PERSONALITY TYPE AND STUDENT PREFERENCE IN THE DESIGN STUDIO

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1 ABSTRACT

Some authors believe that student learning outcomes can be improved by catering for different 'learning styles', while others suggest that there is little evidence to support a pedagogical approach based on learning styles. One approach to understand how people learn best is to establish how they prefer to take in and process information. The Myers-Briggs Type Indicator (MBTI) reveals these preferences through type; 'personality type' may be a better identifier of appropriate learning strategies than 'learning styles'. A pilot study investigated student achievement and experience using different levels of content in two landscape architecture studio project briefs. One brief was deliberately open, allowing interpretation, while the second was detailed with explicit requirements.

Student MBTI types were established as predominantly Intuitive-Feeling (NF; 63%). NF students tended to prefer the 'open' brief, while Intuitive-Thinking (NT) and Sensate-Feeling (SF) students preferred the detailed brief. Teachers need to be aware that their own preferences for learning may need to adapt to the likely range of personality types in each student cohort, to enable teachers to appeal to the learning preferences of as wide a range of students as possible. There is also merit in considering other implications for learning of understanding type and preference.

1.1 Keywords

landscape education, learning styles, personality type, MBTI

2   INTRODUCTION

Teaching in a landscape architecture design studio is sometimes challenging but always rewarding, working with creative students on aspects as diverse as understanding complex relationships between natural and cultural systems, the resolution of frameworks of green and blue infrastructure, or the development of sensitive responses to landscape change while enhancing cultural connections to place. Writing the brief for a studio project can also be challenging, balancing the directive (I want you to be able to demonstrate this) with the open (I wonder what might happen if we first create a haiku about the emotion of place). It can be challenging for students receiving a brief too; some students seem to respond better to a very detailed studio project brief which carefully itemises everything that they need to do to complete a successful project, while other students seem to prefer a more open brief which sets out a broad direction but leaves plenty of room for interpretation, and the form of a final submission. This observation gives rise to questions, including: Why do some students prefer one type of studio brief, while others prefer a different type? What might drive these preferences? Do these preferences affect the student learning experience or levels of achievement?

A research question evolved from these initial musings: "Do the levels of information provided in a studio brief affect student experience and performance?". If the answer is yes and we can understand what those effects are, then we will be in a position to potentially improve the learning experience for students, catering for a wider range of preferences. In this study, 'preference' means the expression of our behavioural tendency for optimal choice; we like one alternative more than another alternative.

3   LEARNING STYLES

Much research on student learning is based around the notion of 'learning styles'; for example: Ashraf, Fendler, and Shrikhande, (2013); Fowler and Thomas, (2015); Kim, Gilbert, and Ristig, (2015); and Kozhevnikov, (2007). The general premise of this work is that people learn best in different ways; they vary in their preference for particular teaching approaches and if learning opportunities are provided that suit their learning style, academic achievement will be 'better'. There are many theories about learning styles, comprehensively summarised by Cassidy (2004), but well known examples include 'experiential learning' which led to the Learning Styles Inventory (Kolb, 1984; 2015), and the VARK model (Fleming & Mills, 1992).

The VARK model is a system of categorising learners by how they best absorb and remember information (and thus learn better), with four suggested modes:

V - Visual (seeing images, diagrams)
A - Auditory (listening to lectures, discussion)
R - Read/write (books, articles, taking notes)
K - Kinaesthetic (practical, experience, hands-on)

In this model, visual learners for example prefer to access information "…in maps, spider diagrams, charts, graphs, flow charts, labelled diagrams, and all the symbolic arrows, circles, hierarchies and other devices, that people use to represent what could have been presented in words." (VARK, 2016). Fleming (1992) suggests that if we can identify those visual learners in a class, teaching materials could be refined to appeal to their learning 'style' and thus they would learn better, their experience would be better, and their academic achievement should improve.

Theories such as the VARK model generally propose that we should modify our teaching approaches to cater for particular learning styles, since this will improve student learning outcomes. However, work by authors including Cuevas (2015); Lilienfeld, Lynn, Ruscio, and Beyerstein (2010); Pashler, McDaniel, Rohrer, and Bjork (2008); Pashler and Rohrer (2012); and Willingham, Hughes, and Dobolyi (2015) suggests that there is little evidence to support the adoption of a pedagogical approach based on learning styles. Since these authors do not support a link between teaching approaches which target specific learning styles and improved student learning, is there something else which might underpin student expressions of preference for different teaching approaches?

Teachers also have their own preferences for learning and it is likely therefore that they will tend to deliver their material in a way that is influenced by those preferences. Some teachers may be more comfortable presenting ideas or information using a facts-based approach, while others might prefer presenting the same material using a broader, big-picture lens. If we consider say auditory learners (which the VARK model suggests prefer listening to information), then we know that the lecture they are attending could be delivered in several ways, for example as a detailed facts-based presentation, or as a series of broader themes which touch on the wider contextual aspects of the topic. One of those lecture approaches is likely to appeal more to some students

than the other approach, even if they are all auditory learners. This suggests that the VARK 'learning styles' modes could be understood as a 'secondary layer' that is influenced by something more fundamental.

Preferences for the ways in which information is presented, how we take in that information or process it to make decisions might be a more useful fundamental measure or explanation of difference. The expression of these innate behavioural preferences, or our personality, is a potential contender for that underlying role. Thus, a supplementary research question arises: "If levels of information provided in a studio brief affect student experience and performance, is this related to their personality?". To answer this, we need to understand how to categorise personality.

4   PERSONALITY TRAIT AND TYPE

Personality is "the complex of characteristics that distinguishes an individual or a nation or group; especially: the totality of an individual's behavioral [sic] and emotional characteristics." (Personality, [Def. 3a]. n.d.); and "Personality refers to individual differences in characteristic patterns of thinking, feeling and behaving." (Personality, n.d.). Personality then is defined very much on an individual basis, the aggregation and expression of a wide range of different facets possessed by each person. As with learning, there are many theories about how to understand personality; there are also many instruments which can be used to uncover or establish personality type.

These instruments are normally based on trait or type theory. Trait instruments are designed to establish regular and consistent patterns of behaviour resulting from the combination of particular factors being measured along a continuum. Type instruments are designed to establish individual preferences for equally viable alternatives, based upon the assumption that one will be inherently more appealing than the other. A key difference between these two approaches is that participants using a trait instrument can gain a high or low score for a particular trait such as intelligence, for example; it is about having 'more' or 'less' of that trait, a measure of the degree to which that trait is expressed. Conversely, type systems are sorting systems, which determine the level of clarity that participants identify for each of their preferences rather than the 'amount' of that particular preference (Myers, McCaulley, Quenk, & Hammer, 2009). Quenk (1993) further elaborates by noting that measuring trait assumes "...a normal distribution and continuous scores" (p. 9) whereas type is "...not normative; there is no 'normal' or 'best' score to obtain or type to be." (p. 11).

Trait instruments include attributes which can be valued differently, such as intelligence as noted previously, or age. For example, it is 'better' to have higher intelligence than low, and in some cultures (Maori or Chinese communities, for example) older people are valued and respected for their experience and knowledge while in other (predominantly Western) cultures, older people can be deemed less relevant or useful to society. Fleeson and Jayawickreme (2015) suggest that trait theories do not show how these differences are expressed in individual behaviour. In type theory, all attributes are valued equally; they are simply describing the way we are without prioritising one aspect over another. Most personality theories or instruments such as the Revised NEO Personality Inventory (NEO PI-R) are trait-based.

The NEO PI-R was developed by Costa and McCrae in 1992 from their work researching age-related changes in personality, based upon a Five Factor Model (FFM) which measured the following factors (Hogrefe Ltd., n.d. a):

- Neuroticism (identifies individuals who are prone to psychological distress)
- Extroversion (quantity and intensity of energy directed outwards into the social world)
- Openness (the active seeking and appreciation of experiences for their own sake)
- Agreeableness (the kinds of interactions an individual prefers), and
- Conscientiousness (degree of organisation, persistence and motivation in goal-directed behaviour)

Costa and McCrae (1992) believe that this is a useful instrument in clinical psychology practice, to describe the behavioural characteristics of an individual. There are six sub-elements under each of the five factors in the NEO PI-R, and particular combinations of these categories provide a comprehensive assessment of normal adult personality. The NEO PI-R is used in the occupational market for job-related assessment, vocational guidance, and counselling (Hogrefe Ltd., n.d. b).

The most well-known type-based instrument is the Myers-Briggs Type Indicator (MBTI), which measures preferences, rather than abilities. The MBTI was developed by Katherine Briggs, an American intellectual who studied and applied psychiatrist Carl Jung's theory of personality, which was published in his seminal work "Psychological Types" in 1921. Jung developed a theory of personality from his observations that differences between people are not random, but form patterns which he considered to be 'types'. In 1943, with

her daughter Isabel Myers, Briggs assembled the first version of the MBTI instrument, providing a vehicle to understand basic preferences of behaviour in four areas:

- How people focus their attention (Extroversion-Introversion: E-I);
- How they take in information (Sensing-iNtuition: S-N);
- How they process that information to make decisions (Thinking-Feeling: T-F); and
- How they engage with the world (Judging-Perceiving: J-P).

The combination of preferences for one of each of these dichotomous pairs of attributes results in 16 basic types each with a unique four-letter code; further refinement occurs with five aspects expanding on each attribute. The MBTI theory regards all types as equal and seeks to better help people understand themselves and others rather than using type to select or limit choices say in job-related decisions. The instrument must be taken voluntarily and results are confidential to the individual (Myers and Briggs Foundation, n.d. a).

Confusion still exists in the literature about the differences between trait- and type-based instruments. For example, the MBTI is incorrectly referred to as a prominent trait model in Matz, Chan, and Kosinski (2016); Ashraf et al. (2013) similarly refer to "MBTI traits" in their work on learning styles (p. 50). It is clear that although both the NEO PI-R and the MBTI seem to be useful in attempting to explain or understand the ways in which people express different preferences, there is still some confusion about their theoretical foundation; they are also both subject to on-going critique.

4.1   Critique of personality instruments

There is general critique of the value or efficacy of personality instruments, as well as specific critique on the NEO PI-R and the MBTI. Psychologist Linda Berens (Berens, 2013) suggests for example that we each have many different facets that are richer than can be explained by the responses to a simple questionnaire; her view is that we have a core self overlaid with a contextual self (which is more adaptable to circumstance) and a developed self which has responded to both nature and nurture. The question she poses therefore is about which self is responding when completing an instrument which claims to help us understand who we are; behaviour is subjective and largely contextual. Both the NEO PI-R and the MBTI have also been criticised because of the vested interests of the commercial entities which promote them.

Pashler et al. (2008) presented a clear argument about a lack of evidence to support the value of 'learning styles' in education; they suggested that any claimed effect of a specific teaching practice on student learning must be objective and measureable. A similar criticism applies to both trait and type models of personality, in terms of their validity (do they actually measure what they claim to measure) and their reliability (does the same result occur if the test is retaken at a later date). A review of arguments that support or critique the validity and reliability of both the NEO PI-R and the MBTI can be found in Carey and Barthelmeh (2016), but it is helpful to repeat some of those arguments here.

The validity of the fundamental basis for the NEO PI-R, the Five Factor Model (FFM), has been called into question by many authors including Block (1995; 2010); Bouchard (2016); Boyle (2008); Fleeson & Jayawickreme (2015); Gurven, von Rueden, Massenkoff, Kaplan, & Lero Vie (2013); and Juni (1995) who suggested that since the FFM was 'phenomenological' and not based upon theory, its popular use could be attributed largely to Costa and McCrae's influence on fellow psychologists. Boyle (2008) concludes that the FFM should be expanded to acknowledge the dynamic components of personality, while Ben-Porath and Waller (1992) noted that factors of dishonesty and social desirability would improve the NEO Inventories. More positively, Sherry, Hewitt, Flett, Lee-Baggley & Hall (2007) found a high level of internal consistency in the NEO PI-R scales, confirmed by McCrae and Costa (2010).

McCrae and Costa, developers of the NEO PI-R instrument, have critiqued the MBTI (McCrae & Costa, 1989) as have Barbuto (1997), Boyle (2008), and Pittenger (2004), while Capraro and Capraro (2002) and Lloyd (2012) provide support. Much of the critique of the MBTI appears to be based on an incorrect assumption about what the instrument is measuring; for example that preferences are expressed as absolutes. Rather than an 'amount' of Extroversion, for example, the MBTI identifies the clarity of a preference for Extroversion.

Given the questions asked in this pilot project, and the specific characteristics of trait and type instruments, on balance "...the MBTI appears to be the most suitable instrument to use in investigations of learning preferences in the design studio." (Carey & Barthelmeh, 2016, p. 8). Establishing the profile types of students may help teachers to better understand the preferences expressed by learners for particular approaches to teaching; 'type' may be a better identifier of appropriate strategies than continuing to focus on 'learning styles'.

4.2   MBTI type characteristics

Expressing a preference for one of each of the dichotomous pairs in the MBTI underpins a process which enables the determination of a best-fit type for those taking the instrument. Each of the 16 'types' identified by the MBTI features a particular combination of likely characteristics, but since everyone articulates different behaviours depending upon circumstance and their own mind-set at the time, these characteristics are not rigid or limiting but merely indicators of basic preference; people are likely to use both poles of each dichotomous pair at different times. As noted earlier, individuals articulate preference with different degrees of clarity; each of the four dichotomies is reported with a Preference Clarity Index (PCI; a score of 1-30), where a lower number indicates "…almost equal votes for each opposite pair in a dichotomy." (Myers et al., 2009, p 8). Competence in a particular facet such as Intuition (N) cannot therefore be inferred from the PCI score, unlike trait scores which measure an amount of each characteristic.

Brief descriptions of the attributes of each of the dichotomous pairs are listed in Table 1.

Table 1. MBTI facet characteristics.

Preference	Characteristic
Extrovert (E)	Focus on and energised by interaction with the external environment; immediate response to questions; sociable and active, assertive, outgoing, action oriented
Introvert (I)	Focus on personal thoughts and inner experiences; likely to need processing time when asked questions; attention on beliefs and ideas, reflective, accommodating
Sensate (S)	Facts and realities about present day events; ideas based on observations or concrete experience; systematic, conventional, practical, precise, stable, methodical/sequential
Intuitive (N)	Theories and possibilities, future oriented; find patterns serendipitously; imaginative, idealistic, creative, bored by routine, prefer abstract conceptualisation, use hunches
Thinking (T)	Objective judgement through systematic enquiry; logical and impartial, analytical, rational, systematic, assertive, consistent
Feeling (F)	Subjective values-influenced judgements, with empathy; more subjective, non-linear, demonstrative, loyal and sensitive, implications for people
Judging (J)	Able to make a decision as soon as enough information gathered; seek closure, plan activities, methodical and controlled, organised and disciplined, structured, conscientious
Perceiving (P)	Likely to suspend making a decision and continue to gather information; open-minded, spontaneous, flexible, adaptable, tolerant, inquisitive, spontaneous

Note. Table 1 is adapted from a range of sources including Gardner and Martinko (1996); Horton, Clarke, and Welpott (2005); Myers et al. (2009); and Ross and Francis (2015).

The preferences of these different types suggest that certain methods of instruction are likely to suit some types better than other methods. The two important dichotomies to consider in regard to learning preferences of landscape architecture students are how people take in information (S or N) and how they process that information (T or F), making four combinations (NF, NT, SF, ST). The findings show that these are also the two dichotomies in which the respondents in this pilot project and the general population differ the most.

5   PILOT STUDY

To investigate learner preferences, a pilot study was initiated in a third-year landscape design studio course (N=14); approval was obtained from the University Human Ethics Committee. The study was designed to investigate whether or not there is an effect on student experience and performance from the levels of information provided in a studio brief, and if there is an effect, whether or not this is related to personality type.

The class was informed that they would be undertaking two x two-week projects with the same studio tutor, and that approval was being sought to use their experience as part of a research project. The students completed the first two-week project using a brief which was 'open' (with few constraints) and then completed a similar two-week project using a 'detailed' brief (with all requirements explicitly noted). Both projects were marked and moderated using normal school processes and incorporated into students' final studio grades.

Once this formal process had been completed, all students in the class were invited to take part in the research project, which involved them completing a short questionnaire about their experiences in the projects and taking the MBTI instrument. This approach of waiting until final grades had been confirmed was taken to

avoid any perception that taking part or not in the research project might influence final course grades. About half of the class (n=8) chose to take part in the research, reporting that class mates who did not take part cited pressure from other work prevented their involvement.

Since the pilot project was attempting to identify if there was any relationship between the level of information provided in a studio brief and student experience as well as any relationship to personality type, protocols for the research were adapted from Pashler et al. (2008) who were commenting on learning styles. In summary, Pashler et al. (2008) suggest that to reveal whether or not a specific interaction exists between learning and type of instruction:

- Students should be divided into groups on the basis of their learning styles,
- Those in each group are randomly assigned one of multiple instructional methods,
- Students then take a final test or project that is the same for all students.

Pashler et al. (2008) concluded that to prove the efficacy of a teaching approach targeting a particular learning style, students with a preference for learning style 'A' would need to perform significantly better in a final test than students with a preference for learning style 'B', if both groups had been taught with an instructional method designed for learning style 'A'.

In this current pilot study, the whole population (N=14) undertook two different projects rather than splitting the group with each half taking one of the two projects. This means that instruction variation was experienced by the whole group, all students had the same studio teaching approach, and all students had to complete the same project submission. Work was marked by the same tutor and moderated according to standard school processes. This approach provides an opportunity to identify the levels of information preferred by students and ascertain whether or not their preferences had any relationship to achievement or personality type.

Of the students who chose to participate in the research project and complete the MBTI instrument (n=8), two did not finish the second project and so although their type can be reported, it is not possible to also consider their experience of both types of brief.

6   FINDINGS

The research question has two parts: Do the levels of information provided in a studio brief affect student experience and achievement, and if so, is this related to their personality type? This leads to three sets of observations:
- Student experience of each type of brief
- Student achievement
- Student personality type

6.1   Student experience

Students who elected to take part in the research project (n=8) completed a short questionnaire about their experiences. Respondents were asked whether they strongly agreed, agreed, were neutral, disagreed, or strongly disagreed with each of the following statements: "This type of more open project brief suited my design approach better than a brief which is too prescribed."; and "This type of more detailed project brief suited my design approach better than a brief which is too open.". Aggregated responses (strongly agree and agree = yes; disagree and strongly disagree = no; a neutral response = 0) showed four students reporting that the 'open' brief suited their design approach better, while two reported that the detailed brief suited their design approach better (one student preferred both, one preferred neither…). The distribution of these responses is shown in Table 2.

Some participants also commented about their experiences of the projects, expanding on their preferences for a more open or more detailed brief: (#2 - 'open' better) "The open brief was a nice beginning to the project. Usually on day one when the project is introduced to you, as you haven't got stuck in yet, it seems extremely daunting. You can't imagine ever finishing it in 4 weeks and the concepts seems so foreign, so it was nice to have a free sounding brief and it gave you space in your head to think about what you could do, and be creative."; (#5 - 'open' better) "The less information was more enjoyable easier to work with and less confusing."; (#6 - 'open' better) "It is more beneficial to have a "tick list" of points on the brief to work with, but this seems to limit creativity (unlike the open brief). With the open brief there was [sic] no 'wrong' answers."; (#7 - 'detailed' better) "It was a good indicator about what I preferred and the process I am more comfortable [with]. Although

the first project was a learning curve for me and pushed my boundaries, I was more comfortable in the second project.".

6.2   Student achievement
Student achievement in project work was determined by grade differences between the two projects. A higher grade in the first project ('open') = 1, a higher grade in the second project ('detailed') = 2; the same grade in both = 0. Those who did not complete both projects = NC. The distribution of grade differences is reported in Table 2.

6.3   Student personality type
Administration of the MBTI instrument is governed by an ethical process which provides for each participant to identify their best-fit type. The results are confidential to each person, but are able to be shared if the participants agree to do so. In this case, all participants agreed to share their best-fit four-letter type to facilitate discussion about profile differences. Five of the participants were Intuitive-Feeling (NF) types, two were Intuitive-Thinking (NT) types and one was a Sensing-Feeling (SF) type. The distribution of type is shown in Table 2.

Table 2. Summary of brief preference, type, and achievement.

Aspect	Respondent							
	1	2	3	4	5	6	7	8
Information in brief								
'Open' better	0	yes	yes	0	yes	yes	0	yes
'Detailed' better	0	no	yes	yes	no	no	yes	0
Student achievement								
Higher in 'open' or 'detailed'	NC	1	2	2	1	NC	2	0
Personality type								
MBTI profile	ENFJ	INFP	ENFP	ENTP	INFP	ENFP	ISFJ	ENTJ

Table 2 shows that six students were clear in their expression of preference for one type of brief over the other. It also shows that of the three students whose grades either decreased or stayed the same in the second 'detailed' project, all expressed a preference for the first project with a more open brief (NF, NF, and NT). Three students' grades increased in the second 'detailed' project; two expressed a preference for the detailed brief (SF and NT) while one had no clear preference. Two students did not complete the second project.

7   DISCUSSION
The personality type profile of the students in this pilot study is similar to that found previously by Brown et al. (1994) in their study of landscape architecture students. The 1994 study used the Keirsey Temperament Sorter "…an easily administered questionnaire to determine the MBTI characteristics of learners." (Brown et al. 1994, p152). The authors showed that their student cohort had a larger proportion of intuitive (N) learners when compared with the general population. The MBTI 'general' (base) population, or National Representative Sample (NRS), was carefully selected to match the "...1990 U.S. census on gender and ethnic groups." (Myers et al., 2009 p156). Thus, comparisons of other populations with the NRS mean that conclusions can be drawn about similarities or differences from the general US population.

Table 3 lists the NRS proportions in the first column, with a Multicultural Sample of University Students in the U.S. aged 18-25 (MSUS) in column two adapted from Table 14.3 in Myers et al. (2009, p381). A New Zealand sample of convenience (NZS) is shown in column three for local context, but may not represent the type characteristics of the whole population (Schaubhut & Thompson, 2016). Column four shows the findings of this pilot project (LUS: Lincoln University Students) derived from Table 2, showing a clear difference from the other samples in the S and N dichotomy.

Table 3. Type distribution and comparison with pilot study.

	Population samples			
Preference	NRS	MSUS	NZS	LUS
Extroversion	49.3	56.0	59.0	62.5

Introversion	50.7	44.0	41.0	37.5
Sensing	73.3	60.0	55.6	12.5
Intuition	26.7	40.0	44.4	87.5
Thinking	40.2	45.7	67.9	25.0
Feeling	59.8	54.3	32.1	75.0
Judging	54.1	55.6	56.3	37.5
Perceiving	45.9	44.4	43.7	62.5
(Population size)	(3009)	(29765)	(3836)	(8)

Brown and Hallet (1994, p. 153) reported S=33% and N=67%, similar to the LUS; their figures, supported by the current findings, indicate that the landscape student population could include two to three times as many people as the general population who prefer an Intuitive approach to learning. Adding the second dichotomy of Thinking and Feeling, Brown and Hallet (1994, p. 153) found that the ratio of NF = 55%; this current research found NF = 63%, compared with the NRS proportion of 16.5%.

We would expect that those who prefer Intuition would be more likely to favour a studio brief that allows them to achieve a creative design response in a flexible manner, while those who prefer Sensing would be more likely to respond positively to a brief which is quite explicit in its requirements. Table 2 shows that expectation to have been met by the pilot group, with three NF students (and one NT) preferring the 'open' brief (the remaining two NF students did not indicate a clear preference), and the 'detailed' brief preferred by the SF student (and one NT student).

It is clear that establishing type in a student cohort, and for teaching staff, will facilitate the opportunity to better meet the learning preferences of landscape architecture students. Many of these students are likely to prefer N and F approaches to teaching; Intuitive learners prefer abstract concepts, innovation in problem-solving complementing Feeling learners who prefer a more holistic, subjective approach. But, we must cater for other preferences: e.g. Sensing learners are more practical and seek hands-on concrete experiences using a methodical process, complementing Thinking learners who want facts presented in a systematic and logical way with a more objective component.

We also need to understand teacher profiles; understanding the profile of students while being aware of their own profile allows teachers to reflect on how best to target learning strategies to meet the learning preferences of as wide a range of students as possible. For example, a colleague who prefers Sensing will tend to deliver material in an objective, methodical, factual manner, expecting to see evidence-based design decisions in the studio supported by a clear inventory of facts. A colleague who prefers Intuition is more likely to present ideas with a subjective, 'big picture' focus, expecting to see an emotional response to the landscape (how it 'feels'), and design decisions to be based upon an individual, subjective response to the poetry of place. In classes where some students prefer S approaches and others prefer N, teachers who are aware of their own preferences will be able to modify the expression of their own preferences to facilitate connection with more students. A simple summary of the differences between S and N learners in the design studio is shown in Table 4.

Table 4. S and N differences in the design studio.

Activity	MBTI facet The S student	The N student
Project initiation	Begins with facts then develops a 'big picture' to suit those facts	Begins with the 'big picture', then finds facts to suit that overview
Inventory, site visit	A focus on context and experience; notices facts, remembers details; practical	A focus on impressions or patterns; sees new possibilities, works with symbols and theories
Process approach	Works logically through facts, but may miss new possibilities; concrete experience; adaptive	Leaps between possibilities, but may miss key facts; abstract conceptualisation; innovative
Learning approach	Prefers sequential learning and collaborative work; fact retention	Prefers holistic learning and independence; idea generation
Design character	Methodical; pragmatic, 'bottom line'	Intuitive; idealistic, 'visionary'

Note. Table 4 is adapted from Sensing or Intuition (The Myers & Briggs Foundation, n.d. b) and The Sensing-Intuition Dichotomy (Myers et al., 2009, p. 263).

Given that we are likely to have both S and N students in a cohort, the Sensing colleague will need to cater for an inventory that also includes poetry and serendipitous elements. The colleague who prefers Intuition will need to cater for those who want to collect the facts before embarking on design possibilities.

Myers et al. (2009) suggest that Sensing types move "…from the particular to the general…" (p. 263) while Intuitive types follow the reverse process; they confirm that both approaches are useful in learning. They further note that expectations can differ between staff and students; for example when Sensing type students ask a teacher to repeat a point, "…they mean it literally. Instead, Intuitive types tend to paraphrase, or to say things in other words, which appeals to their own interest in variety and change. Such an approach can frustrate Sensing types…" (Myers et al. 2009, p. 266). They note that Sensing types need exact repetition for reassurance that they understood correctly.

There were too few respondents to confirm a clear relationship between brief preference and personality type, although the expectation of preference was broadly met, providing a useful guide to a likely relationship. What this pilot study did establish however was a method to test these ideas with a larger cohort of students, as well as finding that the profile of this group was similar to that established previously for landscape architecture students.

7.1   Limitations

This research was undertaken as a pilot study for future work on student learning in the design studio; to establish protocols for ethics approval, test the research design, establish an approach to involve students further in their own learning about themselves, and investigate ways in which the studio learning experience for students can be improved. As a pilot study, certain limitations were evident, including: a small number of potential participants; a relatively small proportion of the population agreeing to be part of the research project; the sequential nature of the two projects and their order; and project timing at the end of semester, with increased pressure from other assessment deadlines. The study does, however, establish a method for future investigation.

8   CONCLUSIONS

Improved student learning is a goal of all teachers. Designing a pedagogy around 'learning styles' has not been proven to be helpful in regard to enhancing student learning or the student learning experience. The insights that can be gained from understanding the preferences of a student cohort should enable teachers to deliver a project or learning activity that appeals to a wider range of learners. Behavioural preference as expressed through 'type' is likely to be a more appropriate method to influence teaching approaches than catering to 'learning styles'; the findings of this study suggest that there is likely to be a relationship between type, experience and achievement. Staff profiles are also important; teachers who prefer S will deliver material in quite a different way to someone who prefers N; both types of teacher need to acknowledge the value of the other approach.

Study limitations could be addressed by adopting the following protocols:

- Number of participants: work with a larger cohort of students to obtain sufficient data for statistical analysis. If small numbers eventuate from a modest or large cohort, use focus groups to understand qualitative experience of alternatives and potentially refine the research question.
- Timing: run a project earlier in the semester, to reduce pressure from other project deadlines and allow more reflection on process and outcomes.
- Project order: Either split the class randomly and run both project variations for each cohort, swapping the project order in each group; or work more closely to the approach suggested by Pashler et al. (2008), with the same project requirements but adopting a teaching approach which appeals more to sensate students in one half and one which appeals to the intuitives in the other half, to test student experience and achievement.
- MBTI protocols: Ethical use of the MBTI requires participants to know that undertaking the instrument is voluntary, so that it would be possible for an entire cohort to decline to take the instrument; provided project work was a normal part of the course requirements and met the appropriate learning outcomes, students would not be disadvantaged although the research aspect would be terminated.

- Perceived advantage or disadvantage: project learning outcomes need to make an essential contribution to the course learning outcomes, so that students get the right tuition and skills regardless of whether or not there was a research project or whether any of them chose or declined the opportunity to learn about their type.

There is further value in establishing type through the MBTI; comment made by those who attended the MBTI workshop was positive in terms of insight gained into why they may have thought or reacted differently from their colleagues during design studio. It also helped some students to better understand their own preferred way of working, and that their colleagues who worked in a different way were simply expressing different preferences, not working better or worse than they were.

We should be flexible in our approaches to teaching delivery and be open to difference; understanding how others might prefer to take in and respond to information in a way different from our own way can help staff refine their teaching approach to help a wider range of learners enjoy their learning more, potentially improving learning outcomes. It is important that we do not stereotype our students or limit learning possibilities; someone whose profile type indicates that they prefer an intuitive approach to their learning may still need facts and enjoy hands-on activities. It would be interesting to conduct a larger study to test these ideas further, working with both staff and students to not only apply targetted learning strategies but also help understand why others may respond differently to the same level or type of instruction. Following a cohort of landscape students over their whole programme while recording matters such as levels of information in a brief and student performance would provide an opportunity to test these ideas further.

This pilot study suggests that students of landscape architecture as a group are different from the reference adult population, in terms of their personality types and thus their preferences for particular types of instruction. It also highlights that the type and therefore preferences of academic staff for teaching delivery may match the learning preferences of only a proportion of their class. Academic staff need to remember that there are differences in student learning preferences, and that we need to be aware of these differences to target learning opportunities that meet the needs of as wide a range of students as possible. There is also the opportunity to investigate a wider range of applications of understanding difference or preference expressed through type, such as group work, design communication, or the balance between practical and theoretical learning in a programme.

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