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Abstract
The study examines the effectiveness of active learning in Management Accounting (MA) in Singapore Management University (SMU). The aims of the paper are to determine student learning styles through the Felder and Soloman's Index of Learning Styles (ILS) instrument, if there is correlation with demographics and whether activities found effective matched learning preferences. Findings from the ILS instrument established a slight preference for Sensing and Visual learning styles. Findings from the second questionnaire concluded that the active learning curriculum comprising diverse activities succeeded in supporting formative learning. The results present a case for the active learning curriculum and fine-tuning certain teaching and learning components.

Keywords: active learning, management accounting, learning style preferences, Felder and Soloman's Index of Learning Styles (ILS)

Introduction

The School of Accountancy in SMU has encouraged active learning in the undergraduate Management Accounting (MA) module since the School was established in 2001. However, there has not been a deliberate attempt to assess the effectiveness of the experiential learning curriculum and the influences on students' perceptions of learning activities to date.

Active learning had been defined as "any learning activity engaged in by students in a classroom other than listening passively to an instructor's lecture (Faust & Paulson, 1998, p. 4). While often termed as learning by doing, Lawrence (1994, p. 210) stated "it is learning by doing - but not 'just'; learning by doing… in action learning, we go further by making arrangements … to enhance the opportunities to learn from our experiences and to speed up the process". Silberman (1996, p. 4) imparted "when learning is active, the learner is *seeking* something. He or she wants an answer to a question, needs information to solve a problem, or is searching for a way to do a job".

The field of learning, learning style, cognition, strategies and teaching methods is undoubtedly complex as their relationship involves many elements within a learning process (Boström & Lassen, 2006), making a holistic evaluation of teaching and learning competencies challenging.

Furthermore, with resource constraints, there has been increasing emphasis on efficiency and effectiveness as the university attempts to improve staff and student performance with less.

Management Accounting is an introductory module taken in the first or second year of the four-year Bachelor of Accountancy programme. A key learning outcome is to equip graduates with technical knowledge, skills and attitudes to function effectively as accounting professionals. Students understand cost concepts, cost measurement methods, cost behaviour and estimation, cost volume profit analysis, budgeting, variance analysis, capital budgeting and relevant costing. Upon completion, students are able to analyse, synthesize and evaluate financial information for managerial decision-making.

There are 120 to 160 students enrolled in MA each term. The small class size of 30 to 40 students is conducive for conducting active learning individually or in a group. The learning activities include Seminar Materials, Quick Checks, Homework, Group Project, Discussion Forum, Video and Group Activities on real life cases.

The research study examines:
i) the learning style preferences of a group of SMU students taking MA;
ii) whether gender and admission types influence their learning style preferences;
and
iii) whether the active teaching and learning activities found effective by the students correspond with their learning style dimensions

The findings will guide curriculum review, delivery and assessment so that the pedagogy can cater to all types of learners. The results will be applied to help students increase awareness of their learning styles to develop into independent lifelong learners ready to grasp workplace opportunities through understanding their strengths and enhancing skills linked to the less preferred styles. Finally, the study hopes to contribute new knowledge on the use of the ILS in MA education, and how active learning experiences can benefit both learners and educators.

Literature Review

In the American Accounting Association's *Active Learning Toolkit*, Hobson (2002, p. 1) declared that "active learning is about engagement". Active learning is "student participation in the teaching and learning process, where students themselves engage with and, to an extent, create their own learning experience" (Mitchell, 2002). The focus is on learning rather than teaching. Students construct meaning rather than acquire knowledge and analyse rather than memorise in a facilitated active learning environment that is a departure from the passive lecture pedagogy. Hence, deep learning is encouraged.

Active learning techniques are "activities that an instructor incorporates into the classroom to foster active learning". The active learning activities may include "short writing exercises in which students react to lecture material, to complex exercises in which students apply course material to 'real life' situations and/or new problems" (Faust & Paulson, 1998, p. 4). In MA, the instructor guides students from the processing of knowledge to the application of financial information (cost concepts, cost behaviour and estimation, cost volume profit analysis, budgeting, variance analysis, capital budgeting and relevance costing) in a wider context of managerial planning, decision making and evaluation.

There is much literature on learning styles (Dunn et al., 1995; Kolb, 1999; Kolb & Kolb, 2005; Keefe, 1985; Honey, 1988; Felder & Silverman, 1988; Felder & Spurlin, 2005; Larsen,

McCright & Weisenborn, 2004). Despite the various perspectives, the common understanding is not all learners learn in the same way and thus facilitators who make an effort to accommodate the learning styles of the students during curriculum design, delivery and assessment can achieve constructive alignment, greater transfer of knowledge and higher learning effectiveness. Boström and Lassen (2006, p. 186) believed that "knowledge of learning styles, learning strategies and meta-cognition … give teachers tools to identify the individual traits that effectively impact on achievement and give each learner the opportunity to develop personal strengths" which then "empower students towards life-long learning".

On definitions of learning styles, Keefe (1985, p. 138) stated that a learning style was "recognised by observing a student's overt behaviour that indicated how a student learnt best" and had "cognitive, motivational and physiological elements". Park (2005, p. 5) described learning styles as "general characteristics showing individual differences, intrinsic procedures of information processing" identified as "learners' unique behavioural patterns with durability and stability regardless of changing situations". Others have defined learning styles as "a group of cognitive, affective, and physiological characteristics used as indicators of how a learner perceives, interacts with and responds to the learning environment" (Alkhasawe, Mrayyan, Docherty, Alashram, & Yousef, 2008, p. 574). In addition, Felder and Spurlin (2005, p. 103) explained learning styles as "the different strengths and preferences in the ways students take in and process information". When there was a mismatch between the learning styles of students in a class and the teaching style of the faculty, there were negative consequences such as boredom, inattentiveness, low motivation, poor test performance, discouragement, curriculum change or drop out. The same undesirable outcomes due to incongruence between learning styles and teaching styles were also hypothesised in Van Zwanenberg, Wilkinson and Anderson (2000). Hence, it could be assumed that activities that fit to, or teaching adapted with, the learning styles of students could increase learning and chances of success. Smith (2010, p. 69) championed that "learning styles can be used to make learning accessible to a greater range and a number of students. However, it should not be seen as a compensatory or remedial move. There are positive benefits for all students in recognizing and valuing differences inside and outside the classroom, acknowledging how background and experience shape individual perceptions and attitudes, and how learning how to learn can be the most empowering learning of all".

The Felder-Silverman learning style model was conceived in 1988 to capture the differences in learning styles among engineering students. Instructors used the knowledge to design a teaching and learning approach that addressed the needs of all students. The associated and validated Felder and Soloman's Index of Learning Styles (ILS) questionnaire of 44 items is now currently used. The model classifies learners according to one of the following four learning style dimensions:

- *Sensing* (concrete, practical, oriented towards facts and procedures) or *intuitive* (abstract thinker, innovative, oriented toward theories and underlying meanings);
- *Visual* (prefer visual representations of presented material such as pictures, diagrams and flow charts) or *verbal* (prefer written and spoken explanations);
- *Active* (learn by trying things out, enjoy working in groups) or *reflective* (learn by thinking things through, prefer working alone or with a single familiar partner);
- *Sequential* (linear thinking process, learn in small incremental steps) or *global* learners (holistic thinking process, learn in large leaps) (Felder & Spurlin, 2005, p. 103).

Larsen, McCright & Weisenborn (2004) summarised the ILS as a straightforward instrument that assessed individual preferences on the four dimensions of learning. The four scales referred

to the types of information that learners preferred. The visual/verbal scale indicated the sensory channel that was used more readily to process incoming information. The sensing/intuiting scale reflected the types of information that the learner preferred. The active/reflective scale referred to preferred information-processing patterns. The sequential/global scale showed the information comprehension model that was most often utilised. Felder and Spurlin (2005, p. 103; 110-111) in an examination of the application, reliability and validity of the ILS concluded that "the ILS is best used to allow individuals to compare the strengths of their relative learning preferences rather than offering comparisons with individuals" as "learning what those strengths are can be empowering and even transformative".

In an empirical study by Visser, Vreken and McChlery (2006), the ILS was used to compare the learning and teaching styles of Accounting students and lecturers in one United Kingdom and one South Africa university. On student learning styles and with regard to the active/reflective dimension, the majority's learning style was balanced with the rest skewed towards an active learning style. With regard to the sensing/intuitive dimension, the majority preferred a sensing learning style while a balance between sensing and intuitive was the second choice. On the visual/verbal dimension, many preferred a balance or a visual approach with few opting for verbal learning. On the sequential and global dimension, the majority preferred a balance, with a preference for sequential learning next and a minority for global learning style. The researchers acknowledged that while it might not be possible to match each learner's learning style, they recommended planning for an environment to create opportunities for learner success whether through matching or mismatching.

Van Zwanenberg, Wilkinson and Anderson (2000) found their sample consisting of 59% business students and the rest engineering students to be more Active, Sensing, Visual and Sequential. In an exploratory study on business students using the ILS, Sandman (2014) established that the preferred learning styles for over 1,100 business students might depend more on the course than the major. The business students, rather than having a consistent preferred learning style, adapted their preferred learning style to the subject of the course. De Vita (2001) used the ILS to explore if cultural influences affected the learning style preferences of home and international students in an international business management class in the United Kingdom. The study revealed that each side of each dichotomous learning style dimension was amply represented. However, the scores reported by international students on active-reflective, sensing-intuitive and sequential-global learning style dimensions "show much wider measures of absolute and relative dispersion to those of home students, suggesting that greater variations of learning style preferences are present within culturally heterogeneous cohorts" (De Vita, 2001, p. 172-173). Also, international students for whom English was not their first language preferred the visual style of information perception. The findings advocated a multi-style teaching approach in multicultural educational settings.

The ILS is not without critique. The ILS was first designed for engineering education. Replication on students from other disciplines and generalisability had been questioned. The ILS had been compared to Kolb's Learning Style Inventory (LSI) (Kolb, 1999). Van Zwanenberg, Wilkinson and Anderson (2000) expressed concerns over the ILS' psychometric properties especially the low internal reliability and bipolarity of the scales and their definition. While the LSI appeared more robust with higher internal reliability, it did not achieve the minimum acceptable levels for psychometric instruments. Hence, both the ILS and LSI should be used to assist the individual student in personal development but not as predictors of performance. In another comparative study on the LSI and the ILS, Platsidou and Metallidou (2009) discovered both instruments to have similar psychometric weaknesses and limitations.

Lastly, Hosford and Siders' (2010) study on the use of the ILS in medical education concluded that the factor structure, internal consistency and temporal stability of the ILS on the sample representative and justified. However, construct validity and specifically the convergent and discriminant validity of the visual/verbal and sequential/global dimensions needed further inquiry.

Methodology

In the first phase, the ILS instrument was used to uncover the learning styles of students taking MA in Term 1 of SMU's Academic Year 2018/19. It was the first time that any formal attempt had been made to profile individual learning preferences in such a context, to the best of the researchers' knowledge. The instrument was chosen as it was developed for classroom application and had been used extensively. Being completely online, the advantages were ease of administration and immediacy of results. Importantly, the ILS was considered reliable, valid and suitable if "used to help instructors achieve balanced course instruction and to help students understand their learning strengths and areas for improvement" (Felder & Spurlin, 2005, p. 111).

The research was conducted during Week 3 after the add/drop course period and the student numbers and classes stabilised. In each of the four classes, the instructor explained the ILS questionnaire. The benefits of knowing their learning styles and how students could help themselves learn better were next related. The students were informed that anonymity was assured, participation was voluntary and they could opt out at any time. The amalgamated findings could be made known to them if they wished. The students' participation was sought through signed consent forms. Finally, instructions on how to complete the online questionnaire, to record and retain the results were given and the link to the online questionnaire provided. One hundred and twenty nine of 131 students took about 30 minutes to complete the exercise. Two students did not participate. The results of their learning styles were emailed to the students on Week 4. During the second phase, the questionnaire constructed by the researchers (Appendix 1) was administered during the last teaching week. The students ranked the effectiveness of each of the six key active learning activities from (1) Least effective to (7) Most effective. In addition, an open-ended question asked students to share what they liked or disliked about the learning activities and resources as well as suggest possible improvements. Five of the 129 students who participated in the ILS survey were not present. Hence, 124 students completed the two surveys. All research procedures were approved by SMU's Institutional Review Board (IRB).

The six key learning activities used in MA that promoted active learning and their corresponding learning style dimensions are summarised in Table 1 below and described with examples from Appendices 2 to 7:

Figure 1: Active learning activities and learning style dimensions

	Quick Checks	Homework	Seminar Materials	Video & Group Activities on real life cases	Group Project	Online Discussion Forum
Reflective: think through taught concepts	✓	✓	✓			✓
Active: apply the new information they have learnt in class	✓	✓		✓	✓	✓
Active: discuss with friends; interact with instructor	✓	✓	✓	✓	✓	✓
Sensing: use established methods to solve problems	✓	✓		✓	✓	✓
Sensing: relate to real world or practical situations		✓	✓	✓	✓	
Intuitive: integrate concepts to solve problems		✓		✓	✓	
Intuitive: multiple approaches to solve problems	✓	✓		✓	✓	
Sequential: guided steps/building block approach to solve problems	✓	✓	✓			
Global: roadmap/overview at beginning of activity; end of activity debrief		✓	✓	✓	✓	
Visual: pictures, charts, diagrams, graphs, numerical illustrations	✓	✓	✓	✓	✓	✓
Verbal: written and oral explanations	✓	✓	✓	✓	✓	✓

Findings

The participation rate was 96.1% (or 124 students of 129 students) for both surveys. The proportion of male students at about 40% and female students at about 60% had been the norm even for previous 2017 and 2018 academic year intakes. The two main types of admissions to SMU are from junior colleges/GCE A-Level (46%) and polytechnics (43%) with the rest (11%) from International Baccalaureate and international students (Table 1). The demographics of the sample who were between the ages of 19 and 26 years are shown in the descriptive statistics below:

Table 1: Demographics of sample

	Number	**%**
Total	**124**	**100%**
Gender		
• Male	49	39.5%
• Female	75	60.5%
Admit Type		
• Admitted from Junior College	57	46.0%
• Admitted from Polytechnic	53	42.7%
• Admitted from Others (from International Baccalaureate; international students)	14	11.3%

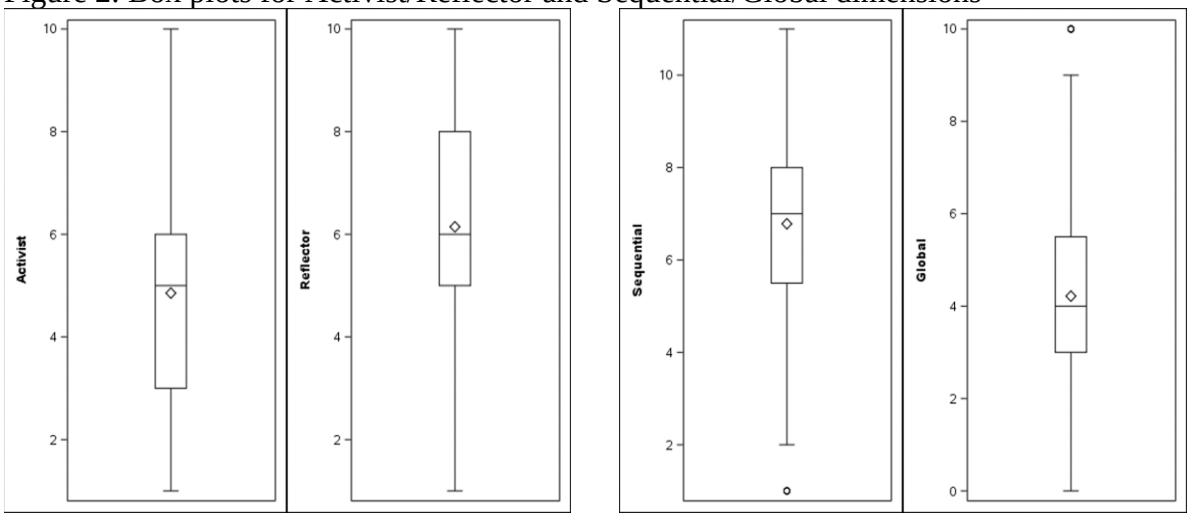
The ILS classified the learners under a particular learning style category (Active/Reflector; Sensing/Intuitive; Visual/Verbal; and Sequential/Global) based on the net score of the responses to 22 questions for each of the four distinct categories. To reduce the distortion that might arise from the bipolar measurement, we decided to use a unidimensional scale based on the responses to the 11 questions pertaining to each of the eight learning styles. From the ILS survey, the descriptive statistics of learning style preferences are shown in Table 2:

Table 2: Mean scores and standard deviation from ILS survey

Variable	**N**	**Mean**	**Std Dev**	**Min**	**Max**
Activist	124	4.855	2.035	1	10
Reflector	124	6.145	2.035	1	10
Sensing	124	7.298	2.375	0	11
Intuitive	124	3.702	2.375	0	11
Visual	124	7.831	2.148	2	11
Verbal	124	3.169	2.148	0	9
Sequential	124	6.782	2.211	1	11
Global	124	4.218	2.211	0	10

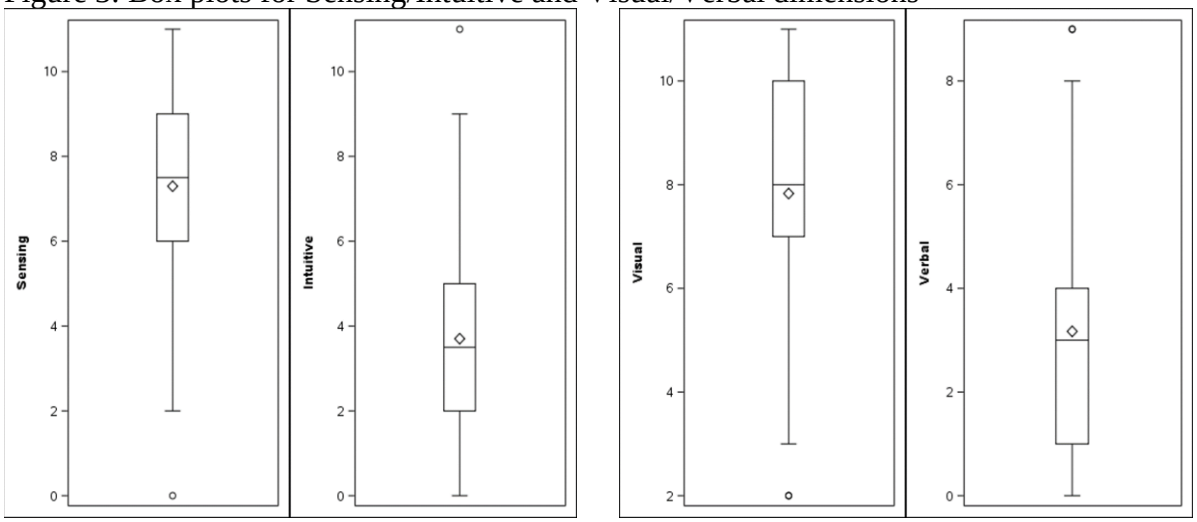
When comparing the learning style preferences visually by using box plots to map the spread of data points, students did not show distinct learning preferences for Activist/Reflector and Sequential/Global dimensions as displayed by the narrow dispersion of data or overlapping notches in the box plots in Figure 2:

Figure 2: Box plots for Activist/Reflector and Sequential/Global dimensions



However, moderate variability or minor skewness was observed in the box plots for Sensing/Intuitive and Visual/Verbal dimensions (Figure 3) indicating a slight preference for Sensing and Visual learning styles as represented by the higher medians respectively:

Figure 3: Box plots for Sensing/Intuitive and Visual/Verbal dimensions



Next, when comparing gender and admit type student profiles, no obvious differences worthy of further investigation were revealed between box plots of the respective learning style dimensions (Appendices 8 & 9).

Examination of the quantitative data from the second survey on the effectiveness of the six learning activities provided the descriptive statistics in Table 3. Indication from the mean scores revealed students found Quick Checks (M = 6.23; SD = 1.09), Seminar Materials (M = 6.11; SD = 1.19) and Homework (M = 6.04; SD = 1.03) to be the most effective while the Online Discussion Forum (M = 3.69; SD = 1.75) was perceived the least efficient for them despite the notable number of threads, replies and reads.

Table 3: Mean scores and standard deviation from Survey 2

Variable	N	Mean	Std Dev	Min	Max
Quick Checks	124	6.234	1.090	3	7
Online Discussion Forum	124	3.685	1.750	1	7
Video and Group Activities on real life cases	124	4.347	1.572	1	7
Group Project	124	4.847	1.557	1	7
Homework and Quizzes	124	6.040	1.031	3	7
Seminar Materials	124	6.113	1.191	2	7

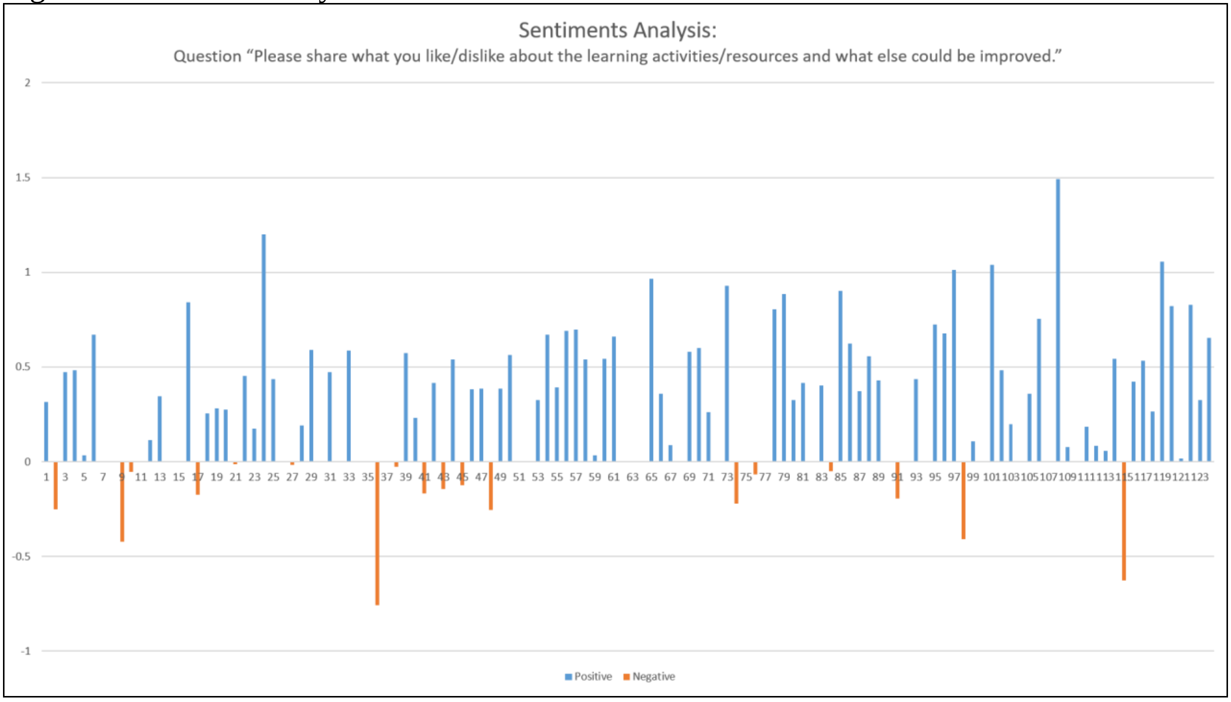
Next, the correlation analysis in Table 4 showed no statistically significant correlation between learning style preferences and the students' preferred choices of learning activities:

Table 4: Correlation table

	Activist	Reflector	Sensing	Intuitive	Visual	Verbal	Sequential	Global
MEAN	4.855	6.145	7.298	3.702	7.831	3.169	6.782	4.218
STD	2.035	2.035	2.375	2.375	2.148	2.148	2.211	2.211
N	124	124	124	124	124	124	124	124
Quick Checks	-0.098	0.098	0.073	-0.073	-0.032	0.032	-0.023	0.023
Online Discussion Forum	-0.052	0.052	0.124	-0.124	-0.125	0.125	-0.001	0.001
Video Group Activities	-0.037	0.037	0.003	-0.003	-0.086	0.086	-0.161	0.161
Group Projects	-0.092	0.092	-0.089	0.089	-0.166	0.166	-0.118	0.118
Homework & Quizzes	0.065	-0.065	0.048	-0.048	-0.041	0.041	-0.053	0.053
Seminar Materials	-0.064	0.064	0.017	-0.017	-0.005	0.005	0.040	-0.040

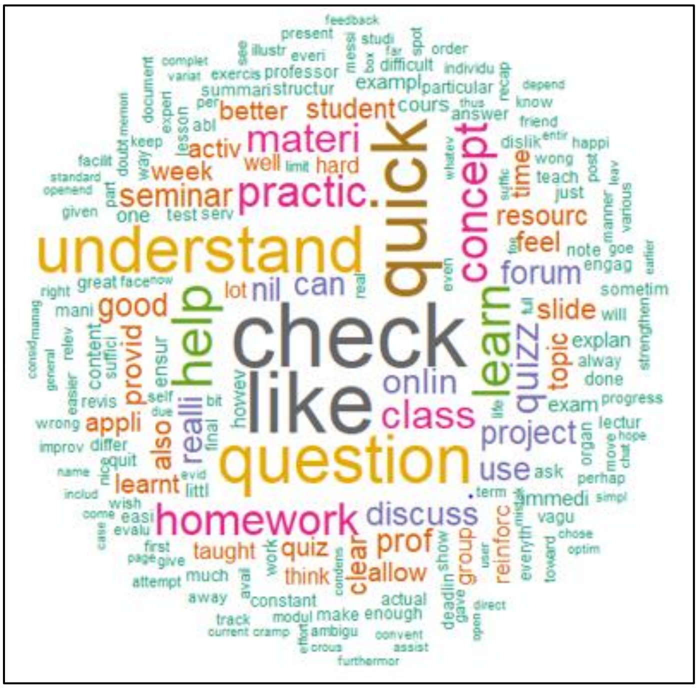
To assay factors that might influence students' ranking of effectiveness of the learning activities, the qualitative data from the open-ended question in the second survey was investigated. When a sentiment analysis of the qualitative comments was run on R (Figure 4), the sentiments were predominantly positive:

Figure 4: Sentiment analysis



Furthermore, words articulated in the feedback were scrutinised and responses represented in a word cloud (Figure 5). Observation from the frequency of the words penned showed that students liked learning activities that helped them verify the understanding of concepts:

Figure 5: Word cloud



Most of the positive comments pertained to Quick Checks. Students liked Quick Checks for the immediacy of knowing right from wrong and as markers of their progress. The verbatim responses were:

> I like the quick checks because it gives students a chance to test their understanding on the spot and will not leave the class thinking they know it and then not actually knowing it.
>
> It reinforces what I learnt right away and allows me to clarify my doubts immediately.
>
> It allowed me to track my progress during class and see what I did or did not understand.

Also, Quick Checks served the purpose of reinforcement of course materials and a useful resource for examination revision:

> Helped me reiterate the concepts learned in class and helped me see the lecture material in a much more understandable manner.
>
> Very useful to evaluate my understanding after every topic is taught.
>
> Serves as a good recap when studying for exams.

Suggestions to improve Quick Checks, such as having a greater variety of questions and ensuring similarity of level as examination questions, were readily dispensed:

> Quick checks can have more variation in terms of the questions so that students can have more exposure to the different questions and help them to better understand the concept.
>
> Quick checks were very good to help me facilitate my learning. However, it should be more difficult and be around the same standard as exams.

With regard to Seminar Materials, the second ranked most effective active learning activity, the comments reflected the Visual and Sensing learning dimensions. The affirmation of the Seminar Materials displayed students' tribute to visual and factual clarity resulting in ease of learning:

> I like that the seminar slides and illustrations are very clear.
>
> Seminar materials are very concise and structured well.
>
> I liked the seminar materials. They helped to reinforce the concepts learnt.

Concerning Homework, the third ranked most effective active learning activity, the students welcomed even more questions to aid recognition and recall. They were familiar with the benefits of Homework perhaps because they were products of Singapore's reputed school system where students devoted many hours to additional schoolwork completed out of classes and at home. Their pragmatism and equal emphasis on form and function of the learning activity were stated plainly:

> The homework serve as additional practice which was very helpful.
>
> The homework and quizzes also help me in revising the topics we have learned in class.

> The quick check, homework and seminar materials are of varying difficulty and can help with progressive learning.
>
> Perhaps the homework questions and quick checks can have more variation in terms of the questions so that students can have more exposure to the different questions and help them to better understand the concept.

On the other hand, the negative comments referred to the Online Discussion Forum and Group Project mainly. Some students appreciated the timeliness of the instructor in responding to questions and facilitating discussions. Many were unable to see the Online Discussion Forum as an effective contributor to their learning. There were several reasons: preference for face-to-face consultation with the facilitator or interpersonal discussion with peers; lack of confidence in their intellectual abilities as authors of posts were easily identified; harsh assessment of self-concept due to the fear of not meeting expectations of self and others; and the user friendliness of the learning management system where the tool resided. The supporting quotes were:

> I do not have the habit to ask questions on the discussion forum nor looking at the forum constantly as I always chose to ask my friends or seniors first!
>
> I didn't really use the online discussion forum as I am afraid that my questions were too silly.
>
> Online discussion forum, it is not user friendly at all, should have just make it into some chat box format so that it is easier for students to discuss.
>
> Online discussion forum was a bit overwhelming and messy. Perhaps a thread naming convention should be introduced e.g. Qn no. (for self prac) or Qn in full/Pertinent keywords of qn (for online quizzes under quiz 2).

As for the Group Project, the majority were dissatisfied with the perceived length, complexity, duration, effort and team. A few found collaborating in a group and applying concepts to a real life scenario practical and useful as the learning experience enhanced workplace readiness. The challenges were cited in their feedback:

> The group project is too open-ended and difficult.
>
> I feel that the group project took quite a lot of time to do and I did not really gain a lot from the group project so this is the part that I do not really like.
>
> The project cannot really be shared and done among team members.
>
> The project is entirely irrelevant as it takes more than 8 hours per individual and does not help to strengthen the concepts. This is in comparison to other modules. Furthermore, having a peer evaluation instead of project quiz in week 13 will suffice as week 13 is rather late due to it being close to finals. This might affect the project submissions.

In summary, the findings showed no significant learning style preferences among the MA students despite gender and admission types even though there was a very modest skew towards Sensing and Visual learning dimensions. The qualitative data supported students' preferred

active learning activities namely Quick Checks, Seminar Materials and Homework while the Online Discussion Forum and Group Project were perceived less positively.

Discussion

Students viewed the active learning activities effective if the pedagogy led to primarily their ability to perform well in examinations and secondarily the development of skills for employability. Hence, individual learning style preferences mattered little as long as the learning activities served the utilitarian purpose of academic performance and personal achievement. Consistent with Riley and Ward (2017) who found prior research on active learning inconclusive regarding the effect of gender, our study did not find gender affecting learning style preferences considerably even though a slight orientation towards Sensing and Visual learning dimensions was perceived.

The six active learning activities were designed to develop disciplinary knowledge and assess multi-disciplinary skills and abilities formatively and summatively. They were constructed to develop students holistically during the course, tapping on the domains of cognitive, affective and to some extent psychomotor learning competencies while preparing them for the industry. Since the activities invoked and accommodated a variety of learning styles, they were not inclined to advantage students with any specific learning style preference that would impact performance or grades.

In active learning, the student is the critical stakeholder in the learning process, and "active learning, done well, improves student motivation" (Bonwell, 1999, p. 549). Active learning activities that enabled learning by doing allowed time for students to digest and reflect. The mix of visual and verbal instructions and timely feedback in Quick Checks and Homework led to increased student learning and developed them further for enhanced knowledge and skill acquisition during the course.

However, carefully tailored learning activities and platforms using the jigsaw strategy such as Group Project and Online Discussion Forum, deemed important to strengthen specific employability skills such as communication, collaboration, teamwork, problem solving and critical thinking, were not ranked highly. The structured Group Project with a 20% weighting was aimed at developing people skills and stretching students to manage uncertainties. The assessment concentrated on using budgeting as a management tool and preparing capital budgeting to decide on investing in a project. Perhaps, it was a mistake to think that assigning students the mission in groups would automatically lead to the aforementioned outcomes. Moving forward, the Group Project will be composed with a more defined scope and difficulty commensurate with students' expected level of proficiencies. In class, the instructor will accentuate MA theories and principles by correlating with current industry practices for students to realise immediate professional relevance, as well as to evoke curiosity and augment comprehension. A peer evaluation centred on emotional intelligence, situational awareness and conflict resolution will help students improve self-awareness leading to smoother collaboration among team members and achievement of shared goals.

The researchers feel that the Online Discussion Forum should be continued as an active learning activity in MA despite the adverse and counterintuitive feedback but with some fine-tuning. The threaded and regulated Online Discussion Forum provided the arena for collaborative learning. The intention of extending learning beyond the classroom to an online environment of peer learning, information sharing, interaction and debate was somewhat underachieved because of personal factors, group dynamics and learning management system

challenges. While the last was inevitable because a university wide application had to be adopted, the instructor will improve instructions, threading of topics and segmenting contents. Students will be introduced to 'Netiquette' guidelines on scholarliness, respect, professionalism and civility. They will be encouraged to practise organisation by subject field/title/sub-head that will state the key point and inspired to be constructive by positively acknowledging one another in the form of badges.

Finally, the findings substantiate students' propensity towards individual active learning activities rather than in a group and their perception that outcomes achieved in the shortest time and least effort were most effective and desirable. The MA students, not exhibiting distinct learning style preferences, seem balanced and appear adaptable to respond successfully to the active learning environment focused on student centricity, usage of mixed instructional facilitation strategies and diverse course materials that appealed to a range of learning dimensions.

Further research

The study can be replicated in future academic intakes for reliability and validity. The qualitative investigation may be strengthened by including more open-ended questions and broadened by holding focus groups to probe into students' beliefs and attitudes about active learning and its resultant outcomes. While the population of International Baccalaureate and international students in the Others admissions category is small in the current study, the number has been steadily increasing over the past four intakes and is likely to increase in the future because of the declining birth rate in Singapore. Therefore, there may be greater variation in learning style preferences in this group as compared to Junior College/GCE A-level and Polytechnic students.

Conclusion

In the study, the sole instructor embraced the active learning style approach by designing and administering varied active learning activities that demanded more endeavour (constant facilitation, intervention and supervision) and resources (time) to achieve the learning outcomes. The active learning curriculum of MA, comprising activities of multi teaching and learning approaches and facilitation styles seemed to have succeeded in helping students learn formatively. While the sample did not exhibit significant learning style preferences in the ILS survey, the ratings and comments of the active learning activities in the second survey were distinctive. Overall, students were positive about most active learning methods, appreciated the enhanced learning experience and generally satisfied with the outcomes. The majority liked Quick Checks most, attesting to the practical nature of students, directed in their individual learning to do what was most effective and efficient to perform well. In contrast, their less positive qualitative comments on Group Project, a complex case with open-ended questions requiring analysis and decision-making, raised a concern on whether students were over emphasising short-term results at the expense of long-term employability development. This is especially since the mission of accounting education is to prepare students to become professional accountants based on lifelong learning built on the three components of skills, knowledge and professional orientation (Hobson, 2002).

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Note
The students' quotations have been largely unedited.

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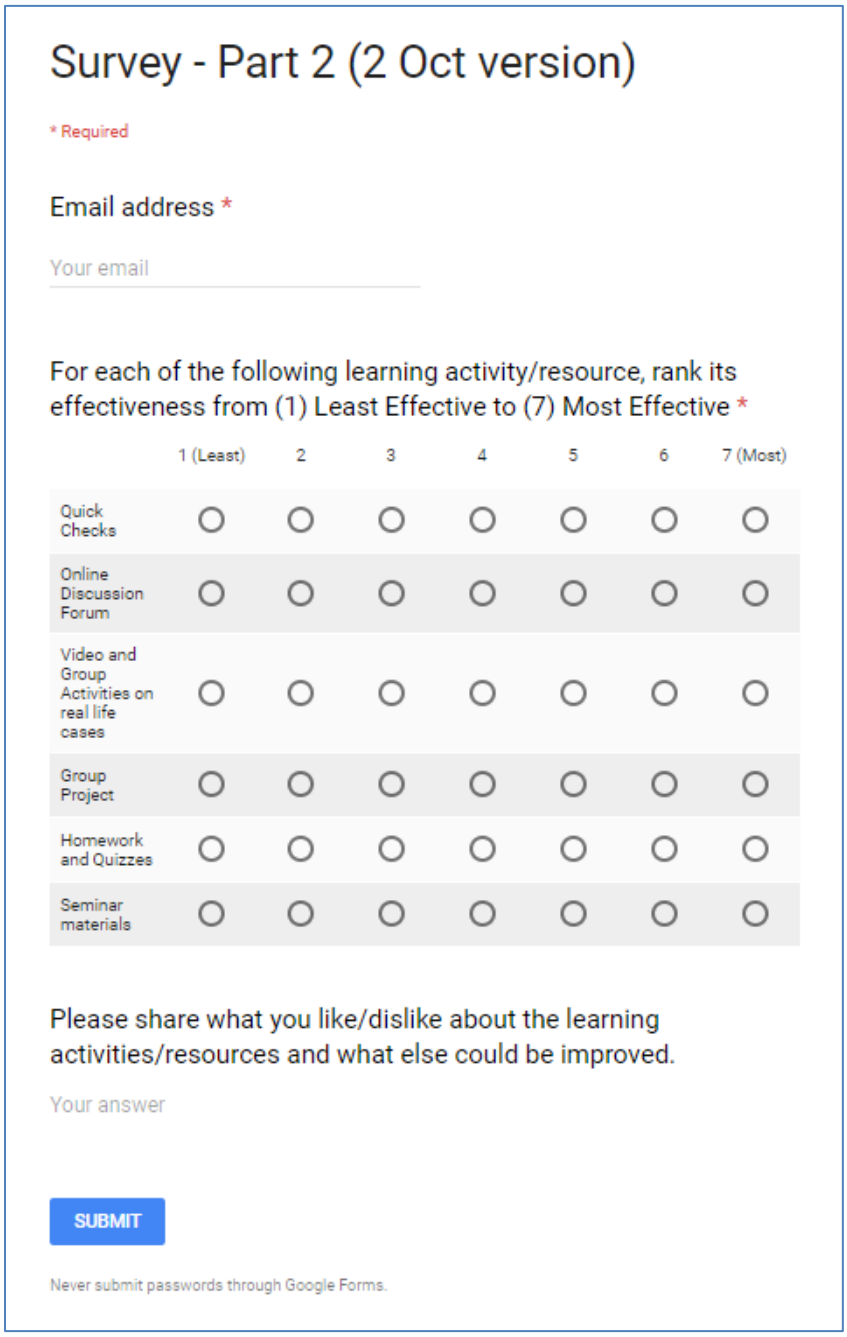
Appendices

Appendix 1

Survey 2: Questionnaire designed by researchers for students



Survey - Part 2 (2 Oct version)

* Required

Email address *

Your email

For each of the following learning activity/resource, rank its effectiveness from (1) Least Effective to (7) Most Effective *

	1 (Least)	2	3	4	5	6	7 (Most)
Quick Checks	○	○	○	○	○	○	○
Online Discussion Forum	○	○	○	○	○	○	○
Video and Group Activities on real life cases	○	○	○	○	○	○	○
Group Project	○	○	○	○	○	○	○
Homework and Quizzes	○	○	○	○	○	○	○
Seminar materials	○	○	○	○	○	○	○

Please share what you like/dislike about the learning activities/resources and what else could be improved.

Your answer

SUBMIT

Never submit passwords through Google Forms.

Appendix 2

Quick Checks

Quick Checks were short exercises for the students to practise concepts or methods taught. They were given to students after completion of a key learning objective before progressing to the next part of the lesson in class. The breaks during the lesson delivery allowed students to review the concepts and do a quick self-assessment of their understanding by practical application. Doing the brief exercises gave students the assurance that they had understood the concepts. At the same time, they enabled students to identify gaps in their understanding and to seek immediate clarification from the instructor. Students might work on the problems on their own or in discussion with their peers. They were stimulated to learn as they were kept engaged through individual effort or teamwork. After completing the exercises, the instructor summarised the key learning points and explained how they fitted into the big picture of management accounting. Students were also encouraged to share alternative approaches and answers, where applicable.

Examples of *Quick Checks*

Example 1: This exercise aims to ensure students understand cost concepts before they progress to learn how to determine the cost of a product. After the exercise, we will discuss the impact of a wrong classification on the product cost and other consequences.

Which of the following is the best classification of the cost of the toys in the Kinder Joy?

A)	Period cost	Variable
B)	Period cost	Fixed
C)	Direct material	Variable
D)	Manufacturing overhead	Fixed
E)	Manufacturing overhead	Variable

Example 2: This exercise guides the students to use the two main methods to allocate costs. The students could see the impact of the two methods on cost measurement by doing the exercise.

RGB Ltd uses **normal costing**. Use the given production data to answer Q1 and Q2.

	Product P	Product Q
Total Budgeted Manu Overheads	$1,200,000	
Total Expected Production Quantity	5,000 units	200 units
*Batch Size (no. of units per batch)	200 units	40 units
*Direct Material Costs	$50 per unit	$90 per unit
*Direct Labour Hour	$40 per unit	$250 per unit
Total Actual Production Quantity	5,200 units	190 units
Total Actual Manufacturing Overheads	$1,500,000	

**assume actual = budget*

Q1) **Traditional costing**: RGB allocates overhead using a **plantwide rate** with cost of direct labour (DL$) as the cost allocation base.

POR =

Applied OH (Product P) =
Applied OH (Product Q) =

Q2) **Activity-Based Costing (ABC)**: RGB found that 70% of the total manufacturing OH are driven by batches and 30% by DL$.

(a)

Activity	Bgt OH $	Cost allocation base	Activity rate
Driven by batches			
Driven by DL$			

(b) Compute the Total Applied Overhead for Product Q using ABC:

	Product P	Product Q
Total Actual Production Quantity		
Batch Size (no. of units per batch)		
Actual number of batches		
Activity rate (driven by batches)		
Applied OH (driven by no. of batches)		
Actual DL$ per unit		
Total Actual DL$		
Activity rate (driven by DL$)		
Applied OH (driven by DL$)		
Total Applied OH		

Appendix 3

Homework

Take-home assignments were given after students had understood a topic. They consisted of short cases with challenges that assessed students' ability to connect concepts taught across different topics, integrate theories and apply principles. After attempting the assignment on their own, students would work in teams to present their solutions. During the presentations, students shared their thought processes used to solve the problems. Common mistakes, alternative approaches and other situations where the concepts could be applied were too discussed.

Appendix 4

Seminar Materials

Classes were conducted in a small class size of about forty students each. Materials were uploaded to the learning management system before the class for students to prepare themselves before face-to-face contact with the facilitator. The materials comprised PowerPoint slides that provided the 'big picture' of the topic to be taught and more detailed slides that systematically presented the materials to achieve the learning objectives. The slides used a combination of text, pictures and diagrams. At appropriate intervals, slides that presented questions to trigger deep thinking and stimulate discussion during the class were introduced.

Example 1: Use of picture to explain degree of operating leverage

Load represents the objective of maximising profit
Effort represents the sales required to achieve the profit
Lever represents operating leverage

The picture visualises the concept of operating leverage (DOL) – high DOL (lever) enables a small percentage increase in sales (effort) to produce a much larger percentage increase in operating income (load).

Example 2: Question to trigger thinking and application

Why is promotional price applicable only for breakfast? (application of concepts of fixed cost behaviour and excess capacity)
Why is the breakfast promotion price lower than the regular price? (application of concepts of positive contribution margin and breakeven analysis)

Appendix 5

Video and Group Activities on real life cases

Videos and current news events were introduced to bring the real world into the classroom. Students worked in groups to discuss the issues and shared their answers using Google slides.

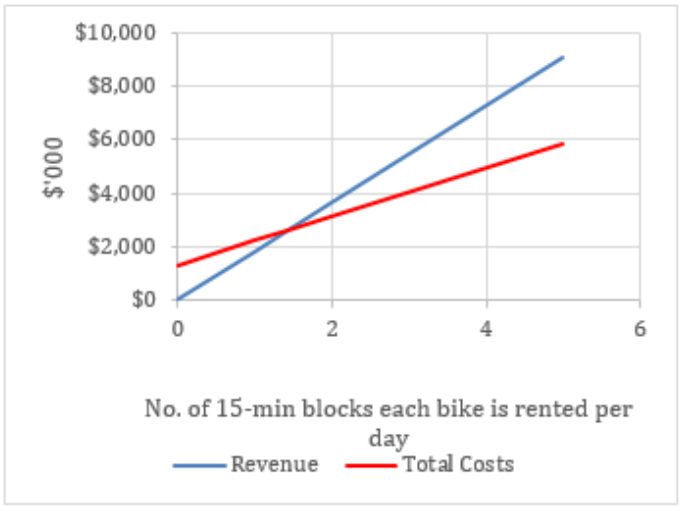
https://www.channelnewsasia.com/news/business/is-dockless-bike-sharing-doomed-to-fail-in-singapore-10505662

Singapore
Jan 2017: Started
Jun 2018: Exit

Hong Kong
April 2017: Started
Jul 2018: Exit

Only 5 Out Of 8 Bike-Sharing Firms Remain In S'pore - How Many Will Finish The Race?

Is bike-sharing business model viable?



The graphs immediately show the impact on revenue and costs when students make changes to key variables like volume of bikes, rental charge, number of staff, cost of the bikes and other cost assumptions. The dynamic presentation provides a visual experience of the practical application of theories.

Appendix 6

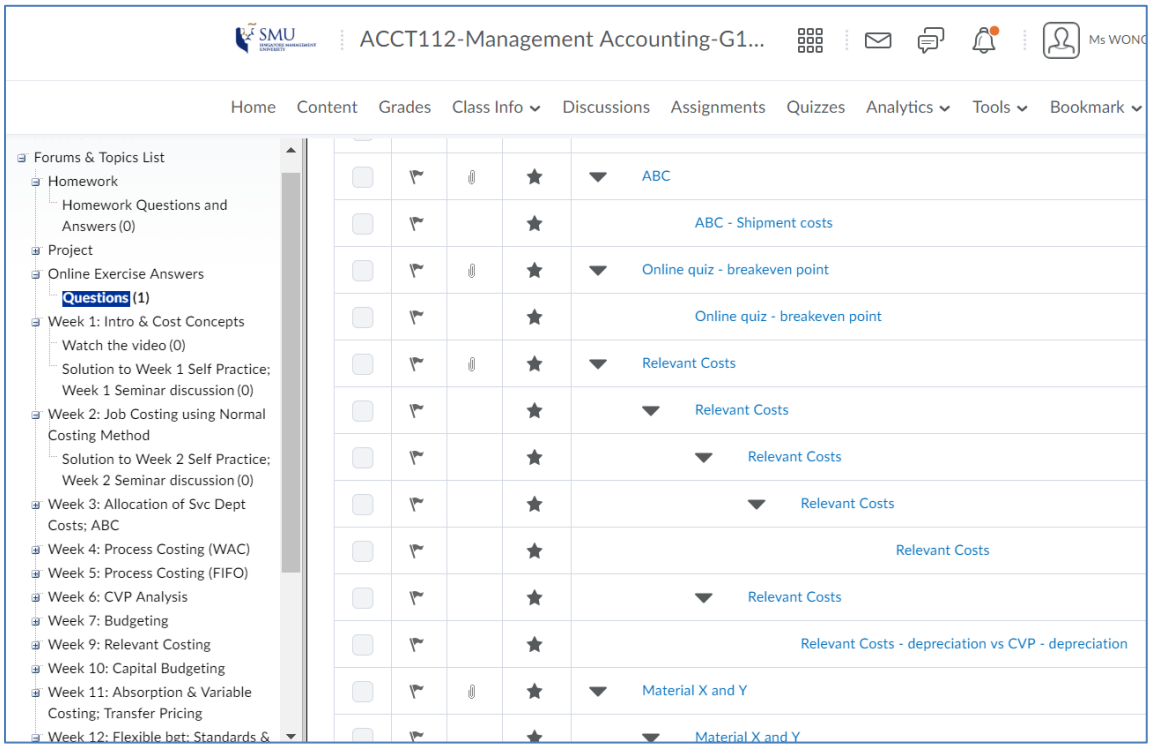
Group Project

Towards the end of the course, students worked in teams on a business case project. The project aimed to test the ability of the students to work independently and as a team, to solve a business problem by integrating and applying the knowledge acquired during the course. To simulate real life decision-making, the case was deliberately written with incomplete information and some ambiguity. There was no one right answer. The students learnt to assess given information and had to be resourceful in dealing with uncertainties. Doing the project taught the students to analyze, synthesize and evaluate financial and other related information for decision-making. Through the written report, students learnt to communicate effectively in a simulated business context.

Appendix 7

Online Discussion Forum

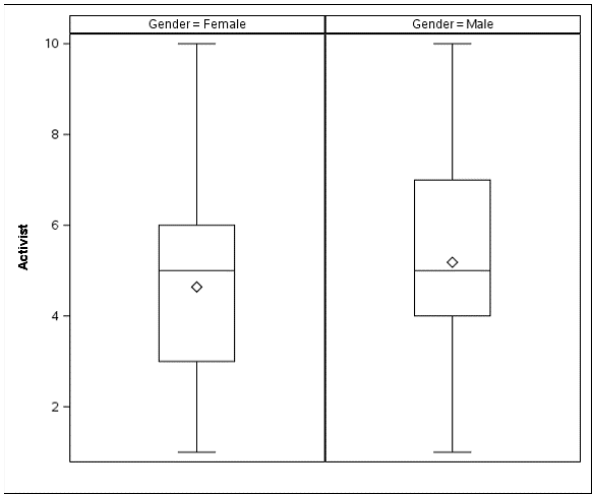
At the beginning of the course, the online discussion forum was set up to facilitate collaborative learning. Students could reflect on the contents covered in class to post questions and comments in the online discussion forum asynchronously. Responses to questions encouraged peer-to-peer learning. The instructor monitored the forum regularly to facilitate discussion. The students participated actively. At the end of the course, there were a significant total of 212 threads, 307 replies and 14,173 reads.

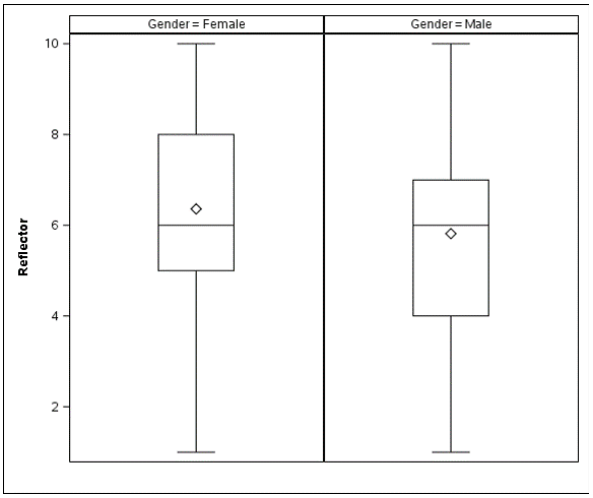


Appendix 8

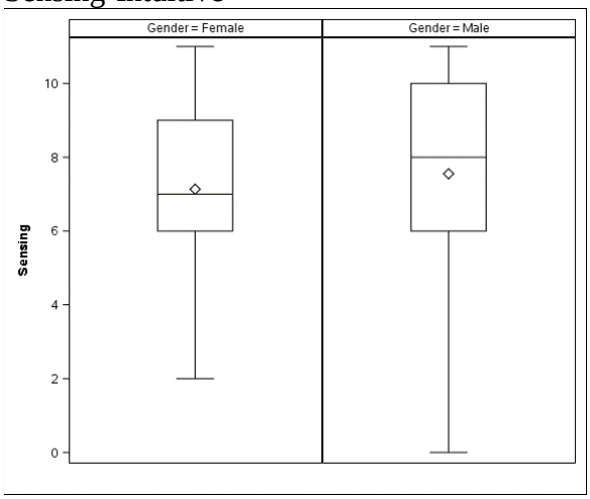
Distribution by gender

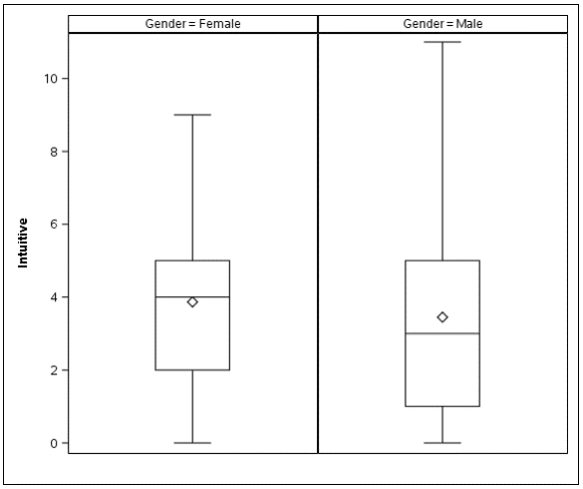
Activist-Reflector



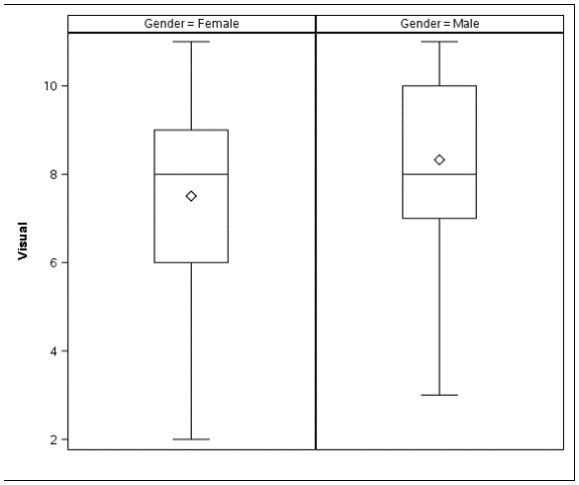


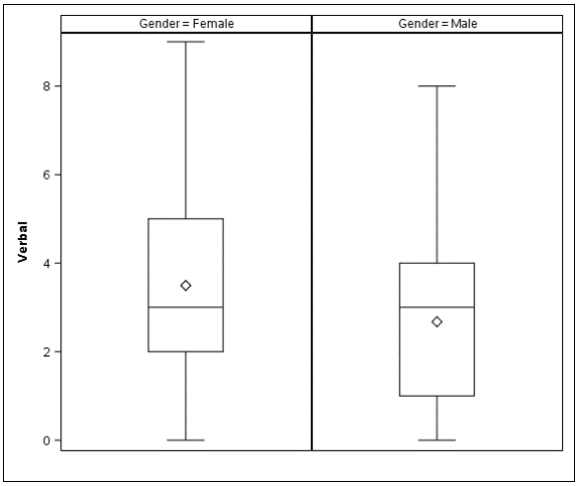
Sensing-Intuitive



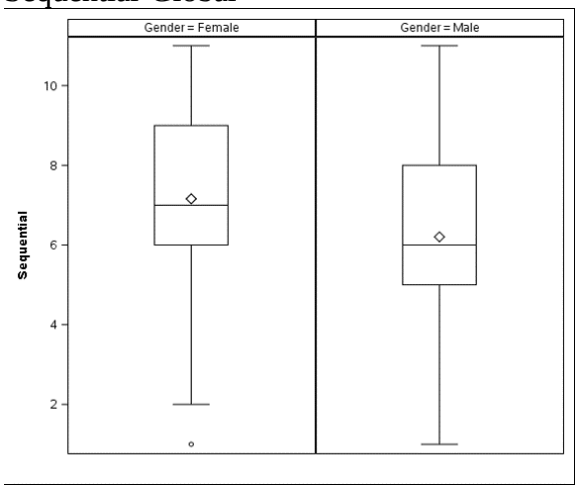


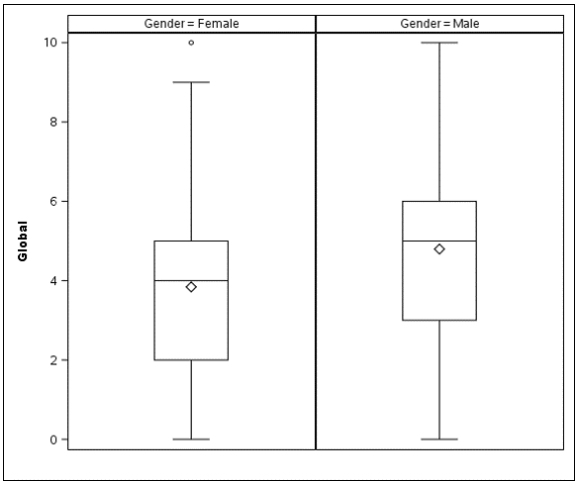
Visual-Verbal





Sequential-Global

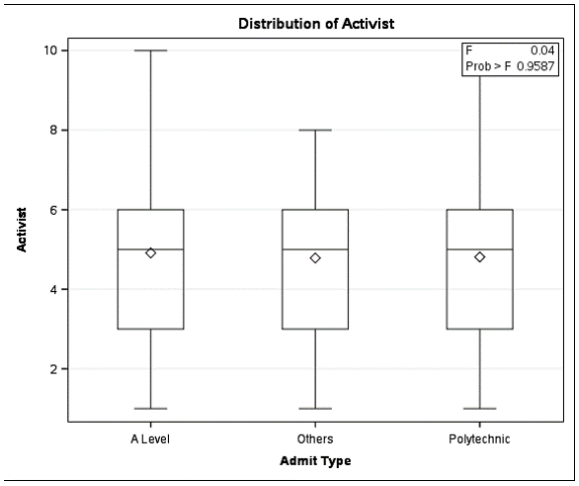


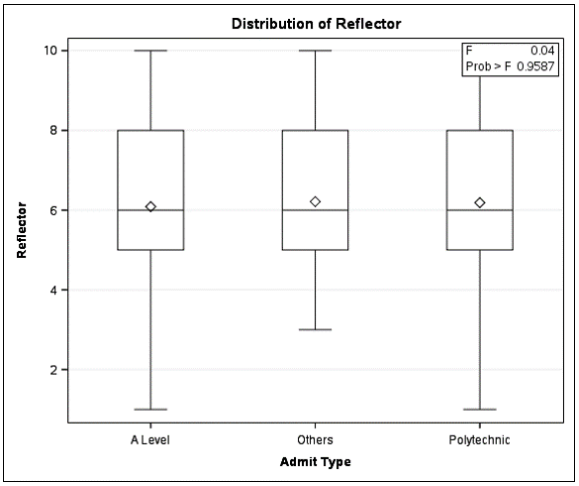


Appendix 9

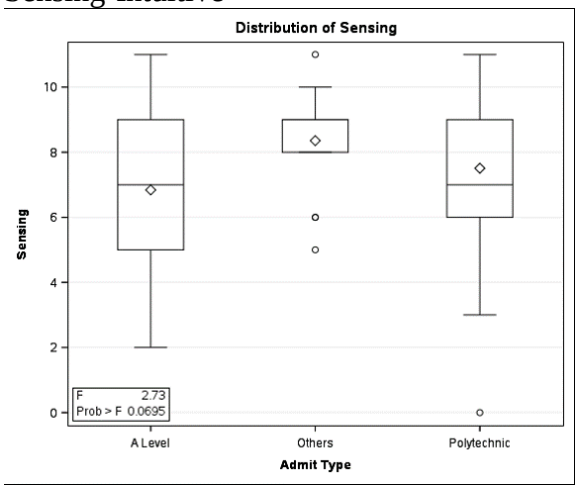
Distribution by admit types

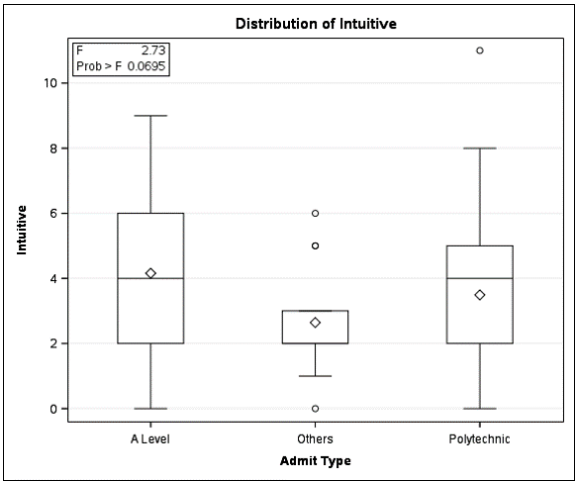
Activist-Reflector



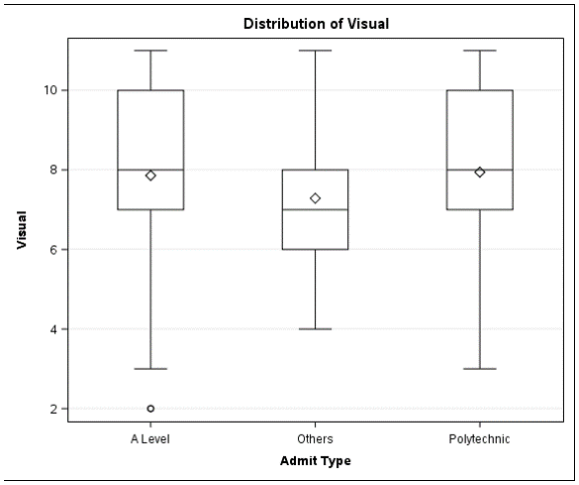


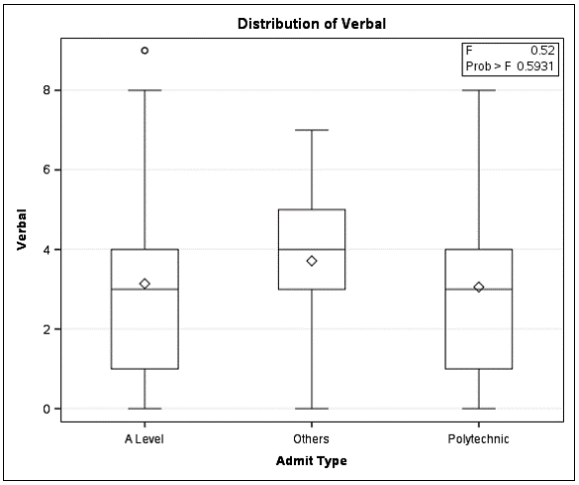
Sensing-Intuitive



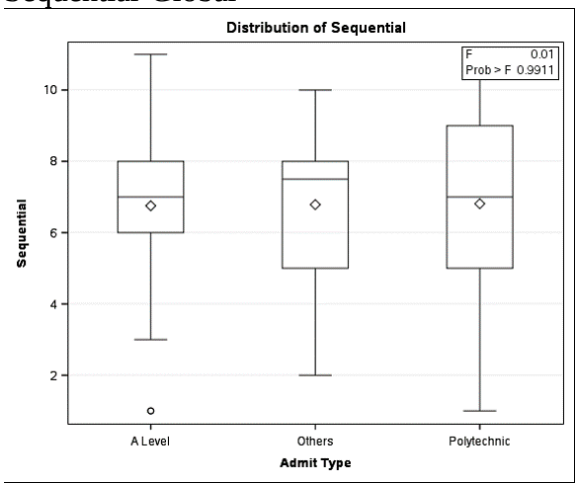


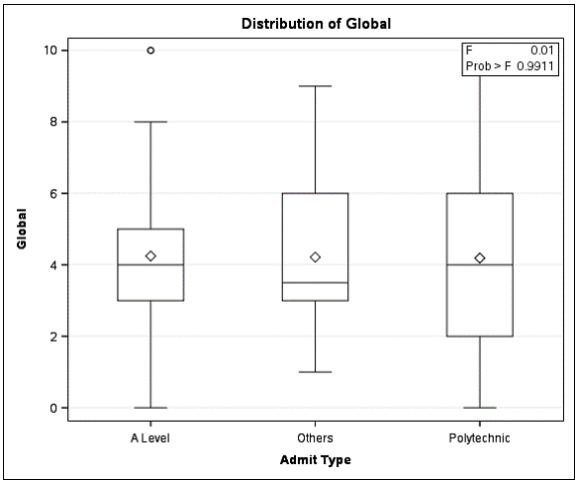
Visual-Verbal





Sequential-Global





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