students that receive TA are extrinsically motivated to achieve the highest grade possible in academic tests. However, because our RIT intervention is designed to engage students' critical curiosity, they develop an appreciation of accounting from various perspectives. We believe that developing an appreciation of positions held in the accounting research literature develops intrinsic motivation to acquire accounting knowledge outside of the classroom, over and above technical accounting skills. We also report that providing students with the ability to consider numerous accounting research perspectives provides students with the opportunity to develop their own 'voice', which is also likely to motivate students to acquire additional accounting knowledge. Overall, our results are consistent with previous studies that suggest the inclusion of research topics in accounting lectures enhances student engagement (Baldwin, 2005; Healey & Jenkins, 2000; Healey et al., 2005; Griffiths, 2004). In addition to increasing intrinsic motivation, our RIT intervention is a multisensory process. Multisensory learning is shown to enhance the learning environment (Clark and Paivio, 1991; Shams and Seitz, 2008; Shams et al., 2011). Furthermore, the group work element of our RIT intervention is likely to enhance academic performance consistent with evidence that group tasks accommodate numerous learning styles (Ashwin, 2015; Wegner et al., 2002). Taken together, our results suggest that the traditional lecture paradigm can be

considered incomplete, and that engaging students' critical curiosity through specifically designed research focused interventions can enhance student experience.

Whilst we believe that the above explain our findings, we offer alternate explanations for completeness. First, the RIT intervention can be considered a 'treatment' because it includes changes to the learning environment, specifically it is i) a new active method of learning ii) which is presented at the end of a lecture. Thus, the RIT intervention may influence learning achievement because placing an active learning task at the end of the lecture when students are tired and less focused can improve a student's motivation and attention. We included the RIT intervention at the end of the class to consolidate learning to achieve the best possible results. We would encourage future studies to capture whether an alternate teaching (strategy) intervention placed at the end of lecture would complement TA and demonstrate similar results. Second, students in the RIT sample are required to consider different accounting perspectives (left and right). Therefore, students that participate in the RIT intervention may learn more about accounting research topics (but less class content) compared to the TA sample. This implies that both classroom accounting information and additional information from outside the classroom can affect students' perceptions. Therefore, we suggest that educators who wish to adopt the RIT intervention should understand how specific forms of accounting information outside of the classroom can influence students' perceptions and academic performance.

Finally, we list limitations. Our 'perception' measures listed in Table 1 are designed based on parsimony and relevance to lecture material. It is beyond the scope of this paper to clearly define varying polar views in the accounting literature. We leave it to future studies to develop a more robust accounting perception framework. Furthermore, our sample population consists of 112 of students, 58 and 54 in the PER and TA samples. Thus, the population may be considered relatively small. However, because we use a population, our results can be considered representative of a larger population of Korean university students. Meta-analysis studies may draw international comparisons to discover whether a similar teaching intervention can provide similar results. We show our samples have homogenous performance and perceptions at the initial stages of the study. However, we acknowledge that we cannot guarantee the academic ability/perceptions of our groups are equal based on random selection. Shadish et al. (2002) suggest that group matching may be considered a strategy to control for important individual characteristics, but also acknowledges that the random sampling procedure used in this analysis is the most effective research design.

Shadish et al. (2002) suggest that because the cause of the perception/performance effect is predetermined before the start of the study in quasi-experiments, the researcher must acknowledge potentially alternative explanations for empirical results. We believe that the inclusion of the RIT intervention is the cause that has enhanced student performance and modified student perceptions. However, we also acknowledge that there is the potential for some non-observable cause to influence student achievement. For example, students that participate in the RIT intervention can learn more about accounting research topics compared to the TA sample in group discussions. There is also the potential for the RIT intervention to develop group cohesion. Therefore, we suggest that educators who wish to efficiently adopt a similar treatment should consider how group cohesion and learning outside of the classroom can influence learning experiences. We leave it to future studies to develop controls for group cohesion and to control for how students learn outside of the classroom as a result of a teaching intervention.

Campbell and Stanley (1963) explain a quasi-experiment is distinguished from a true experiment based on the authors' ability to control which group received the treatment. Spector

(1993) suggests that it is impossible to isolate and control every variable or to know with absolute certainty whether the cause outlined at the start of the study is the variable that causes the underlying effect in quasi-experiments. In our study, to the best of our ability we develop an environment where the two groups are equal apart from the RIT intervention. However, students in both groups may discuss differences between class materials and class delivery in social settings. Therefore, we cannot conclusively rule out that the Hawthorne Effect has a positive/negative effect on student performance or influences our empirical results because students can feel advantaged or disadvantaged as a result of participating in a TA or PER delivery. Cook (1991) suggests that including multiple groups can reduce the Hawthorne Effect. However, we are unable to repeat our study using multiple comparison groups because it is unethical after establishing that RIT is a superior teaching methodology to TA. Future studies may use multiple groups to enhance the predictive validity of our results. Finally, Cook (2015) suggests quasi-experiments are designed to identify whether a 'treatment' has led to a specific outcome; a consideration for why the outcome has occurred is considered of less importance. Therefore, we do not identify which individual cause leads to the performance effect. Given the increasing interest in RIT as a strategy to improve academic performance, future studies may capture the specific cause that influence student performance/perceptions based on the introduction of research informed teaching.

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Table 1 Discussion(debates) among students

Discussion (Week 2-7 & Week 9-14)		
Right leaning perception	Left leaning Perception	Week
Orientation/Survey		1
User perspective 1	Preparer perspective 1	2
User perspective 2	Preparer perspective 2	3
Developing Technical information 1	Understanding Business 1	4
Developing Technical information 2	Understanding Business 2	5
Shareholders	Various stakeholders	6
Rigid	Flexible	7
Mid-term exam		8
Rules based	Principle based	9
Profit maximizing	Environmental issues	10
Monitory issues	Social issues	11

Tax evasion	Fair taxation	12
Mainstream issues	Critical perspectives	13
National values	Global values	14
Final exam/Survey		15

Table 2 Sample Selection

	Full Sample	PER sample	TA Sample
Initial sample	129	66	63
Excluded because of class incompletion	(5)	(3)	(2)
Excluded due to participation	(12)	(5)	(7)
Final sample	112	58	54

Table 3 Pearson Correlations

	1.	2.	3.	4.	5.	6.	7.
1. Group	1						
2. Mid_term	0.14	1					
3. Final	0.27***	0.71***	1				
4. Final-Mid	0.17*	-0.22**	0.47***	1			
5. Week1_per	-0.02	-0.18**	-0.09	0.12	1		
6. Week15-per	0.29***	0.04	0.14	0.13	0.15	1	
7. W15-W1	0.25***	0.17*	0.18*	0.01	-0.61***	0.67***	1

Table 4 Descriptive statistics and difference tests for perception changes

Week1 Perception score difference between TA and PER groups, week 1							
Group	Obs.	Mean	Median	Max	Min	S.D.	**diff test(PER-TA)**
TA	54	68.57	69	90	40	10.03	t value -0.29
PER	58	68.09	69	90	50	7.68	z value -0.33
Week15 Perception score difference between TA and PER groups, week 15							
Group	Obs.	Mean	Median	Max	Min	S.D.	**diff test(PER-TA)**
TA	54	67.53	66.5	92	40	10.66	**t value 3.22*****
PER	58	73.13	73.5	99	49	7.56	**z value 3.40*****

Table 5 Descriptive statistics and difference tests for academic performance

Mid-term difference between TA and PER group

Group	Obs.	Mean	Median	Max	Min	S.D.	diff test(PER-TA)
TA	54	0.75	0.8	1.00	0.20	0.21	t value 1.52
PER	58	0.81	0.9	1.00	0.15	0.2	z value 1.61

Final difference between TA and PER group

Group	Obs.	Mean	Median	Max	Min	S.D.	diff test(PER-TA)
TA	54	0.599	0.68	0.92	0.00	0.26	**t value 2.98*****
PER	58	0.72	0.80	0.92	0.00	0.21	**z value 2.80*****

1   **Table 6 Descriptive statistics and difference tests for each question**

2

Perception changes for each question (Obs. For TA = 54, PER = 58) Diff tests = PER - TA										
Group	Question 1		Question 2		Question 3		Question 4		Q	
	Mean(S.D.)	t value/z value	Mean(S.D.)	t value/z value	Mean(S.D.)	t value/z value	Mean(S.D.)	t value/z value	Mean(S.D.)	
TA	-0.48(3.49)	**t=3.07*****	-0.15(3.64)	t=1.32	-0.13(3.73)	t=1.13	-0.26(3.04)	t=0.68	-1.29(3.05)	
PER	1.39(2.95)	**z=2.74*****	0.64(2.58)	z=1.46	0.50(1.92)	**z=1.80***	0.08(2.21)	z=0.68	0.32(2.28)	
	Question 7		Question 8		Question 9		Question 10		Q	
	Mean(S.D.)	t value/z value	Mean(S.D.)	t value/z value	Mean(S.D.)	t value/z value	Mean(S.D.)	t value/z value	Mean(S.D.)	
TA	-0.63(2.96)	**t=2.43****	0.43(2.44)	t=0.46	-0.87(2.51)	**t=2.22****	0.11(3.06)	t=0.76	-0.74(3.36)	
PER	0.62(2.47)	**z=2.24****	0.65(2.79)	z=0.67	0.22(2.68)	**z=2.01****	0.27(2.23)	z=0.99	0.17(3.05)	

4

5

6