EXPLORING THE IMPACT OF STUDENTS’ LEARNING STYLE ON PERFORMANCE IN TAXATION

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ABSTRACT

The findings of various studies regarding the association between students’ learning style and academic performance are inconclusive. This study examines the association between learning style preferences and performance of students in an undergraduate taxation course at a large New Zealand university. An instrument based on Kolb’s Learning Style Inventory was used to profile the learning styles of students as one of four learning groups: Converging, Diverging, Assimilating or Accommodating. The results indicated that the majority of the students were either Convergers or Assimilators and there were no significant differences in performance between the two learning style groups. These results suggest that as more and more educators adopt various approaches in teaching and engaging students in learning, tertiary students have the ability to adapt to different learning styles. Educators can certainly help students to learn by exposing them to varied learning styles.

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I INTRODUCTION

Students enrolled in tertiary education have widely diverse backgrounds, including their cultural, life and work experiences, age, gender, attitudes, and intellectual abilities. This diversity brings with it diverse learning styles.

Learning style is the "composite of characteristic cognitive, affective, and psychological factors that serves as an indicator of how an individual interacts with and responds to the learning environment". Therefore, a person's learning style is his or her preferred way of learning and different individuals have different learning styles or certain learning orientations. If students have a preference for a particular learning style, the effectiveness of any learning activities can be strongly influenced by that style of learning. For instance, some may prefer to work with concrete information (e.g., facts, experimental data) while others are more comfortable with abstractions (e.g., theories, symbolic information, mathematical models). Some are partial to visual presentation of information (e.g., pictures, diagrams, flowcharts, schematics) while others prefer verbal explanations. In other words, some like to learn by trying things out and seeing and analysing what happens, and others would rather reflect on things they plan to do and understand as much as they can about them before actually attempting them. When the learning styles of students in a class and the teaching style of their teacher are seriously mismatched, those students may become uncomfortable, bored, and inattentive in class. As a consequence, they may lose interest in the course, the curriculum and themselves, and in some cases may change to other courses or drop out of studies altogether. If learning styles affect students' academic performance and competence, then it certainly poses further challenges for educators in assisting students in learning and succeeding academically.

There are numerous learning style models and instruments used for assessing students' learning preferences. Kolb's experiential learning model is one that is well established and widely used by researchers. This model identifies four learning styles:

1. Converging (those who like to think and do; take in information abstractly and then process the information actively);
2. Diverging (those who like to feel and watch; take in information concretely and process the information reflectively);
3. Assimilating (those who like to think and watch; more concerned with abstract concepts and process information reflectively); and
4. Accommodating (those who like to feel and do; takes in information concretely and process the information actively).

3 Honey and Mumford, above n 2.
4 Noel Entwistle, Styles of Learning and Teaching (Fulton, 1988).
Studies that examined the learning styles of accounting or business students using Kolb’s Learning Style Inventory produced interesting results. Earlier studies tended to show that accounting students predominantly displayed a Converging learning style. However, some more recent studies suggest that this Converging style may not be as universally applicable to accounting students as once thought, as studies have shown that accounting students are also Assimilators.

Interestingly, studies which examined the effect of learning styles on students’ performance or achievement showed diverse results and not many studies have focused on the association between learning style and students’ performance in the accounting discipline. Some studies which examined this aspect found that students with the Converging learning style were more successful. In contrast, Geiger, Boyle and Pinto found students’ learning style had no significant effect on final grades. Only one study considered students’ performance in a taxation course. Although Too found that students enrolled in a taxation course were mainly Convergers, there was no significant association between their learning styles and performance in the final exam.

Taxation is one of the many subjects required in most accounting degrees at both undergraduate and postgraduate levels. It is a subject that requires interpretation and application of tax rules and regulations, and students usually find it challenging as tax law is complex and voluminous, replete with conditions and exceptions, constantly changing, and is interrelated with other areas of law. It is therefore interesting to

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10 See, eg, Dennis Togo and Bruce Baldwin, ‘Learning Style: A Determinant of Student Performance for the Introductory Financial Accounting Course’ (1990) 8 Advances in Accounting 189; Holley and Jenkins, above n 8; F Cano-Garcia and Elaine Hughes, ‘Learning and Thinking Styles: An Analysis of Their Interrelationship and Influence on Academic Achievement’ (2000) 20 Educational Psychology 413; and Adler et al, above n 9.


12 Shaw Too, ‘Students’ Learning Style and their Academic Achievement for Taxation Course - A Comparison Study’ (Paper presented at the 2nd International Conference of Teaching and Learning, Malaysia, 2009).

13 Above n 12.
examine whether students’ learning style impacts on their learning outcomes in a taxation course. This study extends prior research by exploring the learning styles of accounting students enrolled in a compulsory introductory taxation course in the second year of an undergraduate accounting degree in a multi-campus university in New Zealand. The students’ performance in this course was considerably lower than other accounting and business courses for the past few years. As a result, it has led us to question the extent to which these students’ learning styles may have impacted on their performance in the taxation course. The taxation course in this university is designed to focus on tax concepts and principles and not the mere memorisation of tax rules. Learning and understanding the tax concepts and principles is very important as students need a sound understanding of the tax law to be able to apply it when faced with a tax problem. Studying taxation, therefore, may present problems and challenges to students who are studying it for the first time, particularly if they have certain learning preferences. To assess each student’s learning style, we adopted the Kolb Learning Style Inventory (LSI) as it is one of the instruments most commonly used by other researchers.14

The remainder of the paper is structured in the following manner. Section 2 provides an overview of the literature on learning styles. In Section 3, the research method and the learning styles questionnaire are discussed. Section 4 presents the results. The last section provides the discussion and conclusion.

II LITERATURE REVIEW

A Learning Styles

There is no universal definition of learning style as the concept has been defined in different ways in the literature. However, there is consensus that every person has a learning style preference.15 The four broad elements that have been attributed to learning style are: (i) ‘cognitive personality elements’ such as field dependence and independence;16 (ii) ‘information-processing style’ such as Kolb’s model of the experiential learning cycle,17 and the associated learning styles (Converger, Diverger, Accommodator, Assimilator) or the related learning styles suggested by Honey and Mumford18 (ie, Activist style, Reflector style, Theorist style and Pragmatist style); (iii) ‘approaches to studying’19 which, in terms of function and process, may lie somewhere in between ‘cognitive personality elements’ and ‘instructional preferences’; and (iv)

18 See Honey and Mumford, above n 2.
19 See, eg, FMarton and RSaljo, ‘On Qualitative Differences in Learning I: Outcome as a Function of the Learners’ Conception of the Task’ (1976) 46 British Journal of Educational Psychology 4; and Noel Entwistle and Hilary Tait, The Revised Approaches to Studying Inventory, (Centre for Research into Learning and Instruction, University of Edinburgh, 1994).
'instructional preferences' such as those measured by inventories like the Grasha-Riechmann Student Learning Styles Scales. Learning style is, therefore, a learner characteristic and students have different learning style characteristics of which they may not be aware. Knowledge about students’ learning styles, particularly early in their academic career can benefit both students and teachers. For students, it would help them to understand their own strengths and weaknesses and consequently to learn more effectively and take responsibility for their own learning. For teachers, it may help them consider appropriate teaching strategies to enhance students’ learning strengths. Their awareness of students’ learning styles would help them in making informed choices in course material, design and learning processes to extend the opportunity for effective learning in their courses. Research shows that students learn better when new material is presented in a way that is compatible with their learning style.

Individual learning styles may also differ according to subject areas, and styles may change as individuals become more competent, confident and mature with the content material of the subject. Dunn notes that although style preferences may change with maturation, strong preferences may take years to change.

In summary, the literature suggests that:

- students will learn better when they use learning styles which they prefer;
- when teaching accommodates various learning preferences, more students are likely to be successful; and
- students are better learners when they can expand their learning preferences.

B Kolb’s Learning Style Measurement Instruments

A number of measurement instruments were used to identify individual learning styles. They include: the VARK Model, the Index of Learning Styles (ILS), the Learning

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23 See, eg, Honey and Mumford, above n 1; and Rogers, above n 21.
24 See Hawk and Shah, above n 14, 2.
27 Above n 25.
28 VARK stands for visual, aural, read/write and kinaesthetic.
Style Inventory (LSI), the Learning Style Questionnaire (LSQ), and the Approaches to Studying Inventory (ASI). These different learning models have their strengths and weaknesses and no one instrument captures all of the richness of the phenomenon of learning style. However, Kolb’s LSI, based on experiential learning theory, is widely used.

The LSI has been considered as an instrument that would give the most valid and reliable coverage of student learning styles and approaches to learning. This experiential model defines learning as “the process whereby knowledge is created through the transformation of experience”. Kolb describes learning style within a two-factor model which combines how people perceive and process information. He defines learning style as the “generalised differences in learning orientation based on the degree to which people emphasise the four modes of the learning process”.

Figure 1 depicts Kolb’s model. This model views learning as a circular process which involves a four-mode or four-process learning cycle. It starts with Concrete Experience (CE) which forms the basis for observation and reflection on experiences. Reflective Observation (RO) then leads to Abstract Conceptualisation (AC), which involves the generation of theories/solutions to the problem set and finally, to Active Experimentation (AE), where theories and concepts are put into practice. Kolb noted that the most effective and complete learning takes place when learning activities embrace all four modes. However, depending on the individual’s preferences, learning may start at any one of the four modes in the cycle. Kolb describes CE and AC as bipolar on a continuum, and orthogonal to a second bipolar continuum of RO and AE. Individual learning styles result from a combination of two adjacent mode preferences in the experiential learning cycle leading to four basic learning styles: Diverger (CE and RO), Assimilator (RO and AC), Converger (AC and AE), and Accommodator (AE and CE).

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32 Honey and Mumford, above n 2.
33 Noel Entwistle and Paul Ramsden, *Understanding Student Learning* (Croom Helm, 1983).
34 Hawk and Shah, above n 14.
35 The LSI was first developed by Kolb in 1971 (LSI 1) and revised in 1985 (LSI 2), in 1993 (LSI 2a), in 1999 (LSI 3) and then in 2005 (LSI 3.1) to improve the instrument’s validity and reliability. All versions of the LSI had the same format – short questionnaire with 12 items (only the LSI 1 had nine items).
37 Hawk and Shah, above n 14.
38 Kolb, above n 6, 41.
39 Ibid 76.
40 Above n 6.
The Divergers are best at viewing concrete situations from different points of view, and tend to be imaginative and emotional, and like to generate ideas. Such learners have broad cultural interests and tend to specialise in the arts, counselling, and personnel management. People with the diverging style prefer to work in groups, enjoy brainstorming within a group, listen with an open mind, and prefer to receive personal feedback.

The Assimilators tend to be less interested in people and more concerned with abstract concepts. They are best at putting information into a logical and detailed form. In a formal learning situation, people with this style prefer reading, lectures, exploring analytical models and having time to think things through. People who prefer the assimilating learning style would not be comfortable being thrown in the deep end without notes and instructions. With these orientations, they are more interested in basic sciences and mathematics rather than the applied sciences.

The Convergers are best at finding practical uses for ideas and theories, tend to use hypothetical-deductive reasoning to solve specific problems, and prefer to deal with things rather than people. People with a converging style like to experiment with new ideas to stimulate and to work with practical applications. Such learners are often found in specialist and technology careers such as the engineering professions as well as the accounting profession.

The Accommodators are “hands-on” and rely on intuition and information from other people rather than books and lectures. They commonly act on “gut” instinct rather than logical analysis. People with the Accommodating learning style prefer to work in teams.
to complete tasks. They are likely to become frustrated if they are forced to follow many instructions and rules, and are unable to get hands-on experience as soon as possible.

Earlier studies provided empirical evidence of accounting students and accounting practitioners predominantly displaying the Converging learning style.41 The majority of senior accounting students (40%) in Baker, Simon and Bazeli’s study were found to be Convergers with another 20% being Assimilators. Baldwin and Reckers43 found that introductory accounting students (who intended to major in accounting) were primarily Assimilators whereas accounting students at higher levels tended to be Convergers. Consistent with these results were the findings of Brown and Burke,44 and Gow, Kembar and Cooper,45 which show that this Converging learning style becomes more deeply ingrained as undergraduate accounting students progress through their studies. It is also the predominant learning style found in lower and middle level accountants.46 However, some recent studies47 suggest that this Converger style may not be as universally applicable to accounting students as once thought.48 Loo49 for instance found undergraduate on-campus accounting major students in Canada tended to be Assimilators. A US study conducted by Novin, Arjomand and Jourdan50 found 47% of undergraduate on-campus accounting students were Convergers and 38% were Assimilators.

Seda51 found that the majority of the undergraduate accounting students in his US study were Assimilators (43%). However, a Malaysian study by Too52 indicated that the

41 Baldwin and Reckers, above n 7, used sophomore, junior and senior accounting students at a large public university in the US; Baker, Simon and Bazeli, above n 7, used 110 senior accounting students; H Brown and Richard Burke, 'Accounting Education: A Learning Styles Study of Professional Technical and Future Adaptation Issues' (1987) 5 Journal of Accounting Education 187, used 583 Canadian accounting students and 146 accounting professionals; and Julie Collins and Valerie Milliron, 'A Measure of Professional Accountants' Learning Style' (1987) 2 Issues in Accounting Education 193, used 334 accounting practitioners and no students.
42 Above n 7. Their sample consisted of 110 senior accounting major students enrolled at one US university.
43 Above n 7.
44 Above n 41. Their sample consisted of undergraduate business students (n=674) and accounting graduates (n=359) at one university in Canada. Their response rate was 42%.
45 Lyn Gow, David Kembar and Barry Cooper, 'The Teaching Context and Approaches to Study of Accountancy Students' (1994) 9 Issues in Accounting Education 118. Their sample consisted of 793 students enrolled in degree-level courses in accountancy and other academic departments at Hong Kong Polytechnic. The survey was conducted during class time and generated a response rate of 80%.
46 Brown and Burke, above n 41.
47 See, eg, Holley and Jenkins, above n 8; Loo, above n 8; Marriott, above n 8; Adel Novin, Lari Arjomand and Louis Jourdan, 'An Investigation into the Preferred Learning Styles of Accounting, Management, Marketing and General Business Majors' (2003) 18 Teaching and Learning 24; and Chung and Hu, above n 8.
48 Adler, Whiting and Wynn-Williams, above n 9.
49 Above n 8. Loo's sample consisted of 437 undergraduate business major students at a small Canadian liberal-education university.
50 Above n 47. Their sample consisted of 274 undergraduate business students at a state university in the US.
learning styles of undergraduate students enrolled in the taxation course are Converger dominant. These latter studies suggest that accounting students have a wider variety of learning styles, with the Assimilator and Accommodator styles being often equally as pervasive as the Converger style.53

An important point to note when making comparisons between studies is the composition of the sample used. In some studies mixed groups were used (eg, fourth year students and graduate students, etc) while in others only single groups were used (eg, only introductory accounting students).

The literature suggests that learning style preference is influenced by particular factors such as personality type, career choice, current job, current task, and culture. As Kolb54 pointed out, many factors helped shape a student’s current learning style and will continue to shape it, perhaps in different directions. Studies in other disciplines have examined the effect of various factors such as personality, culture, course context and demographic profile on learning styles. In the accounting discipline, there are many studies investigating the link between culture and learning styles of accounting students, and these studies show consistent findings for this link more than any other factor. For example, McKee, Mock and Ruud55 showed that Norwegian accounting students tended to be Assimilators whereas accounting students in the US were more likely to be Convergers. Auyeng and Sands56 showed that Australian students exhibited an Accommodating learning style, whereas students from Hong Kong and Taiwan displayed an Assimilator style. A more recent study by Sugahara and Boland57 indicated culture has an impact on learning styles, finding that the learning styles of Australian accounting students is Assimilating, but Diverging for Japanese accounting students. These findings suggest that educators should consider ways to bridge the gap between students’ learning preferences and teachers’ teaching styles in multicultural classrooms where international students may be simultaneously seeking to overcome culture-shock or language-related barriers.58

Other studies suggest that student approaches to learning can be modified as they are exposed to different teaching approaches, learning outcomes, teaching contexts, and modes of assessment.59 Further, Biggs60 noted that approaches to learning are also

Taxation evening class. Data was collected during the first two weeks of classes. No response rate was reported but we assume that all 108 students responded.

52 Above n 12. Too used final year students enrolled in an accounting program with a Malaysian private higher education institution.
53 Wynn-Williams, Whiting and Adler, above n 8.
54 Above n 6.
55 Above n 8.
56 Above n 8.
57 Above n 8.
60 Above n 59, 11.
sensitive to teaching contexts. For instance, changes in the accounting curriculum to reflect the competencies required of today’s accountants may influence students’ learning styles. Indeed, a study of accounting students in the UK\(^{61}\) showed a shift away from Converger prevalence to the dominance of the Accommodator learning style. Marriott\(^{62}\) argued that this learning style is well suited to the demands of accountants’ work today, as Accommodators tend to be practical, technical and good at executing plans, and they display risk-taking behaviour, leadership and intuitive problem-solving skills. However, Duff\(^{63}\) and Busato et al\(^{64}\) found little change in students’ learning style over time. Adler, Whiting and Wynn-Williams\(^{65}\) work on the effect of case studies found that there was a move away from Accommodators and Divergers toward Assimilators.

**C Learning Style and Performance**

There are fewer studies that have examined the possible link between learning styles of undergraduate accounting students and performance in accounting courses. However, the findings were not consistent. Some studies showed that accounting students with the Converging learning style were more successful particularly in multiple choice tests.\(^{66}\) For example, Holley and Jenkins\(^{67}\) found that there was a significant relationship between learning styles and performance on each examination format except for the multiple-choice quantitative format. Their study indicates that students with the AC learning mode performed better in open-ended theory questions compared to students with the CE learning mode. Further, the AE learning mode was positively associated with performance in open-ended quantitative questions as compared to the RO learning mode. In contrast, Geiger, Boyle and Pinto\(^{68}\) found no significant effect of students’ learning style on their final grades. This is consistent with the finding by Too\(^{69}\) of no significant association between learning styles of students and their performance in the final examination.

Although numerous studies have focused on the association between learning style and students’ performance in other disciplines, there is a dearth of research in the tax discipline in particular. In this study, we explore the learning styles of students enrolled in an undergraduate taxation course and we pose the following research questions: What are the students’ learning styles? Does learning style impact on students’ performance in assessments and examinations and their final results? Do mode of education (on-campus or off-campus), age, gender and cultural origin play a role in predicting students’ performance?

\(^{61}\) Marriott, above n 8.
\(^{62}\) Above n 8.
\(^{63}\) Above n 15.
\(^{65}\) Above n 9.
\(^{66}\) See Togo and Baldwin, above n 10, their sample consisted of introductory accounting students; Holley and Jenkins, above n 8; and Cano-Garcia and Hughes, above n 10.
\(^{67}\) Above n 8.
\(^{68}\) Above n 11.
\(^{69}\) Above n 12.
III RESEARCH METHOD

A Data Collection

The data collection was conducted during the first few weeks of the second semester of the academic year in which the course was offered. The instrument was placed on-line via a link on the taxation course learning website with an invitation to students to voluntarily participate in the survey. An information sheet with an example was provided to guide students in how to respond to survey questions. The examples used in the information sheet were hypothetical and different from the questions in the instrument to ensure no influence or bias was introduced. To encourage participation, students were offered the opportunity to receive feedback on their individual learning style preferences. Students were assured that their responses would remain confidential. Demographic information regarding their mode of education (on-campus or off-campus), age, gender and cultural origin was also collected.

B Student Sample and Assessments

The introductory taxation course is students’ first course in tax and is designed to introduce them to the principles of New Zealand taxation. The learning course has three outcomes:

- Explain and discuss the various types of taxation and tax bases applicable in New Zealand and the potential implications for a New Zealand entity operating in the global environment.
- Demonstrate an understanding of the tax concepts that govern the determination of tax obligations relating to various personal and business structures.
- Demonstrate an understanding of tax as an instrument of fiscal policy.

This course had three separate assessments, one of which was a final examination. The weighting of the first two assessments together was 30% and the final examination 70%. The first assessment (Assessment 1) comprised multiple choice type questions with justification of answers. This assessment was set in such a way so that students who only guessed the correct answers would not receive full marks. Therefore, it provided a better assessment of students’ understanding of content material and also “forced” students to learn how to defend their answers. The second assessment (Assessment 2) required students to provide short answers to various tax issues over a number of questions. The purpose of setting the assignment in this manner was to assess students’ understanding of the concepts and principles of tax and their ability to apply them to various tax scenarios and contexts. The format of the final examination used both multiple choice questions with justifications, and several short answer type questions. With these types of assessments, students would not perform well if they merely adopt a “surface learning” approach.70

70 Those who use surface learning adopt strategies that focus on factual acquisition, rote memorization and they treat parts of the subject as separate entities, failing to integrate topics into a coherent whole (see Entwistle and Ramsden, above n 33).
C Instrument

Students’ learning styles were profiled using the third version of Kolb’s Learning-Style Inventory (LSI).\(^{71}\) The Kolb LSI is a commercially available questionnaire and consists of 12 items where respondents rank-order (from most likely to least likely) four sentence endings that correspond to the four learning modes, with scores between 12 and 48. This study used the third version (3.1) and the 12 items are set out in the following manner. Each item contains four words or phrases that the respondent is required to rank-order according to how well the word or phrase describes his or her learning style. For instance, one item asks, ‘I learn by’ and then is followed by the following four words, ‘feeling’, ‘doing’, ‘watching’ and ‘thinking’. High rank orders given to ‘feeling’ correspond with a preference for concrete experience (CE), while high rank orders for ‘doing’, ‘watching’, and ‘thinking’ correspond with ‘active experimentation’ (AE), ‘reflective observation’ (RO), and ‘abstract conceptualization’ (AC), respectively. Students’ responses were scored on each of these four learning modes and on two learning styles as defined by Kolb.\(^{72}\) These two learning styles illustrate the preference a learner has, first for acquiring the information, and secondly for transforming the information.

The information acquisition preference is determined by subtracting the respondent’s concrete experience (CE) score from his or her abstract conceptualization score (AC). Meanwhile, the respondent’s preference for information transformation is determined by subtracting his or her reflective observation (RO) scores from his or her active experimentation (AE) score. The individual’s AC–CE scores are placed against their AE–RO scores on a Learning Style Type grid which indicates their preferred learning style.

IV RESULTS

Fifty-eight students responded voluntarily giving a response rate of about 11%.\(^{73}\) Seven responses were invalid which resulted in 51 usable responses. The low response rate could be attributed to students feeling that there were not sufficient incentives to participate or that the instrument was complex and too time consuming to complete. Our sample is larger than that of Marriot\(^{74}\), which was made up of 32 students in a UK university, but slightly smaller than Sugahara and Boland\(^{75}\) which had 61 responses (response rate 21%) for an Australian sample.

Table 1 describes the study sample. There was a balance in responses between on-campus and off-campus students. The students’ age varied, with the youngest at 18 years and the oldest at 51 years. About 18% of students were under 21 years of age whereas the majority (82%) were over 20 years of age. This profile is not surprising as

\(^{71}\) Permission was given to use the LSI by the LSI Research Committee in 2010. The third version randomises the scoring items and improves the test-retest reliability (see David Kolb and Alice Kolb, The Kolb Learning Style Inventory – Version 3.1 2005 Technical Specifications (Hey Group, 2005)).

\(^{72}\) Above n 17.

\(^{73}\) There were about 515 students enrolled in the taxation course on the three campuses and in distance learning at the start of the semester, but usually the number drops as the weeks go by, especially for the distance learning students who find they cannot cope with their studies.


\(^{75}\) Above n 8.
most off-campus students were mature (older) students and in employment. Respondents were predominantly domestic students and female

Table 1: Respondents’ profile

<table>
<thead>
<tr>
<th>Mode of study:</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-campus</td>
<td>22</td>
<td>43</td>
</tr>
<tr>
<td>Off-campus</td>
<td>29</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age:</th>
<th>No.</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Under 21 years</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>21-30 years</td>
<td>19</td>
<td>37</td>
</tr>
<tr>
<td>Above 30 years</td>
<td>23</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domestic/International:</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic student</td>
<td>48</td>
<td>94</td>
</tr>
<tr>
<td>International student</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender:</th>
<th>No.</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Female</td>
<td>43</td>
<td>84</td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>100%</td>
</tr>
</tbody>
</table>

A Students’ Learning Style

Table 2 shows the mean scores on each component of the two major learning dimensions. The lowest raw score is 13 and the highest is 47. The vast majority of participants preferred abstract conceptualization (AC) over concrete experience (CE), and active experimentation (AE) over reflective observation (RO).

Table 2: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC total</td>
<td>51</td>
<td>24</td>
<td>47</td>
<td>35.84</td>
<td>6.12</td>
</tr>
<tr>
<td>CE Total</td>
<td>51</td>
<td>13</td>
<td>32</td>
<td>20.20</td>
<td>3.99</td>
</tr>
<tr>
<td>AE total</td>
<td>51</td>
<td>17</td>
<td>46</td>
<td>36.33</td>
<td>6.65</td>
</tr>
<tr>
<td>RO total</td>
<td>51</td>
<td>16</td>
<td>47</td>
<td>27.80</td>
<td>5.82</td>
</tr>
<tr>
<td>AC-CE</td>
<td>51</td>
<td>1</td>
<td>30</td>
<td>15.65</td>
<td>7.19</td>
</tr>
<tr>
<td>AE-RO</td>
<td>51</td>
<td>-20</td>
<td>27</td>
<td>8.53</td>
<td>10.04</td>
</tr>
</tbody>
</table>
Table 3 shows the distribution of the four learning style preferences in the sample which indicates that there were two predominant learning styles. Most students (57%) preferred a Converging learning style, followed by 35% who preferred an Assimilating learning style. Only one student was a Diverger and three students were Accommodators. This result is consistent with more recent studies showing accounting students tend to be Convergers or Assimilators.

<table>
<thead>
<tr>
<th>Learning style</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodating</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Assimilating</td>
<td>17</td>
<td>35</td>
</tr>
<tr>
<td>Converging</td>
<td>28</td>
<td>57</td>
</tr>
<tr>
<td>Diverging</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>49*</td>
<td>100</td>
</tr>
</tbody>
</table>

*Two students who participated in the survey later withdrew from the course.

Table 4 shows the profile of students by each learning style and includes the study mode and students' age. Comparing the four groups, the Assimilators had the lowest mean age and the Divergers had the highest. The majority (65%) of Assimilators were on-campus students whereas the majority (71%) of Convergers were off-campus students. Off-campus students are typically older and have some experience in comparison with on-campus students and this factor may have influenced learning style.

<table>
<thead>
<tr>
<th></th>
<th>Accommodating</th>
<th>Assimilating</th>
<th>Converging</th>
<th>Diverging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Mode:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On campus</td>
<td>1</td>
<td>11</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Off campus</td>
<td>2</td>
<td>67</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3</td>
<td>100</td>
<td>28</td>
<td>1</td>
</tr>
</tbody>
</table>

| Gender:              |               |              |            |           |
| Female               | 2             | 67           | 24         | 1         |
| Male                 | 1             | 33           | 4          | 0         |
| **Total**            | 3             | 100          | 28         | 1         |

| Age:                 |               |              |            |           |
| Mean (SD)            | 30 (7.81)     | 28 (9.55)    | 32 (9.93)  | 51        |
| Range                | 25-39         | 18-49        | 18-55      | 51        |

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76 Breakdowns for gender and domestic/international students are not shown as the numbers for male students and international students were very small compared to female and domestic students respectively.
B Students’ Performance

Table 5 shows that the highest score in all assessments was achieved by the only student with a Diverging learning style. Background information shows that this participant is a 51 year old domestic student. In comparison, the Accommodators had the lowest mean score in all three types of assessments. Perhaps this is not surprising as Accommodators do not like many instructions and rules such as those found in a subject like taxation. However, as the number of students that fell into these two learning preferences was extremely small, any findings may not be subject to generalisation. The remaining analysis is focused on the Assimilators and the Convergers.

Overall, the Convergers appear to have performed better than the Assimilators in the first assessment and the final exam, but the Assimilators performed better in the second assessment. As the nature of the first assessment is different from the second assessment, this may suggest that the performance of students with particular learning styles is influenced by the nature of the assessment.

Table 5: Assessment scores

| Learning Style | Assessment 1 | | Assessment 2 | | Exam |
|----------------|--------------|----------------|----------------|----------------|
|                | Mean | SD | Mean | SD | Mean | SD |
| Accommodating (n=2-3)* | 64.72 | 4.36 | 61.00 | 6.08 | 51.00 | 12.02 |
| Assimilating (n=17) | 65.45 | 12.64 | 73.29 | 10.37 | 59.15 | 11.59 |
| Converging (n=27-28)* | 67.99 | 15.33 | 67.39 | 17.74 | 61.24 | 18.08 |
| Diverging (n=1) | 80.56 | 0 | 82.00 | 0 | 65.50 | 0 |

*One student did not sit the final exam

Table 6 shows a comparison of performance between the Convergers and Assimilators that indicates there were no significant differences in assessment 1, assessment 2 and final exam scores for those with converging and assimilating learning styles. Specifically, the results suggest that students’ performances were not influenced by their learning styles.77

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77 Further analysis also showed that there were no significant differences in performance in the three types of assessments between on-campus and off-campus students.
Table 6: T-test results of comparing the performance of Convergers’ and Assimilators’ learning styles

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>T</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Std. Error Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>.302</td>
<td>.576</td>
<td>43</td>
<td>.568</td>
<td>4.424</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>3.233</td>
<td>-1.245</td>
<td>43</td>
<td>.220</td>
<td>4.739</td>
</tr>
<tr>
<td>Exam</td>
<td>5.883</td>
<td>.468</td>
<td>41.965</td>
<td>.642</td>
<td>4.473</td>
</tr>
</tbody>
</table>

V DISCUSSION AND CONCLUSION

This study examined the learning styles of students enrolled in a taxation course and its impact on students’ performance. The results showed that most students preferred a Converging or Assimilating learning style. In theory, students who prefer the Converging learning style have dominant learning abilities of abstract conceptualisation and active experimentation. They tend to focus on practical application of concepts and ideas, and like to converge quickly to make a decision or obtain one correct answer. These characteristics are typical of the accounting students enrolled in the taxation course, where many are after the “correct answer” and are consistent with Kolb’s identification of accountants as Convergers. This style is more evident in off-campus students, who are mostly working part-time or full-time. Being in a working environment perhaps explains their preference for “active experimentation,” where they learn through doing.

This study found that accounting students can also be Assimilators which is not consistent with Kolb’s model. In theory, Assimilators excel in integrating knowledge from various information sources. They prefer logic and order, and factual and accurate information, and their expert opinion also fits in well with the accounting discipline. This style is more evident in on-campus students who prefer to attend class and learn by watching what the teachers show them in class. This result is consistent with findings from studies conducted in recent years.78

Interestingly, there were no significant differences in performance between Converging and Assimilating students in the taxation course. There were no significant differences in students’ performances in tests 1 and 2 but off-campus students outperformed on-campus students in the final exam. Kolb79 suggests that the multiple choice question format of assessment tends to favour Convergers. But this is not the case in this study,

78 See, eg, Holley and Jenkins, above n 8; Loo, above n 8; Marriott, above n 8; Novin, Arjomand and Jourdan, above n 47; and Adler et al, above n 9.
as the multiple choice questions, unlike the typical format, required further justifications. Of note is that these two learning styles do have a common preference for abstract conceptualisation – students with these styles like to learn through thinking. The taxation course requires students to understand and apply concepts in answering assessment questions and therefore a preference for a logical, reasoning learning style is well suited for the type of assessment set in this course (i.e., multiple choices with justification and short answer application type questions). The findings of this study indicate that the association between learning style differences and performance may not be generalised where the testing or assessment formats vary. Differences in findings may be attributed to differences in the assessment approach. This suggests that within disciplines and professions, even when the material and subject matter are similar, learning styles may vary in their impact on performance if types of assessments are different.

Further, in addition to their preferred styles, this group of accounting students had already been exposed to a variety of learning situations in their first year core papers. Although lecturers may not be conscious or aware of their individual students’ learning styles, they often adopt a variety of teaching and learning approaches to enhance the learning and performance of students. Exposure to different learning approaches may have helped students in developing their ability to adopt different learning styles in different learning situations, recognise their own learning strengths and preferences, and approach learning situations with flexibility.80

The limitation of this study needs to be noted. The response rate is low and the findings may not be subject to generalisation. Students might have found Kolb’s LSI instrument, which used a forced choice format, difficult to answer and therefore may not have been willing to make the effort to participate voluntarily online. Many studies with a high response rate have been conducted in class.81 Interestingly, even though Marriot administered the questionnaire under controlled conditions in the class and achieved a response rate of 94%, about 93 (36%) of the responses were invalid due to an incorrect way of ranking. Sugahara and Boland82 collected additional samples five months later to increase the number of respondents as the initial response rate was low. Even then some responses were incomplete. This further confirmed that students do not find the questionnaire easy to complete and better instructions are required to achieve higher valid responses, even when data is collected in class.

The data in this study was collected from only one university in New Zealand and therefore may not be representative of students in other universities either in New Zealand or overseas. The fact that there were so few students that are classified as Divergers or Accommodators must be acknowledged and this may be attributed to the small sample size. Our study also did not capture many international students to allow us to investigate the possible association between culture and learning style. Future research may examine learning styles in diverse cultural settings or use classroom assessment techniques to get feedback on what students have learned under various

80 See Entwistle, above n 4; and Loo, above n 8.
81 See, eg, Cano-Garcia and Hughes, above n 10; and Marriot, above n 8.
82 See above, n 8.
teaching approaches. The findings may help teachers to identify common mistakes and points of confusion in the learning process and also consider various teaching strategies to engage students in multicultural settings. This cross-sectional study does not examine changes in students’ learning styles. A longitudinal study on learning styles would indicate whether there are changes in learning styles over the years.

Despite the limitations, the findings of this study lend further support to establishing students’ diversity in their learning preferences. However, rather than trying to tailor different teaching methods to suit students’ learning styles, tax educators can certainly help students in becoming “balanced” learners. An effective teacher can create an environment for maximum self-development where students are involved in heterogeneous group learning situations. Different teaching strategies can be used to help students develop their communication, problem-solving and critical thinking skills, attitudes and abilities. They can then adopt the learning style most appropriate to a given situation’s demands, leading to more effective learning. For instance, studies have shown that the use of case studies does modify students’ approaches to learning. Incorporating a diversity of teaching and learning approaches, such as lecturing, assigning relevant reading materials or watching video clips, computing income tax liability, solving tax problems, devising a tax plan, using tax case studies and using discussion groups, will provide students with the opportunity to reflect and apply what they have learned to various tax situations. It will also encourage them to take a deeper and more thoughtful approach to their learning, and help de-emphasise the single solution approach.

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85 See Wilson and Hill, above n 36; and Adler et al, above n 9.
87 Carl Christensen, Teaching and the Case Method (Harvard Business School, 1987) 3; and Louise Mauffette-Leenders, Learning with Cases (Ivey, 1997) 3.